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Supplementary Environmental Impact Statement
Wiggins Island Coal Terminal
Central Queensland Ports Authority and Queensland Rail

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1. Introduction

1.1 Background

The Central Queensland Ports Authority (CQPA) is proposing the construction of a greenfield coal terminal to supplement the current coal export capacity of the Port of Gladstone. The terminal will be situated west of the existing RG Tanna Coal Terminal (across the Calliope River) and will have a nominal ultimate export capacity of 70 million tonnes per annum (Mtpa). Depending on the material handling efficiencies achieved, the actual capacity of the ultimate facility could increase by up to 20% above the nominal capacity (ie 84Mtpa).

The proposed terminal has been named the Wiggins Island Coal Terminal (WICT) due to its proximity to a small island offshore from the stockpile facility, which is to be located on Golding Point.

Queensland Rail (QR) proposes in parallel to develop rail infrastructure to connect the new coal terminal with existing rail networks. Some of the construction works involve overlapping activities, and as a result an Environmental Impact Statement (EIS) was prepared by Connell Hatch on behalf of the joint project proponents (CQPA and QR).

1.2 EIS Consultation Process

In November 2006, the WICT Environmental Impact Statement (EIS) was published and submitted to the Coordinator-General. The EIS consultation period occurred from 13 November 2006 to 8 January 2007. During this period 28 agency and stakeholder/community submissions were received. The submissions provided valuable insight into the views and concerns of the community. Submissions were received from the following:

Advisory Agencies

- Commonwealth Department of Environment and Water Resources (DEW)
- Environmental Protection Agency (EPA)
- Department of Primary Industries and Fisheries (DPIF)
- Department of Emergency Services
- Queensland Health
- Department of Natural Resources and Water (DNRW)
- Queensland Transport
- Department of Main Roads (DMR)
- Department of Communities
- Department of State Development and Trade
- Department of Local Government, Planning, Sport and Recreation
- Calliope Shire Council (CSC)
- Gladstone City Council (GCC)
- Department of Housing

Industry

- Gladstone Pacific Nickel

Public

- Mr C J Andersen
- Mrs Marie Alford
- Mr J Clark
- Mr and Mrs O'Brien
- Mr G McVean
- Mr and Mrs Tooker
- Mrs Roslyn Howse

- Mr T Goodwin
- Mr L Coward
- Mr and Mrs Blackbourn

1.3 Project Layout Changes and Consultation

Following the EIS consultation period further engineering design options were developed. Recent studies, comments and stakeholder feedback resulted in the following key changes to the Project:

- Relocation of the rollingstock maintenance yard and provisioning facilities to the Gladstone State Development Area (GSDA) at Aldoga;
- Construction of a new rail link line from the Moura Short Line to connect to the western end of the proposed rollingstock maintenance yard;
- Removal of the requirement for additional WICT trains to travel along the Moura Short Line adjacent to Pacific Heights, Byellee and Beecher areas as they will utilise a new rail line which traverses the GSDA; and
- Conveyor system (approximately 6km) from dump stations adjacent to the North Coast Line (NCL) to the coal terminal. This change has enabled the removal of the EIS rail loop to Golding Point.

The rail concept design presented in the EIS showed Moura and Surat rail traffic entering the WICT precinct from the south west via the Moura Line. This has now been altered so that Moura/Surat rail traffic would arrive at WICT via a new link line running from the Moura Line to the existing NCL south of Mt Larcom. This new link line would pass through rural areas to the west of the Bruce Highway, and then into the GSDA. From the northern end of the new Moura Link, Moura and Surat trains would follow the same path as Blackwater trains (along the NCL) and all trains would enter WICT from the same direction. This option also addresses many of the issues raised during the EIS consultation period in relation to noise, dust and road/train crossing issues.

Further details of the Project changes are provided within the description of the project in Section 3.

The Project changes have addressed the majority of issues raised in the public submissions (ie rail noise, dust and road/rail crossing issues) received during the EIS consultation period. Further regulatory meetings were held with Gladstone City and Calliope Shire Councils, and State agencies including the EPA (with meetings in Gladstone, Rockhampton and Brisbane), DPIF, DNRW, DMR and Queensland Transport. The proposed Projects changes were explained to each agency and their EIS comments discussed.

In parallel the community was informed through the local press of the Project changes and the proposed new layout was displayed in early June 2006 at the local Ecofest display. An updated WICT newsletter was also distributed in the local area during June 2007 prior to finalising this Supplementary EIS submission.

1.4 Format of Supplementary EIS

This document (referred to as the Supplementary EIS) has been prepared to address the issues raised during the EIS consultation period and through the subsequent Project changes. Appendix A presents a summary of the comments received, and cross-references to the relevant sections within this document containing additional information relating to each issue.

The relocation of the rollingstock maintenance yard and provisioning facilities to the GSDA (Aldoga Precinct) and new Moura Rail Link will be addressed under a separate environmental impact assessment process.

The format of the Supplementary EIS corresponds to each of the environmental sections as presented in the EIS, with the responses to the submission issues provided under the relevant headings.

In order to better facilitate descriptions of the extent and location of any potential impacts of the proposed Project, the Supplementary EIS has divided the WICT project area into four precinct areas, which have been referred to as:

- Wiggins Precinct;
- Hanson Road Precinct;
- Forest Precinct; and
- Rail Loop Precinct.

2. Project Need and Alternatives

No substantial changes are required within the Project Need and Alternatives section of the EIS other than those detailed within the Project Description (Section 3).

3. Description of the Project

3.1 Background to the Project

The proposal is to develop a new coal export terminal, rail infrastructure and supporting infrastructure to service the increasing demand for the export of coal from the Queensland coalfields. The WICT is to be located in the Port of Gladstone, west of the existing RG Tanna Coal Terminal (RGTCT).

The Project scope was described in the EIS issued in December 2006. Subsequent community and stakeholder consultation and engineering studies have refined the scope, extent and location of the project components resulting in the arrangements presented in this Supplementary EIS document.

To avoid potential ambiguity, the entire Project Description has been revised and presented in this section. In some instances, sections are unchanged from the EIS and are not reproduced in the Supplementary EIS. References back to the EIS Project Description are provided in these cases. Most of the coal terminal scope is unchanged except for the changes effected by the relocation of the railyard. The Project area is the same area covered by the EIS. This includes the rail works contained in this area. Rail works outside of this area are to be addressed under a separate environmental approval process.

A list of figures describing the Project is included at the end of this section, indicating if the figure is new, removed, unchanged or updated to reflect the project changes.

3.1.1 Project Changes

The major change to the Project is the relocation of QR's rollingstock maintenance and provisioning yard and associated infrastructure, previously located to the south west of the NCL, to a location in the north of the GSDA. This has resulted in a significant reduction in the rail infrastructure required in the project area, including the removal of the rail bridge crossing of the Calliope River (refer Figure 3.0.1 for overall scheme layout).

This relocated infrastructure (outside of the EIS Project area) now forms a parallel project, which is to be examined under separate environmental studies and is no longer under consideration in this Supplementary EIS.

3.1.2 Project Options

As mentioned in Section 3.1.4 of the EIS alternative rail options were being explored and following further detailed options assessment prompted by community consultation and stakeholder feedback arising from the EIS process a significant change has resulted. Opportunities were examined to relocate the rollingstock maintenance yard and provisioning facilities to a location in the north of the GSDA at Aldoga, and to construct a new link line from the Moura Short Line (MSL) to connect to the western end of the yard at the East End branch line junction.

A base case option (Option1) was described in the EIS issued in November 2006. Under this proposal, Moura and Surat traffic was to enter the WICT precinct from the south west via the MSL. Alternative Options 2 and 3 have Moura/Surat traffic arriving via a new link line running from the existing MSL to the NCL near Mt Larcom. The link line runs through rural areas to the west of the Bruce Highway. After crossing the Bruce Highway it is fully contained within the GSDA. From the northern end of this new link, Moura/Surat traffic follows the same path as Blackwater traffic (along the NCL) and all trains enter the unload loop from the same direction

The only difference between Options 2 and 3 is the location of the rail loop and dumpstations near Wiggins Island. Option 2 includes a rail loop over the extensive mud flats adjacent to Golding Point (as per Option 1) and Option 3 has the rail loop located to the south of the North Coast Line and includes a long overland conveyor.

The three options are shown graphically in Figures 3.0.2 to 3.0.4.

After consideration of the issues raised in response to the EIS and further engineering and risk studies, Rail Option 3 has now been selected as the preferred option. This section provides a detailed description of the revised Project and all of its components as they have been assessed in this Supplementary EIS.

3.2 Overview of the Project

The proponents are seeking approval for the construction of six berths. This includes four berths for the coal export terminal and two berths for other products (currently expected to be utilised by Gladstone Pacific Nickel GPN). For the two non-coal berths, CQPA will be responsible for dredging of the berth pockets, swing basin and approach/departure channel and for construction of the wharf substructure, jetty substructure, berthing and mooring dolphins. Approvals for all above deck facilities (including spillage controls) for these two non-coal berths will be the responsibility of the industrial proponent.

The jetty alignment intersects the wharf at the junction of the coal berths and the non-coal berths and allows separation of coal from other bulk materials across the berth. This eliminates potential for cross contamination of coal with other bulk materials.

Figure 3.1 shows the proposed extent and primary components of the Project. Figure 3.2 shows the revised footprint for clearing, earthworks and offshore work areas, including areas requiring dredging, dredge spoil deposition and proposed borrow areas. Figure 3.3 shows approximate extents of cut and fill areas including dredge spoil placement areas. Figure 3.4 illustrates the coal terminal and marine works while Figures 3.5 and 3.6 illustrate the proposed staging of Project works.

The nominal capacity of the coal terminal will be 70Mtpa utilising three dump stations, three inloading conveyors, three outloading conveyors and shiploaders, and four coal berths. However, depending on the material handling efficiencies achieved, the actual capacity of the ultimate facility could increase by up to 20% above the nominal 70Mtpa capacity (up to 84Mtpa) without the need to increase the infrastructure nominated for the ultimate Stage 3 works. The proponents are therefore seeking approval for the infrastructure nominated in this section of the EIS, but with a throughput variation up to 20% more than the nominal ultimate capacity, namely 84Mtpa.

3.2.1 Coal Export Terminal

The coal terminal will be developed by CQPA and will ultimately include the following primary components:

- Three dump stations and three inloading conveyor streams to the stockyard;
- Coal stockyard and materials handling systems including automated travelling bridge stackers. Coal is to be reclaimed to the shiploading stream from the stockpiles using dozers and stockpile dischargers;
- Three shiploading conveyor streams serving three shiploaders across four berths;
- Internal power distribution, control systems and communications;
- Substations, workshops, administration, security, amenities and lighting for coal terminal and rail yard;
- Marine facilities including jetty, wharf and dolphins;
- Berth Pocket, Departure/Arrival Channel and Swing Basin dredged to navigable depths;
- Site water management and drainage infrastructure for the coal terminal;
- Site roads, services and infrastructure; and
- Landscaping and fencing.

3.2.2 Rail Infrastructure

Supporting rail infrastructure will be developed by QR and will be constructed in stages in parallel with the coal terminal staging. The primary components of the proposed rail infrastructure include:

- Provision for both electric and diesel hauled trains from both north and south to cater for the northern mines in the Blackwater System and for the southern mines in the Moura, Surat and Monto Systems;
- Three rail tracks through the coal unloading stations including multiple approach tracks for holding trains on the loops prior to the coal unloading stations, and a run-around track. The run-around track allows the dump stations to be bypassed but also provides flexibility for a potential rail loading or inloading facility for other projects (eg GPN). Approval for rail loading facilities or inloading facilities for other projects is to be obtained by the applicable industrial proponent;
- Two new tracks along the North Coast Line between the Calliope River and the western edge of the Forestry area, approximately 1 km east of the township of Yarwun;
- Power supply equipment/works associated with electrification; and
- Fencing of the rail corridor.

3.2.3 Supporting Infrastructure and Works

A range of other infrastructure, facilities and works are required to be constructed or modified to cater for the construction and operation of the new terminal and rail works. These works will be constructed by CQPA, QR and others, and will include the following major components:

- Reclamation of areas north and south of Hanson Road. CQPA has previously obtained reclamation approval for the areas known as Reclamation Areas A, B and C. This approval is current to 2011. CQPA proposes to release the approval for Reclamation Area A, and modify the extents of Reclamation Areas B and C. Some parts of Reclamation Areas B and C will not be required, but some additional areas outside the currently approved limits will be required for the proposed coal terminal. The extent of the current reclamation approvals and the proposed modifications to these extents are shown in Figure 3.8;
- It is proposed that all dredged material will be disposed to land. Dredge spoil disposal areas will be located both north and south of Hanson Road, in Reclamation Areas B and C and at the RG Tanna site. These areas will be used for deposition of dredge spoil from the proposed swing basin, departure/arrival channel and berth pockets. The extent of the dredge spoil deposition areas is shown in Figure 3.9.
- Construction access wharf/barge ramp facility on Golding Point. This will be located adjacent to the Calliope River and east of the proposed WICT stockyard;
- Road works along Hanson Road. Hanson Road is to be raised over the new conveyors with access provided to the coal terminal. This will require protection and relocation of the existing services adjacent to Hanson Road.
- Access to the dumpstation and rail loop is to be provided via Reid Road. Upgrade of the existing road towards the NCL will be required to provide an adequate access road;
- Water supply and sewerage infrastructure, telecommunications and power supplies to service the coal terminal;
- Relocation/protection of existing services/utilities (eg gas pipelines, Ergon cables/equipment etc); and
- Queensland Transport (QT) may require additional navigation aids including lead lights and beacons to mark the extent of swing basins and channels. The location and number of these navigation aids are still to be confirmed with QT and will be subject to detailed navigational modelling during detailed design.

3.2.4 Gladstone Nickel Project

GPN plan to develop a nickel refinery at Yarwun adjacent to and west of the coal terminal inloading conveyors. In addition, GPN intend to import ore and other bulk materials across the new Wiggins Island wharfs and jetty. The current construction timeframe of the two projects is similar and an EIS for the GPN project is proceeding independently of this project.

The WICT and GPN Project teams have established regular meetings to exchange raw data for those areas where both projects overlap and to ensure the preparation of development proposals that are consistent with the aims of both projects and the ultimate objectives for the Wiggins Island wharf precinct.

Should the GPN project not proceed, the master planning and earthworks to be undertaken for the WICT within Reclamation Area C (refer Figure 3.8) will allow the location of an alternative industrial facility to be located on the same site with dedicated corridors between the site and the WICT. Sufficient room has been retained in the corridors for at least two conveyors, four pipelines and other infrastructure.

The additional two wharves currently earmarked for the GPN project can readily be utilised for any bulk trades associated with a future industry should GPN decide not to proceed with their project.

Any EIS requirements relating to the movement of bulk products over these additional wharves will be (or are) the responsibility of the industrial proponent. The proponent (ie GPN in the first instance) will be responsible for obtaining the necessary approvals for all associated product handling and infrastructure.

GPN may also build a rail receival dump station to receive domestic bulk materials. Approval for this dump station is the responsibility of GPN.

3.2.5 GPN Plant Site

The GPN plant site is to be located on land adjacent to and west of the proposed coal terminal inloading conveyors. GPN propose earthworks to level the site for the plant. The construction of the coal terminal inloading conveyors (north of the North Coast Line and south of Hanson Road) and the raising of Hanson Road requires material to be won as these works are predominantly embankments. It is proposed to establish borrow areas from the GPN plant site for construction of these works. GPN will use the balance of these areas in their overall bulk earthworks for the site.

In addition, the proposed dredge spoil deposition area to the west of the coal terminal inloading conveyors is planned to be utilised by GPN for its plant expansions. CQPA and QR have maintained regular contact with GPN to determine the extent and level of land reclamation to satisfy both the WICT dredge spoil requirements and the overall bulk earthworks balance requirements for the GPN facility.

Should the GPN project not proceed, the extent of the areas proposed for placement of the dredge spoil would not change, but the borrow area would be reduced from the extent of earthworks required for the GPN project. Should the GPN project not proceed, the borrow area footprint would be as shown in Figures 3.2 and 3.3.

3.2.6 Non-Coal Berths

Two additional berths will give a total of six (6) berths at the Wiggins Island wharfs, comprising four (4) dedicated coal export berths and two (2) additional berths. All wharfs will be capable of handling Cape Class vessels. GPN are currently the most likely user of the two non-coal berths.

The GPN project includes ship unloading facilities on the proposed Wiggins Island wharfs. Ultimately this includes up to two (2) berths for unloading of nickel ore and other materials required for the refining process.

Should the GPN project not proceed then these two additional berths would be available for handling bulk materials for other projects.

As CQPA is the controlling authority for the Port of Gladstone and since potential users of the additional berths have been identified, CQPA is seeking approval under the EIS for six berths.

This includes dredging for berth pockets, swing basin and departure/approach channel, jetty and wharf substructures and berthing and mooring dolphins for all six berths of the Wiggins Island wharfs. However, above deck facilities and any materials handling facilities for the two non coal berths will be the responsibility of the user of this facility (currently GPN).

3.2.7 Project Cost, Staging and Timing

The coal terminal will be implemented in stages to accommodate the expected increase in throughput capacity. The nominal tonnage capacity for the three major stages of coal terminal development and approximate timings are assumed to be:

- Stage 1 – 25 Mtpa (2008 to 2012);
- Stage 2 – 50 Mtpa (TBC); and
- Stage 3 – Ultimate Capacity (TBC).

Other intermediate stages are likely and can be easily achieved given the stockyard and plant layout but are dependent on the demand generated from the coal mining industry.

Table 3.1 Rail Infrastructure Staging

Stage	1	2	3	Other*
Nominal Capacity (Mtpa)	25	50	70-84	
Run-around Track*	0	0	0	1
Inroads	3	4	5	
Outroads	1	2	3	
North Coast Line** (No of Tracks to Yarwun)	2 + 2 existing	2 + 2 existing	2 + 2 existing	

Table Note:
* The run-around track would be required when another project (eg GPN) commences and requires a separate rail inload or outload facility.
** The number and timing of additional rail tracks along the NCL may be reduced for stages 1 and 2.

Table 3.2 Coal Terminal Staging

Stage	1	2	3
Nominal Capacity (Mtpa)	25	50	70-84
Dump Stations	1	2	3
Gantry Stackers	1	3	4
Stockpile Rows	2 (part)	4 (2 complete and 2 part)	4
150 kt Stockpiles	12	22	32
Reclaim Conveyors	4	8	8
Shiploaders	1	2	3
Wharves*	1	3	4

Table Note:
* The two non coal berths are excluded from the staging table above.

As indicated above the Project will be developed in a number of stages in response to market pressures for the export of coal. Current indications are that Stage 1 of the coal terminal (nominal 25Mtpa) is required by 2012 to meet current demand projections as provided to CQPA and QR by their customers. Further staging of the facility will be dependent on continued growth in the coal mining industry.

Preliminary indicative costs of construction for the building of the coal terminal facilities inclusive of the rail loop (but excluding the Northern GSDA yard and Moura Link rail works) is in the order of $3.5billion. With the GSDA rail works included this is in the order of $4billion.

The stage 1 construction cost estimate is in the order of $1.3billion for the coal terminal and rail loop and $1.7billion with the GSDA rail works included. These estimates do not include the 2 non-coal berths.

Construction of Stage 1 is expected to take approximately 3.5 years from commencement of early works in 2009. The early works will involve preload activities, construction of bunds for dredge spoil disposal and relocation/protection of existing services and utilities. Subsequent expansions will not be as extensive as the works for Stage 1, and will therefore be of shorter duration, in the order of 2 to 2.5 years.

3.2.8 Construction and Operation Workforce

Table 3.3 summarises anticipated peak construction workforce and operations personnel for each of the major stages of development. Figures 3.10, 3.11 and 3.12 depict the variation in the anticipated construction workforce for the three construction phases over time for each of the three stages.

Table 3.3 Approximate Workforce Numbers for Construction and Operation

Stage	Peak site workforce for construction phases	CQPA Operations Personnel
1	500	130
2	600	225
3	480	300

Due to the relocation of the rollingstock maintenance and provisioning facilities out of the project area, the QR operations personnel numbers have not been included in this analysis.

Stage 1 workforce figures have reduced from 650 to 500 due to the relocation of the majority of the rail works out of the Project area.

Stage 2 and 3 figures have been increased from 450 and 350 respectively due to the change in scope with the inclusion of the overland conveyor system.

Transport of the workforce to site is expected to be by car and multi-passenger transport.

These workforce numbers cover the works contained in the project area. Additional workforce is required for the GSDA rail yard and Moura Link works. It is necessary to base the assessment on these figures as the coal terminal and rail works need to proceed in parallel as they need each other to be operational.

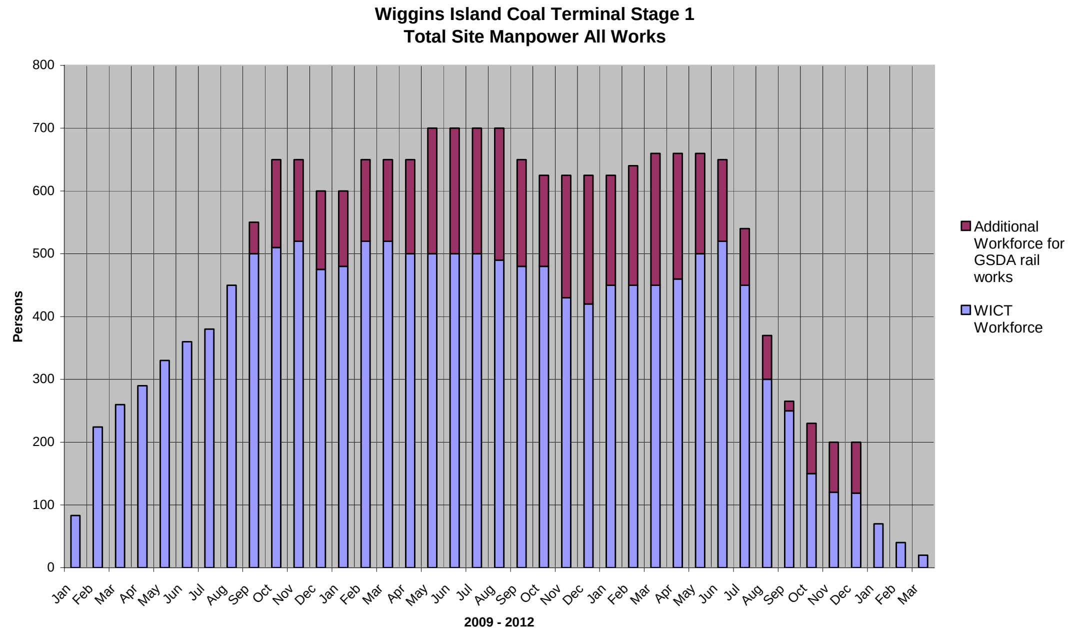


Figure 3.10 Estimated Total Construction Workforce Distribution, Stage 1

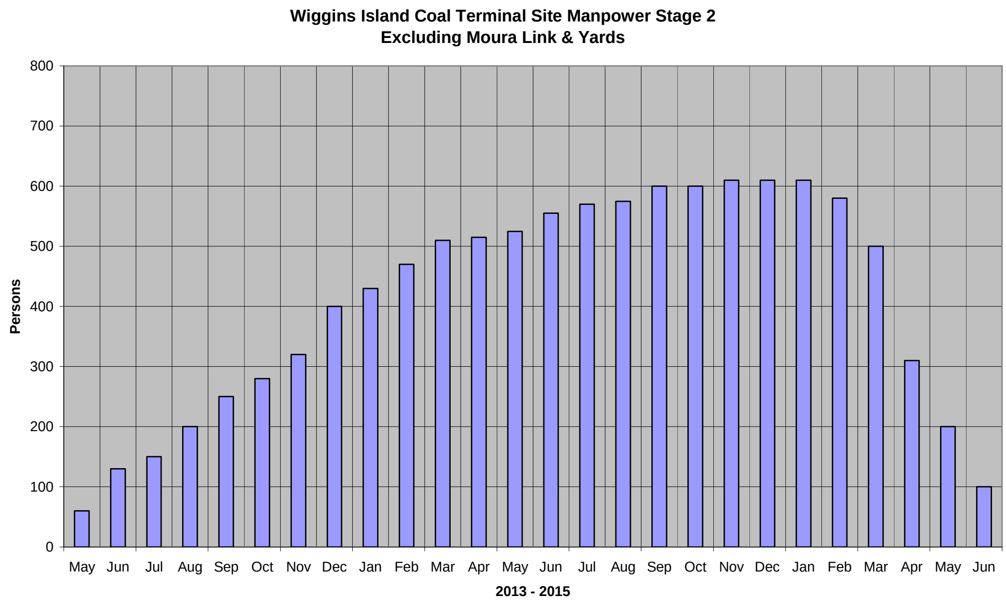


Figure 3.11 Estimated Total Construction Workforce Distribution, Stage 2

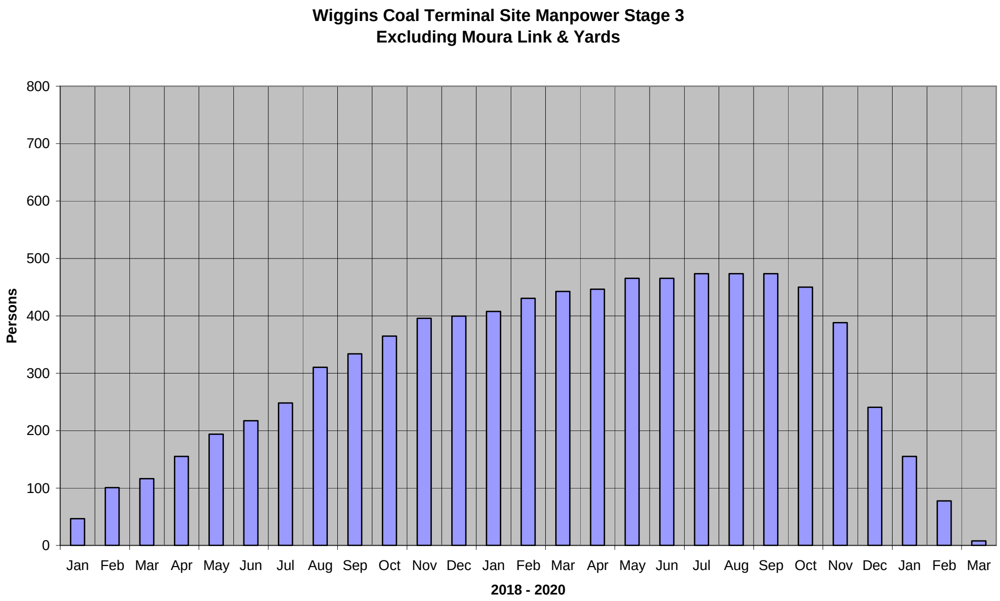


Figure 3.12 Estimated Construction Workforce Distribution, Stage 3

The construction workforce numbers are highest for Stage 1. These numbers are similar to the current RGTCT expansion workforce which has been accommodated within the greater Gladstone area. In the absence of other projects occurring concurrently, the WICT workforce would be similarly accommodated. The Project response to the case of concurrent projects is discussed in Section 18.

3.2.9 Environmental Controls for the Project

Details of environmental design features and proposed mitigation measures are discussed in detail in each of the respective impact assessment sections of the EIS. These are also summarised in the Coal Terminal Environmental Management Plan (EMP) (refer Section 23) and the Rail EMP (refer Section 24).

3.3 Location

3.3.1 Regional Context

The Port of Gladstone is situated approximately 525 km north of Brisbane, just south of the Tropic of Capricorn.

3.3.2 Local Context

The WICT is located to the west and directly across the Calliope River from the existing RGTCT. The site is constrained by the Calliope River estuary to the south and east and by extensive seagrass beds to the north and west of Golding Point. The proposed stockyard is to be located on and around the existing elevated ground known as Golding Point.

The jetty will run in a northerly direction and be located to the west of the two outer islands (Wiggins Island and Mud Island) crossing shallow depth seagrass areas. The eastern end of the ultimate wharf is to be located south of the Targinnie Channel approximately 1 km upstream of the RGTCT. The initial wharf construction will be located approximately 2 km upstream of the RGTCT. Additional coal wharves will advance in an easterly direction advancing downstream from the jetty head. The non-coal wharves will be located west of the jetty head.

The scope of the rail works are reduced from the EIS and are adjacent to North Coast Line.

The proposed swing basin, departure/arrival channel and berth pockets for the ultimate six berth configuration are shown in Figure 3.13 and Figure B1 (refer Appendix B). Declared depths will be as follows:

- Swing basin -11.7 m LAT
- Departure/Arrival Channel -16.0 m LAT
- Berth Pockets -18.8 m LAT

The Stage 1 dredging configuration shown in Figure B2 (refer Appendix B) is based on the establishment of two berths – one coal export berth (Berth 4) and one non coal berth (Berth 5). The extent of seabed dredging required for the ultimate six berth facility is shown on Figure 3.13. A small amount of dredging for the construction access/barge ramp facility adjacent to Golding Point is also required (refer Section 3.4.18).

The initial dredging campaign will excavate approximately 3.2 million m^3 from the seabed. Subsequent dredging campaigns will excavate up to a further 3.1 million m^3 from the seabed giving a total of approximately 6.3 million m^3 of excavation. Final dredge quantities are to be confirmed.

The proposed spoil disposal sites are shown in Figure 3.9 as described in Section 3.2.3. The proposed dredging and spoil disposal strategy is described in detail in Section 3.7.4.

A number of areas with high ecological value have been identified within the Project footprint. These areas have been consciously avoided during the engineering design process with the aim of minimising impacts of these areas as far as possible. It is the intention of CQPA and QR to return to the State areas of land of high ecological value that are surplus to the requirements of this Project. Such areas include Reclamation Area A, incorporating Wiggins Island and Mud Island. This area, although previously approved for reclamation and marine plant disturbance and removal by CQPA, is no longer required for the construction or operation of the terminal. This area will be conserved, to partially offset the unavoidable marine plant disturbances encountered as part of the Project.

3.4 Description of Coal Terminal and Operations

This section describes the coal terminal in detail, including the materials handling plant from train unloading to ship. It also describes the terminal infrastructure and facilities.

The IAS for the WICT indicated that two options for the coal stockyard arrangement were under investigations by CQPA. These included a stacker/reclaimer option and the ‘hybrid’ arrangement option. CQPA has evaluated both options and declared a preference for the hybrid option. The EIS included the hybrid stockyard arrangement (automated stacking with dozer reclaim).

The adoption of the hybrid stockyard arrangement provides greatest flexibility in the assembly of coal for exporting coal companies. It is anticipated that the products to be handled through WICT will be diverse in quality as is experienced at RGTCT. Blending of products provides value adding to the product through the ability to better meet the end user specification. The ability to blend is optimised with the hybrid system whereby stockpiles of product are held at the port and blended on demand. Stacker/Reclaimer systems place a greater reliance on blending of the product prior to arrival at the port and thus require the mines to hold a greater inventory.

The coal chain proposed for WICT, for delivery from mine to ship, reflects the current operations through the Port of Gladstone at the RGTCT and BPCT. The introduction of a cargo assembly terminal as would likely be required for an efficient Stacker/Reclaimer facility would force modified behaviours for all participants in the coal chain from mine, through rail, to the port. A mixing of these behaviours does not allow the maximum efficiency and flexibility of the coal chain through the Port of Gladstone.

An overall arrangement plan for the coal terminal is provided in Figure 3.14.

3.4.1 Site Access

Site access to the terminal is to be provided off Hanson Road between the Anabranch and the overland conveyors. Access is required along the eastern side of the reclamation to provide "non-secure" public access to the security point.

Restrictions on the available land for the coal stockyard has led to the layout being as shown on Figure 3.14, which only leaves areas to the north-east and south-west of the stockyard for siting of the terminal facilities. It is important that these facilities be located on the leeward side of the prevailing winds (which is the eastern side of the stockyard). The potential for coal dust will be controlled with a stockyard dust suppression system and in relatively strong prevailing winds they will be used frequently. Locating the facilities on the western side of the stockyard has the potential for stockyard spray mist to impact on the workers and facilities. For this reason the facilities are to be located to the eastern side of the stockyard.

Port security and workplace health and safety are now a critical factor in planning port facilities. This results in a minimisation of the number of entry points into the secure area of the port, as well as restricting entry only to those who require specific access to the secure areas. For these reasons, the point of entry into the secure area of the facilities and port will be located adjacent the terminal facilities on the north-east side of the coal terminal resulting in controlled access to both the terminal and maritime security to the wharf.

The WICT will have controlled access to its operation for the following:

- Emergency services;
- Customs and port operations services;
- Construction crews and construction equipment;
- Operating and maintenance personnel and associated equipment; and
- Designated non CQPA workers (eg samplers, inloading operations, etc).

Access to all areas of the WICT site will be limited through provision of security barriers and fences, automatically controlled access methods and surveillance to prevent unauthorised activity from occurring on the site at any point. As the rail loop is no longer situated at Golding Point the site access network is simplified significantly to allow access to the terminal only.

Access to the dumpstations and rail loops will be provided from Reid Road for all heavy vehicles. Access from the coal terminal to the dumpstations for light vehicles will be provided alongside the overland conveyor under Hanson Road to Reid Road. Access from this point to the inside of the loop will be as for heavy vehicles.

3.4.2 Train Unloading

The design and functionality of the train unloading system will remain as described in the EIS. However, it has been relocated to the area previously identified for the proposed rollingstock maintenance facility (refer Figure 3.0.3).

Ultimately, three bottom dump coal train receival stations are proposed for Stage 3. Initially in Stage 1, only a single dump station is proposed.

Trains will enter the unloading station on the top level and discharge coal into a hopper beneath. All rollingstock will be bottom dump rail cars with automatic triggering of the doors. Trains will move at constant speed across the dump hopper, with speed feedback based on hopper level. The maximum continuous unloading rate will be nominally 6,000tph.

The dump station will be a multilevel structure, extending below dump level. An operator control room will be provided overlooking the dump operation. The super-structure above the rail level will be fully enclosed except at each end where the trains pass through.

Amenities will be provided for the dump station operators and will include a lunch room and toilet facilities.

The dump hopper length will cater for the maximum design train speed during unloading. The hopper length will also provide sufficient time to empty wagons containing sticky coals which require mechanical assistance or removal (ie jack hammering or wagon vibrator). The dump hopper will incorporate means of dust control through the extraction method.

Coal in the hopper will be drawn out by automatic feeders having nominal 6,000tph continuous feed capacity, and feed onto an underground conveyor for transport to the stacking conveyors. Feed rate will be optimised at all times to maintain maximum throughput. Automatic feedback will be sent to the train driver to maintain correct train speed.

A tramp magnet will be positioned above the discharge from the belt feeder to remove potentially damaging ferrous objects from the coal stream.

Overhead cranes, lay down pads and lifting bays will be provided for ease of maintenance of the feeders and associated equipment.

Dust extraction systems and ventilation systems will ensure adequate air quality at the lower levels of the dump station. Methane sensors will be provided as required. A sump and sump pump will be provided at the lowest level for extraction of groundwater seepage and wash down water and solids. The pump will have provision for quick and easy change out.

The installation of the Stage 1 dump station will incorporate the minimum necessary consideration and construction to anticipate the addition of the second and third dump stations during later stages of the WICT development. This may include construction of the entire concrete substructure for all three stages during Stage 1 to avoid interruption to operations and access around the dump stations and difficult ground retention issues for the second and third dump stations. The staging strategy is to be detailed further in the detailed engineering stage. A typical plan and cross section through the dump station is shown in Figures B3 and B4 (refer Appendix B).

3.4.3 Inloading Conveyors

From the dump station feeders, coal will feed onto one of the inloading conveyors which will climb from the bottom of the dump station via a tunnel under the North Coast Line and Reid Road. Once clear of the tunnel, the conveyor continues overland between the proposed GPN site and the Calliope River. It then passes under Hanson Road and rises into a transfer tower in order to change direction and continue to the north-western end of the stockyard. The conveyors can then transfer onto any of the four stacking conveyors. Initially in Stage 1, only a single inloading conveyor and single stacking conveyor will be constructed.

3.4.4 Stockpile Stacking

The terminal will be capable of stacking from any inloading dump station to any stockpile. Stacking capacity will be equal to the rail dump station nominal capacity of 6,000tph.

Stacking will occur via travelling gantry stacker, which will be capable of delivering coal to any stockpile without any need for dozer pushout. Gantries will be capable of being automated, so that stacking can occur with minimum operator input.

Stockpiles will be divided into nominal 150,000t blocks with a nominal 10m clearance to prevent cross contamination.

Figure B5 (refer Appendix B) shows the plan arrangement of the stockyard and extent of the stacker machine. A typical section through the stockyard and stacker machine is provided in Figure B6 (refer Appendix B). Initially only a single stacker will be installed, but will be staged to include up to four stackers. The final arrangements of the stacker machine and support structures are subject to further studies during detailed design. Figure B7 (refer Appendix B) shows how the stockyard, and inloading and reclaim conveyor systems may be staged as the terminal expands.

3.4.5 Stockpile Reclaiming

Stockpile reclaiming will be achieved using bulldozers and below ground dischargers and reclaim conveyors. Coal will be pushed to the dischargers with D11 (or equivalent) bulldozers. Coal from any one designated stockpile will be able to be discharged to either of two reclaim conveyors. Coal will be able to be transferred from any one reclaim conveyor to any of the three outloading conveyors. Each stockpile discharger will be rated at the full reclaim rate of nominally 6,000 tph. Stockpile dischargers will incorporate a feeder type that will provide flow rate control for coal blending operations.

Figure B8 (refer Appendix B) shows a typical section of the tunnel. The tunnels run longitudinally up to 1.2 km and each may have one or two conveyors. The final arrangement will include eight longitudinal reclaim conveyors in four or eight tunnels. The decision on the number of tunnels has not yet been made.

Reclaim tunnel design will comply with applicable design guidelines. This will consider ventilation, gas monitoring, fire systems, drainage, lighting, hazardous area requirements and emergency egress requirement. Reclaim tunnels will allow for restricted vehicle access (size to be determined) along one side of each conveyor and personnel access to the other side.

3.4.6 Outloading Conveyors

The eight reclaim conveyors rise out of the ground and feed onto any of the three outloading conveyors. This will most likely be achieved by incorporation of a shuttling head at the end of each reclaim conveyor. Initially only a single outloading conveyor will be constructed. Three outloading conveyors will ultimately feed onto the jetty conveyors, potentially via surge bins.

3.4.7 Surge Bin

A surge bin may be incorporated in each of the shiploading streams. A bin allows the product to be profiled prior to transit over the marine environment and reduces the potential for product spillage.

The surge bin size will be determined through modelling to ensure that reclaiming process is not affected by stoppages in the outloading stream due to ship hatch changes. The bin will be designed to empty as completely as possible using the belt feeder, at the completion of each different coal loading type. The surge bin capacity is still to be determined but will be of the order of 1000t.

3.4.8 Jetty Conveyors and Jetty

Three jetty conveyors are proposed for coal export for the ultimate facility, with a single conveyor in Stage 1. In addition, provision has been made for two non-coal conveyers to be accommodated on the jetty substructure. A jetty arrangement has been developed which allows these additional conveyors to be accommodated irrespective of the proponent. Likely arrangements for both initial and ultimate development are shown in Figure B9 (refer Appendix B).

The coal conveyors on the jetty would be clad on one side and the roof. No floor is proposed as belt scrapers and belt washing systems will be installed at the head ends of conveyors to limit carry back.

The jetty will be a skeletal steel framed substructure (piles and headstock) with pre-cast concrete deck units for the roadways, with spacing not less than 20m between jetty bents. Steel conveyor galleries will support the conveyors and will span between jetty bents.

3.4.9 Wharf and Wharf Conveyors

Each jetty conveyor will feed directly onto a corresponding wharf conveyor which feeds to a corresponding shiploader. Ultimately four berths (over a single wharf substructure) are proposed for three shiploaders for the WICT Project, sited to the east of the jetty. Provision has been made for two non-coal berths to the west of the jetty.

A single coal berth, single wharf conveyor and shiploader are proposed for Stage 1 of WICT. Figure B10 (refer Appendix B) shows an overall plan for the ultimate six berths and a general arrangement of the Stage 1 wharf development for the WICT Project.

Figure B11 (refer Appendix B) shows typical sections of the coal wharf for Stage 1 and Stage 3. This indicates that at Stage 3 a further pile and headstock extension is required along the back of the wharf to support the additional conveyors.

The wharf conveyors need to be open along the roof and both sides to accommodate the tripper arrangement of the long travelling shiploaders, and also are not proposed to have a floor.

The wharf structure is likely to comprise a skeletal steel frame substructure with precast deck unit elements, and independent berthing and mooring dolphins.

3.4.10 Shiploaders

Long travelling, luffing type shiploaders will be installed for coal export. A typical section of the wharf and shiploader is shown in Figure B12 (refer Appendix B).

Shiploaders will be designed for continuous loading at nominally 6,000tph. Shiploaders will be suitable for loading ships up to and including Cape Class vessels LOA 320 metres, (220,000dwt 55m beam). The minimum vessel size to be loaded over the WICT is 40,000dwt.

The staging of marine facilities is shown in Figure B13 (refer Appendix B).

3.4.11 Power Supply and Reticulation

A 66kV substation will be provided by Ergon Energy. The final location of the substation is to be determined by Ergon Energy, but allowance has been made for it to be located to the north of Hanson Road and east of the conveyors. There will be two secure 66kV power supply routes from the Ergon substation into the site main substation located to the west of the stockyards. Reticulation of 11kV supply will be from this substation around the site.

3.4.12 General Lighting

General requirements include:

- Outdoor lighting will be on “lumitrol” control, with manual adjustment and override;
- Minimal permanent access lighting will be installed on machines, transfer house etc with additional lighting on motion sensor control; and
- Emergency lighting will be installed in tunnels and other enclosed spaces.

3.4.13 Stockpile Lighting

Stockpile lighting solutions will incorporate the following requirements:

- Minimum lighting levels will follow the recommendations of the International Commission on Illumination Technical Report CIE 129, "Guide for Lighting Exterior Work Areas". Lighting levels will be designed for end of life lamp output, a minimum of 20% lamp failure and once yearly cleaning;
- Lighting levels will be computer modelled for various stockpile shapes and designed to minimise any possible shadows. Consideration will also be given to minimise glare to reclaim bulldozer operators;
- Flood lighting towers around the perimeter of stockpiles will include a system for safely lifting and lowering light fittings during high winds; and
- Stockpile lighting control will include two switching levels, one to achieve minimum safe access lighting levels during non reclaim operational periods and the other at 100% for reclaim operations.

3.4.14 Communications

Communication systems will provide voice communication between rail unloader operator, shiploader operator, train driver, maintenance and operations staff and terminal operations manager.

Alarm notification to emergency services will be according to their requirements.

Telephone, fax and internet communication will be provided to the offices and workshops as required.

3.4.15 Control Systems and Automation

The control system will be a highly automated fault tolerant system. The system will minimise the number of personnel needed to operate the plant.

The control system will be standardised on components, software and protocols across the site, using current software and hardware that is maintainable and supportable in the medium term.

PLCs and control system hardware will be current design, sole sourced from a proven supplier with ongoing support in Australia. The chosen system will be able to support a proven software control program matched to the selected site communication system and with proven operational support and programming capability in Australia.

In principle, the control system will operate with a main control room for an operator. Control and monitoring of inbound systems and stacking will be from the rail dump station control room. Control and monitoring of outbound systems including reclaiming and shiploading will be from the main control room.

The level of automation at the WICT facility will be maximised in order to limit the reliance on operator skills to maximise throughput and minimise risk of spillage. Areas where considerable automation is likely to be achieved include the following:

- Dump station:
  - Wagon vibrator for wagon discharge;
  - Feeder control to maximise throughput; and
  - Train speed feedback to train driver,
- Stacking:
  - Gantry positioning and stacking form; and
  - Gantry skew control system.

- Stockyard Water Sprays:
  - Weather station control of stockyard sprays and misting systems to optimise water use and dust suppression.
- Reclaim:
  - Reclaim feeder control to maintain blending accuracy.
- Surge Bin Outload:
  - Feeder control to maintain desired outloading rate.
- Moisture Content:
  - Moisture analysis and water addition throughout coal handling stream.

3.4.16 Site Water Services

Site water services will include the following:

- Raw water supply and buffer storage;
- Potable water via on-site treatment of raw water, except for the Rail Dump Station which is proposed to be accessed via an extension of the Reid Road treated water main; and
- Sewage disposal is required and is to be treated onsite and irrigated.

3.4.17 Fire Protection and Emergency Systems

Fire protection and emergency systems will comply with Australian Standards, local regulations and Insurance Company requirements. They will be incorporated in the site water supply reticulation system, but still maintain a fail-safe fire fighting capability.

3.4.18 Facilities and Infrastructure

Onshore Facilities

Operational facilities at the coal terminal will include:

- Administration building;
- Central control room;
- Operations amenities;
- Site security office and gate;
- Maritime security office and gate;
- Central Stores building and yard;
- Conveyor belt yard;
- Central fuel storage facility (approximately 100,000 litres);
- Dump station (inloading) control room;
- Sample station building;
- Internal and external vehicle washdown facilities;
- External staff carpark;
- External visitors carpark; and
- Internal carparking facilities for site vehicles.

Maintenance facilities at the coal terminal will include:

- Central workshops;
- Central maintenance amenities;
- Central dozer washdown facility;
- Central dozer service facility;
- Maintenance yard; and
- Maintenance vehicle parking at workshops and other maintenance facilities.

Offshore Facilities

Offshore facilities will include:

- Customs office;
- Vehicle parking area at facilities; and
- Ablutions to be provided at a number of locations along berths.

Site access roads will be sealed between administration and workshop buildings near the terminal entrance. All other onshore roads will be unsealed gravel pavement except on main routes inside plant which are to be confirmed.

Barge Ramp/Construction Access Wharf

A barge ramp/construction access wharf will be provided primarily for construction access to the offshore facilities. It is to be located to the north-east of Golding Point to provide access to the Calliope River. A very small amount of dredging is required to accommodate the barges expected. Figure B14 (refer Appendix B) details the potential general arrangement of the barge ramp.

These facilities would be utilised for the ongoing development of the WICT marine facilities and for future industrial development within this section of the port.

3.4.19 Site Water Management and Treatment

The following water management criteria are to be incorporated into the facility:

- Open, self cleaning style drainage for aiding maintenance;
- Cleanout pits to be self draining where possible to facilitate dry clean out;
- Cross drains to allow safe dozer crossing and ease of cleanout;
- A minimum pond size will be required (ie runoff from 24 hour 10 year ARI storm event);
- Treated water reuse and capture stormwater to be considered for selected process and treated domestic wastewater for irrigation purposes;
- Treatment to comprise cleanout pits at transfers (drain by gravity where possible), major sedimentation basins upstream of the reuse pond and/or final polishing pond/s;
- Utilise gravity as much as possible in design of drains (use natural height of Golding Point). The intent, if possible and if existing levels allow, will not be to dig out for stormwater storage and polishing pond but to build bunds as dam walls. This avoids potential disturbance of acid sulphate soils and makes best use of the high elevation of Golding Point; and
- Only very large rainfall events will necessitate overflow discharge into the Calliope River Anabranch from the coal terminal.

The final arrangement of the water management facilities will be determined during detailed design. A schematic layout of the potential water management scheme for the coal terminal is provided in Figure B15 (refer Appendix B).

3.4.20 Security

Site security will incorporate:

- Whole site fenced with electrically or manually operated gates;
- Camera surveillance where required;
- Wharf secure area needs to comply with DOTARS security requirements for a port facility. All personnel on the wharf will need to hold an MSIC card;

- Single point controlled access to the whole site, including the stockyard and wharf. Additional manual (normally locked) access points for maintenance or construction purposes as required; and
- Keyless access system using swipe ID cards in select locations.

3.5 Description of Rail Works and Operations

3.5.1 Planned Rail Operations

The railway infrastructure for the WICT has been configured so that coal can be transported to the terminal from mines in the Central Queensland coal fields without the need to move through the Byellee Junction or to utilise the facilities at Callemondah Yard. The capacity of these existing facilities is nearing their economic limit and to increase their current capacity would be both expensive and disruptive to current operations.

The EIS project description (Section 3) included new rollingstock facilities, including maintenance and storage roads for locomotives and wagons, crew change facilities, locomotive provisioning sheds and facilities where locomotives are refuelled and re-sanded. As a result of community and stakeholder consultation and feedback, these facilities have been relocated out of the project area to a proposed location in the north of the Gladstone State Development Area (GSDA).

The only rail works remaining within the original project area is covered by this Supplementary EIS. The rail yard and other rail works not included within the EIS Project area will be addressed via a separate approval process.

3.5.2 Scope of Railway Works

The scope of railway works covered by the Supplementary EIS includes only those works within the EIS project area. Support infrastructure, including holding roads, provisioning and rollingstock maintenance facilities for operational support of rail traffic generated by the terminal have been relocated from the Project area to the north of the GSDA. These works are to be addressed separately.

The scope of railway works proposed does not include any upstream Main Line upgrade works to support additional rail traffic from newly developed or upgraded coal mines outside the current Project area.

The proposed railway works include:

- A multiple track electrified rail loop servicing the terminal that includes a minimum of three coal unloading stations where coal will be unloaded from bottom discharge rail wagons to the material handling facilities at the WICT;
- Additional tracks to the north of the rail loop to be constructed along the NCL to the northern extent of the forestry area east of the township of Yarwun; and
- Installation of a vegetation buffer zone on the southern side of the unload loop to provide a barrier to ameliorate the visual impacts for the communities on the southern side on the Calliope River. The location of the proposed buffer zone is shown in Figure 3.6.

The railway works are likely to be delivered in stages in line with the build-up in export coal demand and will be designed so that future port expansion and trade through the port is not precluded.

The location and arrangement of the rail loop is shown in Figure 3.6.

3.5.3 Network Connections to the WICT Rail Loop

The WICT will be serviced by a rail loop to allow efficient offloading and return to the system for empty trains. Operationally, the loop will store a number of trains clear of the Main Line on arrival and departure so as to reduce network conflicts. In this way, coal unloading operations can continue as multiple trains await direction to either enter the unloader or depart the loop.

3.5.4 Upstream Impacts

The EIS and Supplementary EIS have identified the likely impacts of the proposed works within the WICT project area. There is a close inter-relationship between the proposed development of the WICT and the opening or expansion of mines in the surrounding coalfields. Some planned mining operations are relying on the WICT Project proceeding in order to proceed themselves; while the reverse also applies in that the proposed WICT is reliant on those new and expanded mining operations to supply the volumes of export coal on which the proposed terminal's planning is based.

Progressive upgrades to rail infrastructure along the existing Moura, Blackwater and the North Coast Lines will be required. The exact definition of works required will depend on the source of the coal, existing and future volumes across the rail infrastructure and train operating characteristics at the time. Planning approval for these works will be arranged progressively once this information is available. However, future versions of the QR Coal Rail Infrastructure Master Plan are expected to define the likely infrastructure required and timing for the infrastructure.

3.5.5 Rollingstock Maintenance and Locomotive Provisioning Facilities

As mentioned in Section 3.5.1 these facilities have been removed from the Project area and are to be relocated to a proposed site in the north of the GSDA. These facilities will now be assessed under a separate EIS/approval process.

3.5.6 Dump Stations and Loadout Facility

The ultimate plan is for three (3) dump stations at WICT. The dump stations are located at the northern end and on the exit of the unload loop. At the dump stations, the rail tracks are spaced nominally 12m apart. A run-around track bypasses the dump stations.

There is a possibility that other product may be loaded or unloaded on the rail loop. There is provision in the rail layouts for a dump station/loadout facility to be located on the outroads of the loop opposite the coal dump stations. An additional road is provided and is of sufficient length to hold a train 1,500m long either side of the loadout/dump station clear of the coal roads.

3.5.7 Staged Construction

The rail facility for the WICT will be developed in three nominal stages to accommodate the volume of coal being shipped from the terminal.

In each stage of the development, the proposed railway construction is:

Stage 1

- Construction of three inroads to first dump station;
- Construction of one outroad from dump station;
- Construction of GPN siding (if GPN proceeds);
- Construction of run-around track (if required).

Stage 2

- Construction of one additional inroad;
- Construction of one additional outroad.

Stage 3

- Construction of one additional inroad; and
- Construction of second run around track (if required).

The quantities given will be reviewed at the detailed design phase of each stage of development and may vary for that stage.

3.6 Description of Road Infrastructure Works

The proposed road works are as summarised in the section below:

3.6.1 Road Access to WICT

Access is required from Hanson Road to service the WICT development north of Hanson Road.

With the relocation of the QR Rail Yard west to Northern GSDA, the requirement for access to the south of Hanson Road is now limited to minor movements associated with access to the Rail Dump Station. CQPA workers associated with the Dump Station shall start and finish shifts at the main WICT facility and shall access the Dump Station via an access along the Conveyor Corridor. Larger vehicles associated with construction and major maintenance activities shall access the Dump Station via Reid Road.

CQPA have stated an express desire for the WICT Access to:

- Minimise travel times for WICT traffic;
- Provide connectivity to the secure area of the WICT development, via unsecured areas of the development, without the need to cross or enter secure areas;
- Provide for Stage 1 construction traffic and minimise impact on existing traffic during construction;
- Minimise impacts of future Hanson Road works on the operational Services Corridor, ie construction over/adjacent operating conveyors;
- Allow for current DMR proposed Overtaking Lane Scheme between the Calliope River Anabranch and Reid Road; and
- Minimise costs whilst providing a safe intersection in accordance with DMR Road Planning and Design Manual.

The preferred WICT Access identified in accordance with the above comprises of an at grade T-intersection, located approximately 500m west of the Calliope River Anabranch. The intersection provides for protected right and left turn movements for through traffic design speed of 100km/hr, in accordance with the DMR Road Planning and Design Manual (RPDM):

- Figure 13.45 – Options for Auxiliary Lanes on the Departure Side of an Intersection: (a) Acceleration Lane Transition;
- Figure 13.63 – Preferred Seagull Layout on a Rural Road (Left Hand Side Merge); and
- Figure 13.82 – Auxiliary Left Turn Treatment (AUL) on a Rural Road.

An intersection analysis has been undertaken to determine the intersection capacity through to 2030, 10 years post Stage 3 implementation, with the intersection performing at a high level of service, and with delays to turning traffic well within accepted guidelines.

The intersection has been designed in accordance with the DMR Road Planning and Design Manual for a design speed of 100km/hr. For the initial form of the proposed intersection, ie a single eastbound through traffic lane, the requirements for right turning traffic, both in and out, across the single through traffic lane is in accordance with general practice for rural roads throughout regional Queensland. The provision of the seagull treatment negates any impact on the westbound traffic movements, with two through traffic lanes allowed for in the initial intersection treatment.

When Hanson Road is further developed as an industrial arterial road to a 4 lane divided carriageway from Gladstone City to Gladstone-Mt Larcom Road, as a result of ongoing industrial and port growth to the north west of Gladstone, it may be appropriate to amend the posted speed west from Gladstone City, in line with this function, to 80km/hr. It is noted that the proposed development of the Reid Road / Hanson Road intersection as a roundabout to service other development, when combined with the existing speed restrictions through the Rio Tinto Alumina Yarwun Refinery Access intersection, will result in the reduction of the posted speed from east of the Reid Road intersection through to Gladstone-Mt Larcom Road to 80km/hr. in keeping with the above function as an industrial arterial road.

The future construction of the second eastbound through traffic lane within the proposed WICT intersection shall be introduced within the context of Hanson Road operating as per the above, where the posted speed for the through traffic is typically 80km/hr. The Overtaking Lane Scheme is proposed to be replaced by the construction of a section of 4 lane divided carriageway, comprising:

- Westbound – 1200m length, inclusive of tapers, commencing west of the Anabranch through the above intersection, and terminating west of the Services Corridor; and
- Eastbound – 800m length, inclusive of tapers, commencing west of the Services Corridor and terminating west of the Left Turn Lane into the WICT Access.

The above negates the need for any future construction within the Conveyor Corridor, with the proposed intersection allowing for future extension of the second eastbound lane through the intersection in association with future 4 laning of Hanson Road towards Gladstone by DMR.

3.6.2 Raising of Hanson Road over the new Overland Conveyor

The Conveyor Corridor, which comprises 3 separate conveyors to service WICT, and allows for an additional 2 separate conveyors and 4 pipelines associated with other development south of Hanson Road (currently GPN), crosses the alignment of Hanson Road approximately midway between the Anabranch and Reid Road, at the location of the existing access into Golding Point.

Two basic options were assessed for the crossing of the proposed Conveyor Corridor and Hanson Road, namely conveyor over road and road over conveyor.

Conveyor over Road

The raising of the conveyors over Hanson Road is constrained by the horizontal and vertical design constraints for the conveyors, and the need to provide the vertical clearance to Hanson Road, both existing and future northern carriageway, and then grade down under the existing power lines on the northern side of Hanson Road, with the necessary clearances. No design solution was identified that did not compromise either of the clearance requirements, which together with the desire to maintain minor vehicle access along the corridor for inspection and maintenance, discounted this option from further consideration

Road over Conveyor

The raising of Hanson Road over the conveyors is constrained by a number of factors, inclusive of:

- Soft ground conditions – the existing road in the crossing area is built on up to 4m of soft marine muds, with additional height embankments needing to address issues of stability, differential settlements with the existing road embankment, and long term settlement.
- Alinta Gas Main – the 300mm diameter gas main is a buried pipeline located in a toe berm to the southern side of the existing road embankment, buried at a depth to be located within the soft marine clays. Additional stresses associated with additional embankment loadings are to be avoided where possible, by either constructing at a suitable distance from the main, or providing suitable protection
- GAWB Raw Water Main – a 375mm diameter main is located within the northern batter of the existing road, and will be impacted by any proposed works. Allowance has therefore been made to relocate the pipeline to a suitable location and standard approved by GAWB
- Minimum flood heights – Hanson Road is currently built to approx Q100 flood levels with freeboard allowance. The adopted formation height for the proposed conveyors is at approximately the same level as the road.

The following options were considered for elevation of Hanson Road over the proposed overland:

- Full length bridging, which allows for the retention of the conveyor formation at minimum flood immunity levels, and raising of Hanson Road with no impact on the gas main. This option was discounted due to the cost of the bridging elements.;
- Reinforced earth/sheet piling, which allows for the retention of the road on the existing alignment and retention of the conveyor formation level at minimum levels. This option was discounted due to the high costs associated with soft ground improvements under the higher embankments, and the costs of establishing the reinforced earth structure to negate impacts on the gas main.; and
- Lowering of the conveyor formation across Hanson Road, with minor realignment of the existing road north (adopted). This option allows for the raising of Hanson Road to be minimised, which together with the realignment north, negates any impact on the gas main and minimises costs associated with soft ground improvements.

The conveyors shall be contained within reinforced concrete culverts, which allow for minor vehicle access.

The possible pipelines associated with other development are proposed to be located within reinforced concrete pipes, with 1800mm dia allowed based on current GPN requirement for 1500mm OD pipelines

The proposal is shown in Figure 3.15. Further detail is provided in Figures B17, B18 and B19 (refer Appendix B).

3.7 Construction

Indicative laydown areas for construction and site access routes are provided in Figure B24 (refer Appendix B).

Construction of Stage 1 of the Project is proposed to commence in 2009, for completion by the end of 2012. The timing of Stages 2 and 3 is dependent on the continued buoyancy of the coal market, but the earliest Stages 2 and 3 could be required is 2015 and 2020, respectively. The extent of works in each of the various stages is shown in Figures 3.5 and 3.6 for the rail and road works, onshore terminal works and offshore works.

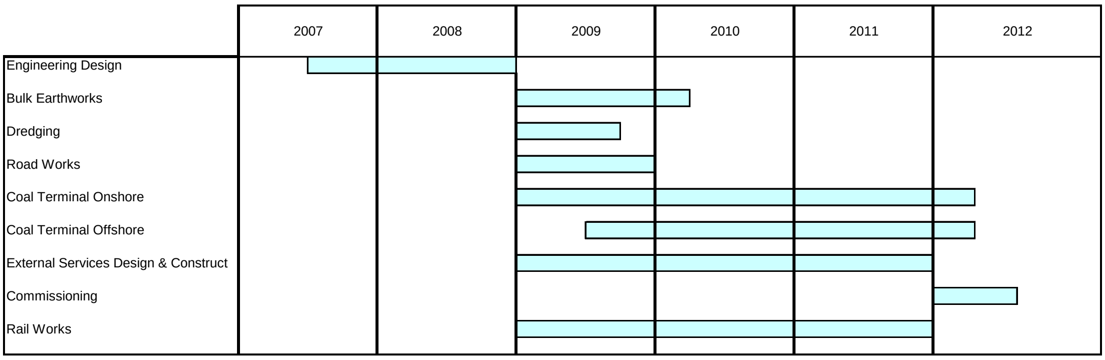


Figure 3.16 Stage 1 Summary Programme

3.7.1 Onshore Construction

The construction of the rail works will involve:

- Site setout and pegging;
- Clearing – utilising dozers, chainsaws, excavators, trucks and similar equipment. Felled material will be stockpiled and mulched for later reuse on batters and within landscaping;
- Bulk Earthworks – major cut to fill operations include the winning of suitable construction material from borrow areas or sections of cut along the railway alignment for the construction of the railway embankment. The bulk earthworks will be constructed in three (3) distinct areas defined by the nature of the existing ground and the local geography;
  These areas are:
  - North of Hanson Road;
  - South of Hanson Road and north of the North Coast Line; and
  - South of the North Coast Line and west of the Calliope River.
- The rail infrastructure will be developed in accordance with the three stages of the WICT development, however most of the railway embankments will be constructed in Stage 1. It is expected that all cut and borrow activities will be achieved by mechanical means (dozers, scrapers, excavators) however, there may be a need for some limited blasting if less fractured rock is encountered. Equipment used in the bulk earthworks construction will include scrapers, excavators, haul trucks, water carts, compactors and graders as well as other sundry equipment;
- Track laying, including the placement of ballast, concrete sleepers and steel rail and turnouts. The majority of these materials will be delivered by rail, with the exception of sleepers which will be delivered by road;
- Erection of overhead electrical equipment. These will be delivered by rail; and
- Installation of railway signalling and communications equipment;

For the ultimate stage, the railway development will include approximately 28km of track work and 14 turnouts within the EIS Project area.

The construction of the first stage of the coal terminal onshore works will include:

- Bulk earthworks for the stockyard combined with the bulk earthworks for the rail embankment works. Approximately 4 million m^3 of earthworks, will ultimately be undertaken. This figure excludes dredge spoil deposition;
- Following completion of bulk earthworks, the major concrete elements would be constructed including the dump station and tunnels, reclaim tunnels and foundations for conveyor galleries, trestles, and towers. This will include open excavation for the complete dump station and tunnels.

- Cut and cover construction will be used for the stockyard reclaim tunnels. The reclaim tunnels will be a combination of cast-in-situ concrete and precast concrete arches;
- Foundations for conveyor galley trestles, transfer towers, surge bins, and other structures will be either piled or high level concrete footings. Nearly all high level footings will be above ASS, however there will be some areas where ASS will be encountered and will need to be managed;
- Civil works will require dump trucks, cranes, dozers, excavators, compactors, water carts, concrete trucks, and articulated trucks for delivery of precast elements. Due to the quantity of concrete required, there is potential to establish a concrete batching plant on site;
- Steelwork for conveyors will be fabricated off site, transported to site and erected. Limited steel fabrication is proposed on site. Erection will involve the use of cranes of various sizes; and
- All mechanical and electrical equipment will be delivered by road.

The origin of materials delivered to site will be subject to contractor and supplier availability. Notwithstanding, proportions of delivery origins have been assumed for the assessment of road impacts.

The estimated total quantities of materials to be delivered to site by road over three stages of construction are summarised in Table 3.4 below.

It is anticipated that the onshore works will take approximately 3.5 years to construct.

Table 3.4 Indicative Construction Material Quantities to be Delivered to Site by Road (excluding quantities for the GSDA rail yard and Moura Link)

	Concrete (m^3)	Steel (t)	Pavements and Special Fill (t)	Supplies (t)
Stage 1	190,000	18,000	70,000	18,000
Stage 2	100,000	21,000	8,000	15,000
Stage 3	90,000	13,000	5,000	14,000

Quantities above are total project quantities including all rail, road, onshore and offshore works.

3.7.2 Road Infrastructure Works

Road works forming part of the Project include:

- At Grade T-intersection with Seagull Treatment for provision of access to WICT
- An access road from the above T-intersection on Hanson Road into the WICT facility;
- Raising of existing Hanson Road to cross over the Conveyor Corridor.
- Construction of northern carriageway of Hanson Road, to provide a 4 lane divided carriageway from the above intersection west across the Conveyor Corridor before merging back to the existing 2 lane road.
- The above work will involve the construction of culverts for the conveyors under the road embankment and services relocation and protection. Negotiations with all affected services authorities are in progress;
- Other site roads and access tracks as required for construction or operational activities;

- It is proposed that the main terminal access during construction be via the T-intersection above. This will allow for a safe/secure access at all times throughout the project. The intersection and northern Hanson Road carriageway would be constructed at the beginning of the Project, to minimise impact on existing traffic and to allow for construction of the Conveyor Corridor across the existing Hanson Road, by diverting traffic onto the new northern carriageway;
- Construction of Reid Road to a low standard sealed road, extending from the end of the existing sealed section east to the proposed new level crossing of the NCL providing access to the Dump Station. The road will be upgraded partially within the existing road corridor to improve deficient horizontal and vertical alignment, within constraints imposed by land resumptions on adjoining properties.

3.7.3 Offshore Construction

The jetty will be constructed from the shore with a travelling construction bridge that spans the pile-headstock bents. Piles will be driven and headstocks installed by a crane mounted on the travelling bridge, in a method called "over the top" construction. Over the top construction eliminates the need for a jack-up barge as the work front is supported off the previously constructed works. Piles and headstocks will be transported to the work front using a tug and barge. Concrete deck units for the roadway will be transported via truck along the portion of jetty roadway already completed, and the steel conveyor galleries may be transported to the work front via barge or via truck along the jetty roadway, depending on the contractor's construction methodology.

The wharf will be constructed on an independent front concurrent with the jetty construction so it will not be possible to get access to the wharf construction front from the jetty. The first two wharf bents will be constructed using a jack-up barge or large floating crane barge with temporary spud piles supporting the piling frame. The jack-up barge would then be used to install crane beams and a crane and the majority of the wharf would be constructed using over the top construction. The jack-up/floating barge may also be used to construct non-repetitive elements of the wharf (eg transfer tower platform, independent mooring dolphins at end of wharf).

It is expected that the shiploader will be constructed complete offsite, shipped to site with a heavy lift ship and lifted onto the wharf. Other alternatives the contractor may adopt include bringing the shiploader to site in two pieces (main frame and boom), or bringing it to site in several large pieces and assembling it on the wharf.

It is envisaged that the following type of equipment will be used for the offshore construction:

- Large jib crawler cranes at each work front supported on travelling bridge or crane beams;
- Jack-up barge or floating crane barge for initial mobilisation and isolated structures;
- Dump barges and tug for supply of materials to the work front;
- Tyre-mounted hydraulic cranes for follow-up work fronts (eg decking installation);
- Hydraulic or diesel pile driving hammers;
- Welding equipment;
- Painting equipment; and
- Grouting equipment.

A barge ramp facility (refer Figure B14, Appendix B) will be used to launch all the offshore equipment and materials that are not supplied along the jetty roadway.

Stage 2 and Stage 3 will adopt similar methods of construction to Stage 1. However, there will be no need to use a jack-up barge to establish the wharf front, as the new wharves will be able to be built off the end of the existing wharf.

Table 3.5 gives an estimate of the materials required for the offshore construction for each stage of the coal facility.

Table 3.5 Marine Works Quantities

	Stage 1	Stage 2	Stage 3
Extent of Works	Jetty and Berth 1	Berths 2 and 3	Berth 4
1200mm diameter steel piles	20,200 m of piling 487 piles	10,560 m of piling 264 piles	4,920 m of piling 123 piles
Steelwork	6,200 tonne	8,000 tonne	5, 300 tonne
Pre-cast concrete deck units	2200 deck units	2000 deck units	700 deck units

It is envisaged that the offshore construction for Stage 1 will take around three years. Stages 2 and 3 will be of similar but shorter duration than Stage 1. The actual implementation timing is dependent on demand for increased capacity.

Sections 3.4.8 to 3.4.10 and Figures B9 to B14 (refer Appendix B) provide further information on the offshore works.

3.7.4 Dredging and Dredged Material Disposal

Description of the Proposed Works

As part of the WICT development over 6.3 million m^3 of material is required to be dredged in two stages, the first of which would remove 3.2 million m^3. The dredging is required to create berth pockets, a departure channel and turning basin to allow access to the coal terminal.

The materials within the proposed dredging area consist primarily of silty sand, sand, clayey sand and clays with gravel at depths to RL-16 m with increasing gravel content below this level. It is proposed that the entire dredged volume be contained within two reclamation areas located over 3 km from the dredging site. These reclamation areas are to be designed to store the soil-water mix for a sufficient time so that the discharge water is acceptable to release into the Calliope River.

The sections below provide an overview of the capital dredging for Stage 1 and the ultimate development case.

Stage 1 Overview

The dredging works present the following constraints:

- Distance from dredging site to Golding Point varies from 1.8 to 3.0 km;
- There are two reclamation areas that are a further 2 km and 3.5 km inland respectively to the centre of each area giving a total of approximately 4 to 6.5 km from the dredge site;
- Dredging works will progress ahead of the wharf construction. It is anticipated that approximately six months may be necessary to complete Stage 1 dredging works;
- The bulk of the dredging will be undertaken with a Cutter Suction Dredge (CSD) with connecting pipelines to the reclamation areas;
- Shallow tidal flats and the shallow Calliope River entrance make the conditions unfavourable for alternative modes of dredging, such as the use of a TSHD to reach the shore, therefore long-distance pumping by CSD is envisaged across the tidal flats;
- Due to the pumping distances, additional booster pumps will be necessary to carry-out the dredging works to convey the stiff clays and gravel;
- It is anticipated that such dredging equipment would use 800 to 900 mm diameter discharge pipes and have engines with a total installed power in excess of 10,000 kW;

- Additionally, operation with one or two compatible booster pump stations in the delivery line will be required to be able to reach the reclamation sites whilst dredging gravel and or clays. Each booster station would have an installed power in excess of 3500 kW;
- The CSD would initially undertake the dredging of the berth pocket before moving to other areas. Dredging works will progress ahead of the wharf construction. It is anticipated that approximately six months may be necessary to complete Stage 1 dredging works;
- The Stage 1 dredging will also require a Trailer Suction Hopper Dredge (TSHD) to dredge approximately 400,000m^3 of material from the eastern extremity of the Departure Channel and remote northern areas of the swing basin. This is to address navigational requirements in the Targinnie Channel, where a CSD with floating pipeline would disrupt vessel traffic in the channel;
- Figure 3.18 shows the extent of dredging by CSD and TSHD;
- The TSHD would be fitted with pump-out installations. The TSHD would intermittently deliver dredge spoil to a separate disposal area adjacent to the R G Tanna Coal Terminal. This disposal area has been previously reclaimed using materials dredged for the R G Tanna Wharf;
- The TSHD may operate simultaneously to the CSD;
- Dredge spoil material consists of clay, silt, sand and gravel, some of which may require management of Acid Sulphate Soil;
- Dredging would be undertaken before jetty construction, and spoil from the CSD should be used at the future GPN site as the first priority; and
- The transport water used in the dredging process will require settlement of fines to acceptable levels of suspended solids before release to the Calliope River Anabranch or Port Curtis at the envisaged outfall location(s).

Ultimate Development Dredging Overview

The ultimate dredging scenario completes and corresponds to a deepening and widening of the wharf infrastructure to accommodate six berths. It is proposed to undertake the deepening before construction of any additional wharfs at some point of time in the future. Again a large CSD would be necessary with connecting pipelines to the land based reclamation areas.
The methodology for the CSD work is the same as Stage 1, but use of a TSHD is not required after Stage 1.

The ultimate dredging could be carried out as a single stage, following the first stage, or in a number of stages to accommodate each additional berth only. However, for the purpose of the dredging assessment a single large Stage 2 dredging scenario to the ultimate case has been considered.

Areas to be Dredged

From the soil information in the Douglas Report (2006A), it can be noted that:

- The upper layers of the materials to be dredged to RL-16m consist in general of silty sand, sand, clayey sand and clays with traces of gravel; and
- The lower layers contain an increasing amount of clay bound gravel over depth.

From the above it follows that with increasing dredging depth the materials can be separated for dredging as follows:

- The Swing Basin areas from the present seabed surface to RL-11.7 m contain silt, sand and clayey sand;
- The Departure Channel from the present seabed surface to RL-16.0 m will contain silty, clayey sand with increasing levels of gravel and clays; and
- The Berth Pockets to RL -16 m to -18.8 m contain pockets with gravel in excess of 30 to 50% within very dense sandy clay grading to hard clays.

Quantity of Dredged Material

The dredging quantities for the proposed stages of the development are as follows:

- Stage 1 3.2 million m^3
- Stage 2 3.1 million m^3
- Ultimate (Stage 1 and Stage 2) 6.3 million m^3

Characteristics of Dredged Material

The characteristics of the dredged material remain unchanged from the description in the EIS.

Dredging Equipment

The dredge equipment is unchanged from that described in the EIS.

Dredge Spoil Disposal Strategy

It is planned that the majority of the dredge material will be brought ashore and deposited in three bunded reclamation areas on the WICT site, named Reclamation B, C-1 and C-2 respectively and an existing reclamation area at the RGTCT site. Reclamation Areas B and C-1 are proposed to be used in Stage 1. Reclamation areas B and C-2 are proposed to be used in Stage 2. Approximately 400,000m^3 of material from stage 1 dredging, to be dredged independently by a TSHD, is to be directed to existing reclamation areas at the RGTCT. This is the same spoil area used for the dredging of RGTCT Berth 4.

Based on the physical and land constraints presented by the site it is proposed that the entire volume of dredge spoil be fully contained within the bunded area. The bunds will be designed such that the levels can be raised in response to increased dredge volumes.

The following presents a brief overview of the proposed end materials in each reclamation area.

The top layers of materials found within the dredge footprint will consist of sand, silts and clay. This spoil can be pumped directly into Reclamation Area C-1 and the fines in the transport water will be allowed to settle in the areas of this reclamation site, before release to the Calliope River Anabranch.

Figures 3.18 and 3.21, and B26 (refer Appendix B) provide details of the Reclamation Sequence and sections through the dredge and spoil disposal areas.

Area B forms the spoil disposal site where gravel, coarse sand and clay balls will be deposited in three cells. After reaching maximum height levels in the reclamation, the dredge discharge points will be changed to the next cell, whereafter clamshell, dragline or excavator cranes mounted on tracks dispose of the spoil in trucks for final disposal in areas within Reclamation Area B or C-1.

All transport water generated at this stage will be trained through settling ponds. The settling ponds will be used to drop out fines and clayey material in suspension before discharge of water into the Calliope River.

Using the above process the drained excess water should meet required sediment concentrations for release to the Calliope River.

In view of the nature of the materials to be dredged, it is likely that the reclamation areas will generally consist of:

- Area B – silty sandy clay with gravel; and
- Area C – silty clayey sand with some gravel.

Both sites will contain soft loose material, which will require dewatering, settlement and compaction before forming the final land surface.

Reclamation Area B

In order to limit the rehandling and transporting sand from Reclamation B to C, it is proposed to pump predominantly sand mixtures to Reclamation Area C and reserve Reclamation Area B for mixtures of material containing larger gravel percentages.

Reclamation Area C-1

Silt, clayey sand, sandy clay, as well as materials, defined as containing gravel traces, will be pumped directly into Reclamation Area C, commencing from NE to SW.

Levelling will take place whilst the reclamation face progresses and would include an allowance for long term settlement including sub-soils and dredge spoil.

Materials transported by truck from Reclamation Area B will be end-tipped and levelled at locations where this superior fill material will be beneficial.

Bund design and construction

Bunds are formed from homogeneous embankments of non-dispersive, general fill materials using conventional earthworks equipment. Bunds are typically 5 m crest width and 2:1 (horizontal to vertical) side batters.

External bund walls have been designed to contain the proposed dredge spoil fill volumes, plus allowance for decant water depth plus freeboard.

External bunds for Stage 1 would be formed by upstream raising of conveyor, road, or stormwater pond formations, or else as discrete bunds, or as contour banks (Area C at RL 4.0) to natural hillsides.

External bunds for Stage 2 would be formed by upstream raising of existing external bunds or as above for Area C-2. Internal bunds have been prepared for Stage 1 to minimise short circuiting of decant flows and to facilitate discrete settling of suspended particles and other sedimentation processes.

- Area B

Three Primary Cells have been proposed, to be filled out in turn, for a single discharge point. Individual ponds have been sized to capture 100% of gravel plus a proportion (Cell Area / Total Pond Area) of sand, and finer materials. A single Secondary Cell has been sized to capture the remainder of the sand plus a proportion of finer materials. A single secondary cell is proposed to facilitate re-dredging of materials for further transport to Area C, if required. The Tertiary Pond is the residual area capturing the remaining fine materials. A polishing pond is provided.

Area B bunds are proposed to have crest levels at the proposed fill out level plus nominal water depths of 1m for primary and secondary ponds and 0.5m nominal water depth for the tertiary ponds, and varying freeboard. This arrangement is proposed to include an allowance for beaching of solids, and to ensure minimum clearance for vehicles on the bunds to the overhead HV cables near Hanson Road.

- Area C-1

Two secondary ponds, each with two or three discharge points are proposed to facilitate even deposition. The internal bunds and secondary ponds are located and arranged to maximise deposition of sand materials under the future GPN stockpile areas. A two stage tertiary pond is proposed. No polishing pond is proposed for Area C-1.

Bunds for Area C are to be constructed to crest level of the proposed fill out level plus 1 m nominal water depth plus 0.5 m freeboard.

- RGTCT

Approximately 400,000m^3 of material from stage 1 dredging, to be dredged independently by a TSHD, is to be directed to existing reclamation areas at the RGTCT. This is the same spoil area used for the dredging of RGTCT Berth 4.

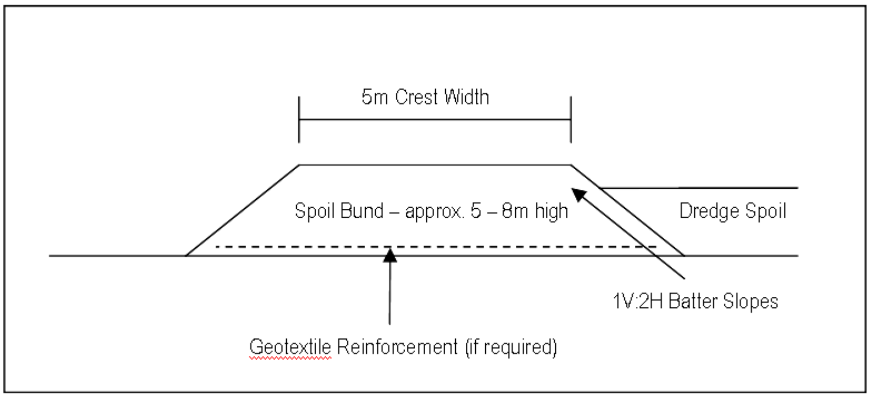


Figure 3.22 Typical Starter Bund Section

Settling Rate of Fine Sediments

The settling rates of fines varies for clays and silts and to establish these rates, it will be required to perform settlement column tests on actual samples of materials (silts and clays) from the dredge site obtained from boreholes. The process of settling these fines must be modeled to confirm the experiences of past dredging contracts in the area.

Modeling work has been carried out to determine residence time, settling rates, pond performance and suspended sediment discharge criteria in order to calculate pond sizes.

The observed long term and short term settlement rates, as applicable to the duration of the dredging, will provide the base information for an estimation of the volumetric requirements of the settlement ponds for the silt and clay particles from the relevant soil type and related quantities. However, previous dredging experiences in the Gladstone area and elsewhere would indicate the following:

- Sand, clay balls and gravel will remain on the Reclamation Areas near the discharge point.
- A minor amount of fines will be trapped within the voids of the granular material, while the bulk of the clay and silt fines will separate and wash out of the advancing reclamation face into the bunded areas reserved for settlement.

- Initially, while dredging is in progress, settlement pond capacity of 3.5 to 4 times the clay and silt volume will be required, estimated from the soil investigations of the in-situ materials in the dredging area. This is in order that the discharge waters (super-natant) are of a quality which meets the environmental requirements. Over time (years) the silts and clays will further settle to approximately 1.5 times the original silt and clay volume.

Reclamation and Settlement Pond Capacity

The proposed Stage 1 dredging of 3.2 million m^3 and placement in the reclamation sites will require an initial storage capacity and long term storage capacity as indicated in Table 3.6.

Table 3.6 Storage Requirements Stage 1

Areas B and C-1, Dredge Spoil from CSD

Material	Percent Quantity (%)	Insitu Volume (m^3)	Short Term Volume (m^3)		Long Term (m^3)	
			Bulking Factor	Initial Quantity	Bulking Factor	Quantity in > 4 years
Silt and Clay	42	1,176,000	3.5	4,116,000	1.5	1,764,000
Sand	44	1,232,000	1.1	1,355,200	1.05	1,293,600
Gravel	14	392,000	1	392,000	1	392,000
Total Storage Requirement		2,800,000		5,863,200		3,449,600

Table Notes:
- No allowances included for settlement of existing sub-soil in reclamation.
- Soil breakdown based on separation of fines

Area adjacent RGTCT, Dredge Spoil from THSD

Material	Percent Quantity (%)	Insitu Volume (m^3)	Short Term Volume (m^3)		Long Term (m^3)	
			Bulking Factor	Initial Quantity	Bulking Factor	Quantity in > 4 years
Silt and Clay	42	168,000	3.5	588,000	1.5	252,000
Sand	44	176,000	1.1	193,600	1.05	184,800
Gravel	14	56,000	1	56,000	1	56,000
Total Storage Requirement		400,000		837,600		492,800

Table Notes:
- No allowances included for settlement of existing sub-soil in reclamation.
- Soil breakdown based on separation of fines

The ultimate development and dredging of 6.3 million m^3 with placement in the reclamation sites will require approximate short term and long term storage capacities as indicated in Table 3.7.

Table 3.7 Storage Requirements Stage 1 and 2

Material	Percent Quantity (%)	Insitu Volume (m^3)	Long Term Volume Stage 1 and Short Term Volume Stage 2 (m^3)		Long Term (m^3)	
			Bulking Factor	Initial Quantity	Bulking Factor	Quantity in > 4 years
Silt and Clay – Stage 1	42	1,344,000	1.5	2,016,000	1.5	2,016,000
Silt and Clay – Stage 2	40	1,240,000	3.5	4,340,000	1.5	1,860,000
Sand – Stage 1	44	1,408,000	1.05	1,478,400	1.05	1,478,400
Sand – Stage 2	46	1,426,000	1.1	1,568,600	1.05	1,497,300
Gravel – Stage 1	14	448,000	1	448,000	1	448,000
Gravel – Stage 2	14	434,000	1	434,000	1	434,000
Total Storage Requirement		6,300,000		10,285,000		7,733,700

Table Notes:

- No allowances included for settlement of existing sub-grade in reclamation.
- Soil breakdown based on separation of fines

Quantity of Tailwater Generated

The ratio of solids over transport water is a function of the available power on the dredge and booster pumps, as well as the type of material, cut height, pipe line diameter and the delivery distance.

With efficient pumping, the following will apply to a large suitable dredger (10,000 kW on pumps) with one or two booster stations while pumping into the reclamation sites. A range of tailwater generation volumes for two sizes of dredge, various soil types and destinations are provided in Table 3.8 and 3.9

The pump out power for the TSHD proposed for the WICT dredging will be in a similar range to the CSD, i.e. 10,000kW to 20,000kW. Therefore it is assumed that the TSHD tailwater volumes will be equal to the CSD.

Table 3.8 Reclamation Area B – Tailwater flow rates

Material	Reclamation Area	Power	Booster (s)	Area B Tailwater Volume per day of 24 hours	
				CSD 10,000kW	CSD 20,000kW
Silt	C	Low	Nil or 1	90,000m^3	115,000m^3
Sand	C	Medium	1	125,000m^3	150,000m^3
Silt/Sand/Clay	C	Medium	1	135,000m^3	165,000m^3
Clay slurry	C	Low/medium	1	140,000m^3	170,000m^3
Clay-clay balls	B	High	1 or 2	150,000m^3	180,000m^3
Gravel/Sand	B	High	2	150,000m^3	190,000m^3
Gravel	B	High	2	145,000m^3	180,000m^3

Table 3.9 Reclamation Area C – Tailwater flow rates

Material	Reclamation Area	Power	Booster (s)	Area B Tailwater Volume per day of 24 hours	
				CSD 10,000kW	CSD 20,000kW
Silt	C	Low	Nil or 1	115,000m^3	150,000m^3
Sand	C	Medium	1 or 2	135,000m^3	170,000m^3
Silt/Sand/Clay	C	Medium	1 or 2	145,000m^3	175,000m^3
Clay slurry	C	Low/medium	1	145,000m^3	175,000m^3
Clay-clay balls	B	High	2	150,000m^3	185,000m^3
Gravel/Sand	B	High	2	150,000m^3	200,000m^3
Gravel	B	High	2	155,000m^3	190,000m^3

Average pumping distances from the CSD are taken as 4,500 m to Reclamation Area B and 6,500 m to Reclamation Area C for the above indications.

Dredges with larger pump capacities and larger booster station(s) will produce larger tailwater volumes, as reflected in low and high range. From the above tables, it follows that the estimated tailwater flow is subject to the size of the CSD and will vary from 150,000 m^3 to 190,000 m^3 per day for Reclamation Area B and from 135,000 m^3 to 185,000 m^3 per day for Reclamation Area C.

Sedimentation Basin Design

Modeling work has been carried out to determine residence time, settling rates, pond performance and suspended sediment discharge criteria in order to calculate pond sizes.

Residence time within settling ponds must be adequate, as may be deducted from settlement tests and related studies. There must be adequate residence time at the end of the works in the reduced size settlement ponds.

At the start of the works, ponding capacity is not as critical an issue as it may be at the end of the reclamation operations, when ponds are nearly filled to capacity with fines. As a guide, from experience the dredging industry would use three to five times the in-situ clay volume and three to four times the in-situ silt volume as being the storage capacity required for works, using dredgers with the capacities as indicated.

The ranges of factors for settlement capacities relate to the size of the dredger, the particle sizes of the clays and silts and the duration of the works. In this instance and from experience gained when reclaiming at the RGTCT and Fishermans Landing Berths with medium size dredgers a factor of 3.5 is expected to be sufficient, subject to settlement tests and deep settlement ponds.

The settlement rate of fines is assisted by the low velocity of tailwater flows through the ponding area. Bearing this in mind, wide (>200 m) and deep (>3 m) ponds would be preferable over narrower and shallower ponds.

The principle of slow sheet flow over the surface of the settlement ponds can be created by distributing the discharge points (consisting of many smaller pipes with adjustable invert levels) from the primary cells to subsequent cells over the full width of the intermediate bunds. This principle assists in taking fine particles from the upper tailwater flow by dropping from the surface flow in the deeper depth of the settlement pond, where slower or no currents exits. The effects of the principle of sheet flow may be influenced by surface winds, shallow ponds areas and ponds with narrow sections.

The flow rate for tailwater from the reclamation sites is assumed to be approximately 1,500 and 2,200 L/s, based on dredge pump capacities for tailwater discharges of 135,000 to 190,000 m^3 per day, respectively for 10,000 kW (800 mm diameter discharge) and 20,000 kW (900 mm diameter discharge) cutter suction dredges. In general, the following Table 3.10 can be adopted for pumping to Reclamation Areas B and C:

Table 3.10 Percentage of solids (by volume) in the soil/water mixture

Hydraulically Delivered Soils			Percent of Solids by Volume	
Soil Type	Estimate % of Total Quantity	Quantity (m^3)	Reclamation Area B Average Distance 4500m	Reclamation Area C Average Distance 6500m
Silt with no Gravel	5%	160,000	35	30
Sand with 5% Gravel	45	1,440,000	20	15
Clays with 10% Gravel	35	1,120,000	17.5	12.5
Gravel 50% Claybound	15	480,000	12.5	7.5
Average Percentage	100%	3,200,000	20%	15%

Table Notes:

- The above percentages may vary with dredging contractors, equipment selection, method of cutting and pipe line selection.

Control of Sediments in Tailwater

The general rule applying to dredging and reclamation works for control of the sediments in the tailwater involves a design that will leave a minimum of 10% of ponding volume available at the highest water levels in the settlement ponds at the completion of the works.

The ponds are configured to include primary, secondary, tertiary and polishing ponds and, allow for emergency settlement procedures. The consequences of there being two main reclamation areas connecting to two separate settlement pond systems will include:

- In case of emergency, the valve system can be changed from discharging in Area B to Area C-1 and vice versa;
- Heavy gravel soils will be deposited in Reclamation Area B;
- The use of two separate systems can allow for planned interchanges from one Reclamation Area to the other to provide additional residence time for the tailwaters;
- The primary ponds immediately following the discharge of dredged spoil will contain the highest levels for bunding to provide adequate capacity; and
- The secondary ponds will have a lower level and will be fitted with adjustable weir structures, which will be designed to allow for raising and lowering of the water level in the ponds.

The rainfall effect on ponding requirement is minimal. Rainfall, as freshwater, will typically form a less saline and less turbid surface layer over tailings and decant, and be preferentially released over weirs. If rainfall does increase the water levels in the ponds the outlet weirs can be raised or lowered as required to control discharge. In case of emergency the polishing pond will be able to contain at least two hours of dredge discharge without external discharge.

Layout of Disposal Areas

The reclamation process is in essence a basic operation that relies on gravity. The soil-water mix enters the pond and the large particles settle first while the finer particles take longer to settle. Within the reclamation ponds it is important to reduce the velocity and increase the flow path to encourage settling.

Based on the above consideration the disposal area layouts have been designed as wide, deep ponds with internal bunds to encourage long flow paths. Within reclamation area B there are three primary cells to be filled out in turn, for a single discharge point. Individual ponds have been sized to capture 100% of gravel plus a proportion of sand and finer materials. While one cell is filled by pumping from the dredge, the other cell is cleared of coarse particle components by dry earth moving equipment. A single Secondary Cell has been sized to capture the remainder of the sand plus a proportion of finer materials. A single secondary cell is proposed to facilitate re-dredging of materials for further transport to Area C, if required. The Tertiary Pond is the residual area capturing the remaining fine materials. A polishing pond is provided.

For reclamation area C, two secondary ponds, each with two or three discharge points are proposed to facilitate even deposition. The internal bunds and secondary ponds are located and arranged to maximise deposition of sand materials under the future GPN stockpile areas. A two stage tertiary pond is proposed. No polishing pond is proposed for Area C.

To assist in the reclamation process, weir boxes are installed between ponds. These structures allow the control of the water level within the ponds. Boards are placed within the weir box where required to increase the level of sediment within the ponds while allowing the water to decant. In addition, if the water quality leaving a pond is unacceptable the weir box can be raised to prevent further release until the quality is acceptable.

Dewatering/polishing ponds are proposed to act as a final polishing area for waters prior to discharge back into the Anabranch. The majority of sediment will settle in the initial reclamation ponds while the dewatering ponds will only retain the finer fractions.

The final layout of the internal bunds will not be confirmed until further information on the dredge spoil is obtained.

Outlet Structures

Conventional drop inlet structures fabricated from pre-cast reinforced concrete items are proposed. The outlet structures are likely to comprise a 1650 DN drop inlet well, with a 900 DN RCP outlet culvert through the bund wall or road formation, to a pre-cast headwall. Figure 3.19 illustrates the dredge spoil decant structure for the following locations:

- The outlets from Area B to the polishing pond
- The outlet from Area C-1 to a small creek, upstream of the conveyor formation
- The outlet from the polishing pond to a small inlet off the Calliope River Anabranch

The first two outlets discharge into ponds with fixed water levels and do not require scour protection. Scour protection is to be provided for the outlet from the polishing pond to control erosion from flows into the small inlet.

An outline Dredge Environmental Management Plan has been drafted and is contained in Appendix D. This includes calculations of residence times and estimated water quality and discharge.

3.7.5 Shipping

Shipping Requirements

It is anticipated that the fleet to cater for the coal trade will continue to follow the vessel size distributions for both deadweight tonnage and cargo lift as currently experienced at RGTCT.

The controlling factor for the shipping fleet is essentially the receival port limitations on draft and beam of the vessel.

It is anticipated that the customers for Central Queensland Coal will continue to be the traditional traders.

The fleet distribution experienced at RGTCT over the three year period from 2003 -2006 is shown in Figure 3.23.

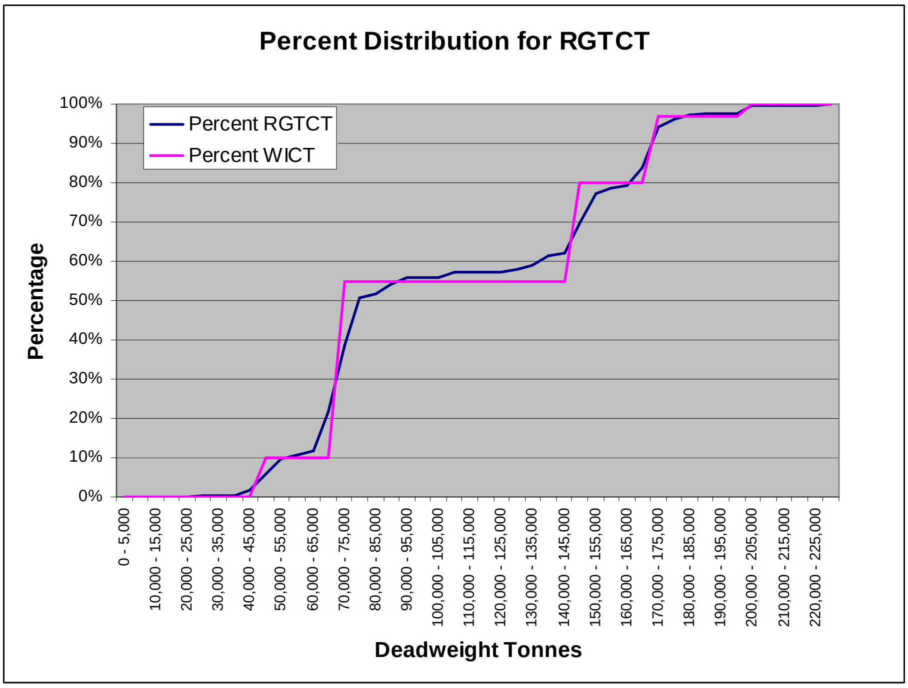


Figure 3.23 RGTCT Shipping Fleet Distribution

An idealised distribution shows that the anticipated fleet for WICT would be:

- Handimax 10%;
- Panamax 45%; and
- Cape 45%.

The average cargo size for all vessels through RGTCT over the financial period 2003-2006 is approximately 90,000 tonnes.

Based on the assumption that a similar fleet and cargo lift results at WICT, the number of vessels anticipated for each stage of development is:

- 25,000,000 tonnes - 280 vessels;
- 50,000,000 tonnes - 560 vessels; and
- 75,000,000 tonnes - 840 vessels.

Further details on shipping and the impacts of increased shipping are included in Section 6.

3.7.6 Road Use

Details of traffic generated during construction and operation are included in Section 6.

3.7.7 Energy

The coal terminal requires electricity and diesel fuel for operation.

The coal terminal requires diesel fuel for operation of the dozers. For the ultimate facility approximately 100kL of diesel per week will be required.

The coal terminal also requires a significant power supply to run the materials handling system from rail inloading through to the shiploaders. The electrical energy needs for the ultimate coal terminal development are estimated to be in the order of 55 GWhrs per annum.

Equipment will be selected to minimise energy consumption and overall life cycle costs.

3.7.8 Water Supply and Storage

There are two water demands for the site, potable water and raw water. These can be defined as follows:

- Raw water – defined as water from the Gladstone Area Water Board (GAWB) raw water distribution network. Water is not guaranteed fit for human consumption; and
- Potable water – water fit for human consumption.

The estimated demands for raw water at the coal is summarised below. These demand estimates will be reviewed at the detailed design stage.

Table 3.11 Summary of Estimated Raw Water Demands

	Coal Terminal		
Stage	1	2	3
Peak flow rate (L/s)	113	218	318
Peak day use (kL)	2,816	5,410	7,890
Annual demand (ML)	720	1390	2025

The Peak day figures includes potable water requirements and the Dump Station but does not include water for construction, and excludes for internal recycling and site stormwater capture and reuse. The Annual demand includes allowance for internal recycling and site stormwater capture and reuse. Use and Demand for stages 2 and 3 will need to be adjusted when actual values from Stage 1 become available.

The proposed source of raw water for the terminal is from the existing GAWB raw water reticulation network. There is an existing 375 mm diameter raw water main on the north side of Hanson Road. A branch off this main, approximately 2.5-3 km in length, is proposed to service the terminal. Depending upon the pressure of the existing supply, storage and re-pressuring may be required.

Where it is feasible recycling of water will be implemented to reduce the total load on the raw water supply. Each washdown location will have a recycling facility. The stockpile dust suppression system will be supplied by an onsite storage with raw water used only as a back-up supply. In addition, nearly all water will be harvested from stormwater runoff from the coal terminal and areas to the east of the overland conveyor and to the north of Hanson Road. Raw water will be stored in appropriately sized ponds and tanks (size to be confirmed). At the dumpstation, raw water will be harvested from inside the rail loop.

The estimated demands for potable water at the coal terminal are summarised below. These demand estimates will be reviewed at the detailed design stage.

Table 3.12 Summary of Estimated Potable Water Demands

	Coal Terminal		
Stage	1	2	3
Peak flow rate (kL)	8.8	16.8	24.5
Annual use (ML)	21.4	41.1	60.0

Demand for raw water for construction will peak in the order of 1.0 to 2.0 ML/day during Stage 1 construction. This will be primarily used for earthworks construction. Construction needs would be supplied from GAWB supplies. Most water would be obtained from the GAWB main along Hanson Road. Supply needs for Stages 2 and 3 will be an order of magnitude less. It is anticipated that construction water needs will be less than ultimate peak operational demand off the Hanson Road main. Raw water to the dumpstation would be provided via a long pipeline from the Hanson Road main along the conveyor formation.

Onsite treatment of raw water will be used to provide the potable requirements for the coal terminal. A combined balancing storage and header tank for raw water prior to treatment and on-site balancing storage of potable water before distribution around the site will be required.

The proposed source of potable water for the dumpstation is a connection into the existing water reticulation network serviced by the Reid Road Water Treatment Plant (WTP) on Reid Road near the corner of Hanson Road. This includes a new 75mm OD PE pipeline (approximately 1.5km in length) along the Reid Road corridor to connect to the existing 150 mm pipeline along Reid Road.

3.7.9 Sewerage

The sewage flows estimated below are based on estimated staff numbers at the coal terminal. The estimated sewage quantities for the coal terminal is summarised below. These estimates will be reviewed at detailed design stage.

Table 3.13 Sewage Estimates

	Coal Terminal		
Stage	1	2	3
Average dry weather flow (L/s)	0.23	0.43	0.63
Daily volume (kL)	19.5	37.4	54.5

The preferred strategy is to install onsite sewage treatment plants and dispose effluent by onsite irrigation of landscape areas at both the coal terminal and the dump station. There is sufficient room reserved for treatment facilities at the coal terminal to allow construction of a stabilisation pond and wetland system to treat wastewater to achieve, with additional disinfection, Class A recycled water suitable for on-site irrigation. The flows at the dump station (approx 6 ep) can be handled by a domestic package system.

Very small sewage flows would be generated at the wharf. It is likely that on site package plants at the wharf will treat the water to a sufficient standard to allow discharge of effluent at the wharf. Alternatively the sewage will be transported to shore and treated at the coal terminal treatment plants.

3.7.10 Stormwater Drainage

The stormwater drainage criteria are unchanged from the WICT EIS.

3.7.11 Telecommunications

Telstra own a fibre optic cable beside Hanson Road. Telecommunications for the terminal and railway facilities will most likely be derived from this service.

3.8 Rehabilitation and Decommissioning

Decommissioning from construction phases will involve demobilisation from laydown areas and areas dedicated to the construction offices and workshop areas. Demountable sheds and offices will be removed and if in good order used for other projects.

All areas will be thoroughly cleaned of debris and other containments. If landscaping of these areas is proposed these will be planted out and established with the appropriate vegetation. However, many of these construction areas will be used for future stages of construction going forward to Stage 3.
The final area of the coal terminal to be developed will be the last area of the stockyard. It is proposed that the stockpile base for this area be used for construction laydown and site offices for the final stage of construction.

Decommissioning of the terminal and rail infrastructure is unlikely to occur in the foreseeable future, as the minimum design life for the facility is 50 years.

Options that would be considered at decommissioning of the entire facility include:

- Handling of an alternative product through the facility. This would require retrofitting/modification of the entire facility to suit the alternative product; and
- Dismantle and change land use. The plant is to be designed to achieve minimal contamination of the site during operations and decommissioning will therefore involve removal of materials that could lead to contamination when the plant is no longer in operation. Rehabilitation of the site will be consistent with the proposed change in land use.

3.9 Waste Management

Section 13 of the EIS contains details of waste management.

Table 3.14 is a list of figures from the WICT EIS and Supplementary EIS which describe the Project and indicate whether the figure is new, removed, unchanged or updated to reflect the project changes.

Table 3.14 Summary of Project Description Figures

Figure Number	Status	Description
3.0.1	Added	Rail Yard Location Options Plan General Arrangement
3.0.2	Added	Rail Option 1 (not preferred)
3.0.3	Added	Rail Option 2 (not preferred)
3.0.4	Added	Rail Option 3 (preferred)
3.1	Revised from WICT EIS	Overall Project Layout
3.2	Revised from WICT EIS	Extent of Clearing Earthworks and Offshore Works Area
3.3	Revised from WICT EIS	Approximate Extent of Cut and Fill Areas
3.4	Revised from WICT EIS	Extent of Coal Terminal and Marine Facilities
3.5	Revised from WICT EIS	Staging Plan Sheet 1of 2
3.6	Revised from WICT EIS	Staging Plan Sheet 2 of 2
3.7	Removed	Alternative Rail Option
3.8	Revised from WICT EIS	Reclamation Boundaries – Gazetted and Proposed
3.9	Revised from WICT EIS	Proposed Dredge Spoil Disposal Area
3.10	Revised from WICT EIS	Estimated Construction Workforce Distribution – Stage 1
3.11	Revised from WICT EIS	Estimated Construction Workforce Distribution – Stage 2
3.12	Revised from WICT EIS	Estimated Construction Workforce Distribution – Stage 3
3.13	Revised from WICT EIS	Extent of Seabed Dredging Ultimate Six Berth Configuration
3.14	Revised from WICT EIS	Stockyard and Facilities General Arrangement
3.15	Revised from WICT EIS	Proposed Works to Hanson Road
3.16	Revised from WICT EIS	Stage 1 Summary Programme
3.17	Removed	Typical Cutter Suction Dredge
3.18	Revised from WICT EIS	Proposed Dredge Spoil Process Schematic
3.19	Removed and replaced	Proposed Dredge Spoil Decant Structure and Drainage Dissipater Details
3.20	Removed	Basic Trailer Suction Hopper Design
3.21	Revised from WICT EIS	Proposed Dredge Spoil Process Plan
3.22	Revised from WICT EIS	Typical Starter Bund Section
3.23	Unchanged	RGTCT Shipping Fleet Distribution

4. Topography, Geology and Soils

4.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to topography, geology and soils issues are outlined below.

- Further details are required of the treatment methods proposed to protect the reclaim area from erosion (ie potential bank undercutting and natural meander). Natural measures are preferred over artificial structures (ie a buffer to the creek bank and revegetation is preferred to revetment).
- Further details of proposed erosion protection measures at the point of discharge to natural waters.
- Further information should be provided on the potential for displacement of estuarine mud as a result of reclamation at Golding Point. The additional information should address the potential impacts associated with Acid Sulfate Soils (ASS) and the potential of this mud to impact on water quality (particularly pH and metals) and the potential impacts on seagrass associated with increased sedimentation through dispersion by the strong tidal flows in the adjacent channel. The discussion should address the design and construction measures to be used to prevent significant environmental impacts in the short and long term.
- Mitigation measures need developing in order to manage erosion of bunds by stormwater runoff and tidal waters. Measures should include re-establishing marine vegetation and rock revetments where necessary.
- Provide further detail regarding the potential impacts of ASS and recommended mitigation measures including groundwater, surface water and tidal flows, settlement, erosion, embankment stability and treatment locations.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

4.2 Project Changes

The change to the Project layout has resulted in a reduction in the overall area of direct disturbance in terms of soils and geology. In particular, the requirement for the area within the Byellee wetlands and a bridge crossing for the Calliope River have now been removed. This will lead to a significant reduction in impacts upon the topography, geology and soils and the potential for acid sulfate soil (ASS) disturbance within these areas.

4.2.1 Wiggins Precinct

Project changes within the Wiggins Precinct relate to the relocation of the dump station and rail loop to the Forest Precinct, which have reduced the requirement and extent of earthworks and potential to cause erosion within this area.

4.2.2 Hanson Road Precinct

Project changes within the Hanson Road Precinct are summarised as:

- Replacement of the rail loop with a conveyor system; and
- Location of construction laydown/storage areas adjacent to the conveyor route within Reclamation Areas B and C.

Ground treatment and disturbance in the new conveyor route area has been significantly reduced as the conveyor system requires significantly less pre-load and disturbance than the previous rail loop option. These changes to the Project will also significantly reduce the potential impacts to ASS and erosion prone soil and sediment associated with Beales Creek.

The overall area of disturbance associated with the construction of Reclamation Areas B and C has reduced slightly from the original layout, and a small area of Reclamation Area C2 is now no longer required. Also, the width of the conveyor corridor is substantially less than would have been required for a rail corridor, and therefore the potential impacts associated with this component of the Project have now been reduced.

4.2.3 Forest Precinct

Project changes within the Forest Precinct relate to a widening of the rail corridor through the undulating hills intercepted by this area, which will require additional cutting and earthworks (including filling in some areas) in order to accommodate the QR laydown/storage locations for sleepers/rails/turnouts.

Replacement of the rail loop with a conveyor system adjacent to the Calliope River will significantly reduce the potential impacts relating to bank stability and the loading and disturbance of the dispersive, erosion prone soils within this area. Also, where the conveyor route crosses Pyealy Creek, there is an opportunity to significantly reduce potential impacts to natural drainage features and creek banks through the design of conveyor span and support structures.

The dump station is to be relocated from the Wiggins Precinct to the Forest Precinct, which significantly reduces the depth of disturbance for ASS and erosion prone soils within the tidal mudflat areas.

4.2.4 Rail Loop Precinct

Project changes within the Rail Loop Precinct (formerly Rail Maintenance Precinct) related to a reduction in the footprint area for the Project due to the replacement of the rail maintenance facilities with a rail loop configuration and the location of two laydown/storage areas.

4.2.5 Byellee Wetlands Precinct

Project changes have resulted in there being no requirements for disturbance to the Byellee wetland area (referred to in the WICT EIS as the Byellee Precinct).

4.3 Potential Impacts

4.3.1 Topography

Coal Terminal

Within the Wiggins Precinct the potential impacts to topography and landforms have been significantly reduced through the relocation of the dump station to the Forest Precinct. The risk of uncontrolled settlement and/or subsidence of the dump station structures have been eliminated from this Precinct area through these changes. All other potential impacts discussed in the WICT EIS within this area are unchanged as a result of the Project changes associated with the development.

Within the Hanson Road Precinct the potential impacts to topography and landforms are summarised as follows:

- Hanson Road alignment is only slightly realigned and raised from its current corridor, which significantly reduces the potential impacts relating to the very high embankment construction and settlement beneath the road alignment proposed in the WICT EIS;

- Rationalisation of the construction of a new access road from Hanson Road to CQPA facilities on the northern side of Hanson Road only resulting in the construction of the T intersection 'seagull' treatment with a new parallel embankment to the north of Hanson Road (refer Section 6) instead of a roundabout. This significantly reduces the potential impacts to the Hanson Road alignment configuration and reduces the potential impacts relating to embankment construction and settlement on the southern side of Hanson Road as proposed in the WICT EIS; and
- Construction of a conveyor system extending through the Precinct for the purpose of transporting the coal product between the North Coast Line and the coal stockyard as an alternative to the construction of the rail loop (as proposed in the WICT EIS) significantly reduces the potential impacts associated with the embankment construction and settlement of the rail alignment across the tidal mudflats.

Protection measures for erosion and settlement/subsidence will be required along the Hanson Road alignment during earthworks and construction activities associated with bunds for Reclamation Areas B and C, the construction of the conveyor system and the T intersection with 'seagull' treatment and access road extending north of Hanson Road to the coal terminal facilities in order to protect the structure and safety of the Hanson Road alignment and associated infrastructure within the corridor.

Potential impacts resulting from the construction of the over land conveyor system embankments would be similar to the rail loop proposed in the WICT EIS. However, the project changes will significantly reduce the requirements for ground improvement, as the settlement criteria are less onerous for the overland conveyor than the rail.

Potential impacts to topography and landforms during operation of the coal terminal and associated facilities relate to the long term settlement behaviour of soft estuarine muds beneath structures and infrastructure and the geotechnical stability of cut faces and areas of excavation.

Rail Infrastructure

The potential impacts to topography and landforms within the Forest Precinct have been significantly reduced due to the Project changes relating to the replacement of the rail loop infrastructure with a conveyor system for the purpose of transporting coal product between the North Coast Line and the stockyard at Golding Point. The Project change has resulted in a reduction in the loading required on erosion prone, dispersive soils associated with the construction and operation of embankments beneath the rail infrastructure adjacent to the bank of the Calliope River. This will significantly reduce the requirements for ground improvement measures and will reduce the impacts associated with embankment settlement and erosion.

Potential impacts resulting from the construction of a conveyor system adjacent to the bank of the Calliope River will be associated with the footprint and disturbance directly related to the support structures and footings for the conveyor system, which will require erosion mitigation measures in line with design and landscaping specifications for the Project.

Widening of the rail corridor through the undulating low hills within the western portion of the Forest Precinct will result in minor changes to potential impacts for topography and landforms within this area due to the increased area of disturbance through cutting and filling activities. Erosion and geotechnical stability of cutting faces and fill embankments will be addressed during detailed design in order to adequately accommodate the proposed changes to the areas of disturbance within the Forest Precinct.

Excavation of borrow areas are unchanged (other than the new layout not requiring a borrow area within the Byellee precinct) and will not result in any changes to the potential impacts on the topography and landforms within the Forest Precinct as outlined in the WICT EIS.

The potential impacts to topography and landforms within the Rail Loop Precinct resulting from the Project changes are summarised as follows:

- Reduction in the Project footprint and areas of proposed disturbance during construction will result in the increased protection of surface soils and enable erosion measures to be implemented that enable these protection measures to mimic and blend with the natural drainage features of the site. These changes will also significantly reduce the potential impacts on the watercourses and natural drainage features within the precinct, which are intercepted by the rail infrastructure; and
- Changes to topography and issues relating to geotechnical stability of landforms within the Rail Loop Precinct have been significantly reduced as a direct result of the reduction in Project footprint and area of disturbance.

There will be a widening of the Project footprint at the south western edge of the Rail Loop Precinct in order to accommodate the rail loop that will replace the rail maintenance facility. These works will require additional cut and fill activities within the footslopes of the adjoining undulating low hills. These activities will require additional design of erosion measures to adequately stabilise the cut face of the hill slopes.

All potential impacts to topography and landforms identified in the WICT EIS for the Byellee Wetlands have been eliminated due to the Project changes (ie the Byellee area is outside the area of direct disturbance).

Potential impacts to topography and landforms during the operation of rail infrastructure will relate to the long term geotechnical stability of rail embankments and cut faces adjacent to the rail corridor.

4.3.2 Geology and Geomorphology

Coal Terminal

Project changes within the Hanson Road and Forest Precincts will result in a significant reduction in potential impacts and risks to the geotechnical stability of the estuarine muds and erosion prone, dispersive soils within these precincts. Erosion mitigation measures and ground improvements for geotechnical stability will be incorporated into the detailed design of the Project.

Ground improvement and geotechnical protection measures will be required in work areas adjacent to existing infrastructure (ie the high pressure gas main, water supply pipes, electricity supply and road/rail infrastructure) throughout construction. These measures will be developed during detailed design and implemented prior to construction and/or site preparation works.

Potential impacts during operation of the coal terminal facilities and nearby infrastructure will also remain relatively unchanged.

Rail Infrastructure

Potential impacts relating to geotechnical stability during construction and operation of rail infrastructure has been significantly reduced within all precincts through the adoption of the conveyor system option. The risk of uncontrolled settlement of soft/incompetent estuarine muds and failure of geotechnically weak and erosion prone soils during construction and operation of the rail infrastructure within these precincts has also been reduced through the relocation of the rail loop and rail maintenance facilities.

4.3.3 General Soils

Coal Terminal

Potential impacts to soils within the Wiggins Precinct during construction will be nominally reduced as a result of the relocation of the dump station to the Forest Precinct. However, potential impacts to soils (ie ongoing erosion of disturbed surface soils and sediment) during operation of the coal terminal will be unchanged and will require mitigation measures to be implemented during construction and operation.

Rail Infrastructure

Potential impacts to soils will be significantly reduced within all precincts due to the Project changes resulting in a reduced Project footprint, replacement of the rail loop with a conveyor system through the Forest and Hanson Road Precincts, relocation of the rail maintenance facilities and removal of the works within the Byellee Wetlands from the Project. There may be a nominal increase in potential impacts relating to geotechnical stability and erosion within the Forest Precinct as a result of the proposed widening of the rail corridor through the western portion of the precinct.

4.3.4 Good Quality Agricultural Land

Coal Terminal

There will be no impacts to Good Quality Agricultural Land (GQAL) within the Wiggins and the Hanson Road Precincts during construction and/or operation of the coal terminal, as a result of the Project changes, as land within these precincts have been identified as Class D (non-agricultural land) under the Calliope Shire Council Town Planning Scheme (www.calliope.qld.gov.au retrieved 26/06/07).

Rail Infrastructure

Within the Forest Precinct the Project changes relating to the adoption of the conveyor system to replace the rail loop option has resulted in a reduction in potential impacts to good quality agricultural land as identified in the Calliope Shire Council Town Planning Scheme (www.calliope.qld.gov.au retrieved 26/06/07). Land adjacent to the Calliope River has been classified as Class A2 (crop land suitable for horticulture) and Urban. Project changes within this area have significantly reduced the potential conflict between land uses in this area.

Within the western portion of the Forest Precinct along the rail corridor the widening of the rail corridor will result in a nominal increase in cumulative loss of good quality agricultural land. Land in this area has been classified as Class C2 (pasture land suitable for native pastures) under the Calliope Shire Council Town Planning Scheme (www.calliope.qld.gov.au retrieved 26/06/07). However, under Section 4.18 of the *Planning Guidelines: The Identification of Good Quality Agricultural Land* (DPI/DHLGP January 1993) the loss of GQAL within this precinct has been assessed as not triggering "Potential conflict within adjoining land uses" as rail infrastructure and services are currently the dominant land use within this precinct and works are proposed adjacent to existing rail infrastructure developments. Also, rehabilitation during the post-construction stage may enable a portion of this area to be returned to its existing land use as grazing pasture.

Land within the Rail Loop Precinct has been identified as Class A2 (crop land suitable for horticulture) in the area adjacent to the western bank of the Calliope River and Class C2 (pasture land suitable for native pastures) in the area associated with the hill slopes on the western side of the Project footprint (CSC Town Planning Scheme www.calliope.qld.gov.au retrieved 26/06/07). Project changes that have resulted in the reduced Project footprint and areas of disturbance within this precinct have resulted in a significant reduction in potential impacts to and/or loss of GQAL and will significantly reduce the conflicts between land uses within this area.

4.3.5 Acid Sulfate Soils

All issues associated with ASS arising from agency comments or the WICT EIS and Project changes have been addressed in the ASS Investigation and Management Plan provided in Appendix C.

4.3.6 Contaminated Land

Coal Terminal

Potential impacts related to disturbance of potentially contaminated soil and sediment remain unchanged within the Wiggins, Hanson Road and Forest Precincts.

Rail Infrastructure

Project changes within the Rail Loop, Forest and Hanson Road Precincts during construction and operation of the rail corridor have been significantly reduced due to the reduction in the Project footprint area, the adoption of a conveyor system to replace the rail loop and relocation of the rail maintenance facilities.

Project changes have resulted in the elimination of potential impacts to land parcels currently listed on the EPA EMR identified within the Byellee Precinct (refer Figure 4.13 in WICT EIS) as this area will not be disturbed as part of the Project.

Potential impacts and risk of contamination have been reduced in all precincts due to the relocation of the rail loop and rail maintenance facilities, and removal of southern rail access road and QR facilities adjacent to Hanson Road as proposed in the WICT EIS.

4.3.7 Red Imported Fire Ants

The potential impacts and risks associated with the disturbance of Red Imported Fire Ants (RIFA) remain unchanged as a result of the Project changes due to the nature of construction activities still requiring a similar magnitude of earthworks within and adjacent to the RIFA restricted areas.

4.4 Mitigation Measures

Mitigation measures required to address Project changes during the design, construction and operational stages for both the coal terminal and rail infrastructure facilities are summarised below.

4.4.1 Coal Terminal

Design

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during design, in addition to the mitigation measures identified in the WICT EIS:

- Design engineers will review the geotechnical model developed for the site as an outcome of the detailed geotechnical investigations that will be undertaken during detailed design;
- Geotechnical engineers will identify and delineate (ie the horizontal and vertical extents) areas of unconsolidated estuarine muds and incompetent/weak geological features that will require specific ground improvement treatments;
- Develop specific ground improvement measures to address areas of unconsolidated, incompetent and/or weak geological features to be adopted prior to and/or during site preparation activities;
- Develop and implement design measures to ensure the safety and stability of stockyard and wharf infrastructure (including reclaim tunnel structures);
- Design surface water diversion systems and erosion control measures that mimic the natural drainage features surrounding Golding Point and direct surface water to stable discharge points within the landscape. Areas that will require particular attention include:
  - Barge ramp;
  - Stockyard perimeters and bunding intercepting tidal drainage lines and mudflat areas;
  - Footings of stockyard structures and subsurface structures of reclaim tunnels; and
  - Ponds, buildings and structures associated with the wharf;
- Geotechnical engineers will provide input into the design of geotechnical protection measures required to protect existing infrastructure in areas that have been identified as vulnerable to variable, excessive or long term settlement and/or subsidence. These will include:
  - Dredge spoil disposal areas (Reclamation Areas B and C);
  - Hanson Road corridor;
  - High pressure gas pipeline;
  - Water and electricity supply infrastructure;
  - Southern end, eastern side and perimeter of Stockyard;
  - Coal terminal facility area; and
  - Overland conveyor route from dump station to coal terminal
- Design of temporary and permanent erosion control measures and surface drainage diversion systems associated with conveyor footings and laydown/storage areas will adopt the design principles specified in the erosion control and landscape plans; and

Construction

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during construction, in addition to the mitigation measures identified in the WICT EIS:

- Construction contractor to implement specific ground improvement measures for the identified high risk areas as developed during detailed design;
- Construction contractor to install surface water diversion systems and erosion control measures specified during detailed design;
- Construction contractor will continuously monitor and maintain surface water diversion structures and erosion control measures throughout construction; and

- Construction contractor will install geotechnical protection measures for existing structures and infrastructure that have been identified during design.

Operation

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during operation and maintenance activities, in addition to the mitigation measures identified in the WICT EIS:

- Settlement and geotechnical conditions will be monitored throughout the nominated settlement period for specific areas of the site and/or structures;
- Temporary erosion control measures will be monitored and maintained until the area of direct disturbance has been stabilised;
- Temporary erosion control measures will be removed once the disturbed area has been stabilised;
- Temporary erosion control and surface water diversion systems will be installed during maintenance activities; and
- Permanent erosion control measures and surface water diversion systems/structures will be monitored and maintained throughout operation of the coal terminal facilities.

4.4.2 Rail Infrastructure

To minimise the potential impacts resulting from the Project changes the following mitigation measures will be applied during construction activities

- Design of temporary and permanent erosion control measures will adopt the design principles specified in the erosion control and landscape plans
- Temporary erosion control measures will be monitored and maintained until the area of direct disturbance has been stabilised
- Temporary erosion control measures will be removed once the disturbed area has been stabilised.

4.5 Conclusions

The Project is located within the tidal and intertidal areas of Port Curtis, between Golding Point and the Calliope River and is located within an area of state, national and international ecological significance.

Previous studies completed by DNRW have also identified this area as being extensively underlain with ASS on relatively undisturbed land. Soils within the Project footprint were also assessed as being erosion prone, particularly in areas within the intertidal areas and adjacent to creeks and drainage lines.

Overall the area of direct disturbance has been effectively reduced and the potential impacts relating to soil disturbance have been significantly reduced, and/or eliminated in some areas. This is as a result of adopting a conveyor system for the transportation of coal product between the North Coast Line and the stockyard at Golding Point rather than the rail loop proposed within the WICT EIS.

Removal of the proposed rail maintenance facilities from the project area to the GSDA has also enabled a significant reduction in potential impacts associated with the management of contaminants relating to railway maintenance activities.

In conclusion, the Project changes with regard to topography, geology and soils will result in a significant reduction of potential impacts within the Project footprint. Mitigation and management measures for soil and GQAL conservation, erosion control and geotechnical stability will be incorporated into the Project design. The implementation monitoring and maintenance of these measures throughout construction and operation of the coal terminal facilities and rail infrastructure will be undertaken in order to further reduce the potential impacts resulting from the development of the Project and minimise the impacts to Port Curtis and the surrounding area.

5. Land Use and Project Approvals

5.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to land use issues and Project approvals are outlined below.

- Clarification needed of reclamation approvals and modifications for Reclamation Areas A, B and C and specification of the areas to be relinquished prior to, or concurrently with, applying for any modifications to the boundaries of Reclamation Areas B and C.
- The new IPA compliant planning schemes for Calliope Shire and Gladstone City are now available. Comparisons made in the EIS with earlier drafts of the planning schemes should be revised, particularly in relation to land zoning and development made assessable by the scheme for the project area.
- The EIS surmised that the proposal complies with the intent of the Rural / Non-urban zone by virtue of the only development of land within this zone is to be the rail and road infrastructure. This does not give an assessment of compliance as required by the ToR.
- The ToR requires an assessment of the compatibility of the proposal having regard to land use planning documents relevant to the area. It is suggested that a more detailed assessment is needed of the impacts associated with the project on existing and proposed Rural Residential Development adjacent to the existing Moura Rail Line.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

5.2 Project Changes

As detailed within the project description in Section 3, a number of Project layout changes have occurred which significantly change the proposed rail infrastructure's interaction with some of the land use issues. These sections below detail the changes to the Project that have a direct or indirect impact on land use and project approvals requirements.

5.3 Land Tenure Changes

Land tenure within the project area was identified by conducting title searches for all properties. Title searches were not conducted for properties directly adjacent to or in the vicinity of the project area. Tenure on these properties was determined through use of the DNRW Digital Cadastre Database (DCDB) mapping.

Project changes have resulted in fewer properties being required in the Rail Loop Precinct and the former Byellee Precinct. Table 5.1 provides the tenure details of the properties required for the WICT Project. Lot 1 on RP602532 is not directly required for the Project, but forms part of the proposed vegetation loss offset (refer Section 15).

Figures 5.1 and 5.2 illustrate the location of the land parcels within the project area.

Table 5.1 Land Tenure of Properties required for the WICT Project

Precinct	Lot	Plan Number	Tenure	Tenure Type	Land Ownership/Lessee
Wiggins Precinct	98	CTN279	Freehold	Strategic Port Land	Central Queensland Ports Authority
	99	CTN279			
	100	CTN279			
Hanson Road Precinct	28	CTN279	Freehold	Strategic Port Land	Central Queensland Ports Authority
	2	SP147891	State land	GSDA	Minister for Industrial Development of Queensland
	N/A		Reclamation Areas B and C. Currently land below High Water Mark. To be reclaimed under existing reclamation approval		
Forest Precinct (Forest Area)	541	NPW740	State land	Conservation Park	State of Queensland[1]
	365	FTY1160	State land	State Forest	
Forest Precinct (GSDA)	3	SP165453	State land	GSDA	Minister for Industrial Development of Queensland
	4				
	21	SP159091			
	22				
	23				
	24				
	25				
	26				
Forest Precinct (North Coast Line)	71-74	SP122249	Lease hold	Perpetuity	Queensland Rail
	51	SP122248			
Rail Loop Precinct	1	SP163783	Freehold	Fee simple	CRE & VMC Beak
	2				
	1	RP602532	Freehold	Fee simple	Queensland Rail

Table Note:
[1] - Grazing lease held by F Hlinovsky over Lot 120 on CTN1510 which encompasses all of Lot 541 on NPW 740 and a portion of Lot 365 on FTY1160 (refer Figures 5.1 and 5.2)

5.4 Planning Framework Changes

The proposed WICT traverses land and tidal areas in four planning jurisdictions with the responsible agencies being:

- Gladstone City Council (GCC);
- Calliope Shire Council (CSC);
- Coordinator-General (CG); and
- Central Queensland Ports Authority (CQPA).

The following statutory planning documents (which are now superseded) were applicable at the time of preparing the WICT EIS:

- Town planning scheme for the whole of the Shire of Calliope, 1991, Transitional Planning Scheme for Calliope Shire Council (Calliope Transitional Plan);

- The Gladstone Transitional Plan Integrated Development Act 1997, 30 March 1998. EPA Integrated Authority No. CG0039 (Gladstone Transitional Plan); and
- Development Scheme for the Gladstone State Development Area (2001) (GSDA Scheme).

These documents were reviewed as part of the EIS to assess the compatibility of the WICT Project in accordance with the planning framework of that time.

Three agencies (GCC, CSC and CG) have recently replaced their existing development scheme or transitional planning scheme with new planning documents. CQPA is also in the process of preparing a new Port Land Use Plan.

On 12 December 2006 GCC adopted a new IPA compliant planning scheme, Gladstone Plan 2005, which came into effect on 29 December 2006 replacing the old 'transitional planning scheme'.

"The new Planning Scheme for Calliope Shire was adopted on Friday, 13th April 2007 and took effect on Friday 27th April 2007. This follows final approval of the draft Planning Scheme from the Minister for Local Government, Planning and Sport on 21 March 2007" (Source:http://www.calliope.qld.gov.au/Services/ DevServices/development/docs/planningscheme.html).

The Coordinator-General (CG) has a Development Scheme for the Gladstone State Development Area (GSDA) which serves an identical function to a local government planning scheme made under the IPA. The Development Scheme is also a statutory land use document, which is administered by the CG for the GSDA rather than a local government. The CG has undertaken a review of the existing Development Scheme for the GSDA, which has resulted in a new Development Scheme, approved by the Governor in Council on 5 April 2007.

The following statutory planning documents are applicable as at June 2007:

- The Gladstone Plan 2005 (Gladstone IPA Plan);
- Calliope Planning Scheme(27 April 2007) (Calliope IPA Plan); and
- Development Scheme for the Gladstone State Development Area (November 2006) (GSDA Scheme).

Figure 5.3 identifies the zoning areas from the GCC and CSC planning schemes as well as the GSDA precincts. Detailed below is an assessment of the compatibility of the revised WICT Project alignment with the updated documents forming the planning framework.

5.5 Compliance with Gladstone IPA Plan

The *Gladstone Plan 2005* is an IPA compliant planning scheme (hereafter referred to as the Gladstone IPA Plan). The Gladstone IPA Plan contains three main statutory controls that aim to promote ecologically sustainable development outcomes, firstly through a zoning based assessment process, secondly through Local Plans, and finally through overlays that apply the relevant applicable State Planning Policies. Each of the three aspects is discussed below.

The following definition applies to the proposed WICT Project:

"Major Infrastructure" (Industry (High Impact)) <u>means the use of premises for the purpose of the provision of facilities and services providing services such as</u> electricity, gas, raw water, <u>transport (air, rail, road and sea), rail terminals, pipelines and conveyors,</u> and telecommunications which is likely to have a notable impact.

This definition is common to both the Gladstone IPA Plan and the Calliope IPA Plan.

5.5.1 Localities and Zones

The GCC area is divided into six geographic `Localities'. Each Locality has a particular character or characteristics that require particular development outcomes. The section of the WICT Project in the GCC area is located entirely within the *North West Locality.*

The Gladstone IPA Plan further divides each Locality into zones that cover the entire Locality. The land and tidal areas required for the Project are either zoned 'Major Industry and Infrastructure' or are unzoned tidal waters.

5.5.2 Level of Assessment

Under Part 5 of Division 3 – Table 5-1 (Page 5-5) of the Gladstone IPA Plan, a development application for *Major Infrastructure (Industry (High Impact))* located within the *Major Industry and Infrastructure* zone is Impact Assessable under IPA.

5.5.3 Local Plans

No local plans apply to the proposed WICT Project.

5.5.4 Applicable Codes

There are codes for:

- Each locality, zone and overlay;
- General matters applicable to all localities; and
- Development for a stated purpose or development of a stated type.

Assessment categories may also be affected by overlays. The Gladstone IPA Plan has several overlay codes which apply to the Project, including the Airport Noise and Safety overlay, Acid Sulfate Soils Overlay and Coastal Management Overlay. The sections below detail the zoning definitions, localities, overlays and codes applicable to the proposed WICT Project.

North-West Locality Code

The compliance of the WICT Project with the overall outcomes relating to North West Locality Code is described in Table 5.2.

Table 5.2 Overall Outcomes of the North-West Locality

2.	The overall outcomes sought for the North West Locality are:	Project Compatibility
a)	the character of the North West Locality as an area dominated by major industry activities and major infrastructure is protected by keeping these activities separated and protected from other activities by areas of open space or transitional and less intense activities, such as local industries;	The Project involves a major infrastructure development and there are no other particular activities that need to be separated from the proposed development. The nature of the surrounding area is industrial.
b)	fragmentation of industrial areas is avoided by allowing only industrial land uses within the Major Industry Zone, the Local Industry Zone and the State Development Area and ensuring existing industrial areas are essentially 'built out' prior to extension of new industrial areas;	The proposed development is a major infrastructure development to support industrial development within the zones and therefore the proposed development will not extend the existing industrial area and will be a compatible land use.
c)	land and facilities located within the Major Industry and Infrastructure Zone are preserved for use for the purposes of major industry and major infrastructure;	
d)	in the Local Industry Zone, higher order services are provided for the needs of major industry and major infrastructure in the locality which will meet accepted standards of environmental performance to maintain the present environmental conditions and quality of life enjoyed by Gladstone residents;	Not applicable. The Project does not involve land zoned Local Industry Zone.

2. The overall outcomes sought for the North West Locality are:	Project Compatibility
e) the activities undertaken within Strategic Port Land are protected from potential adverse effects from development on land within the proximity and any encroachment of land uses which may impact on the operational integrity of activity on land in strategic part;	The Project involves the development of Strategic Port Land for the use of a port, thus preserving the operational integrity of the land for industrial purposes and associated operations.
f) in the Local Industry Zone, Major Industry and Infrastructure Zone, Open Space and Recreation Zone and Strategic Port Land, protect the environment of the harbour foreshores and the banks of rivers and streams and provide wherever possible, public access to the harbour foreshores and watercourses;	The Project will not have an impact on public access to the harbour foreshores and watercourses. As stated in the WICT EIS, the environment of the banks of the Calliope River and Anabranch and other waterways will be protected by the implementation of suitable mitigation measures.
g) enhance the open space system and land and features already within the Open Space Zone especially the foreshores of the port, wetlands, the Calliope River and its tributaries, by providing for the multiple functions of open space, buffer areas, conservation and recreation;	Not applicable. The proposal does not involve land zoned open space.
h) allow for essential major roads, railways and electricity infrastructure free from any potential conflicts or constraints from adjacent development;	Not applicable. Part of the proposal is for a railway.
i) the coast is conserved in its natural or non-urban state outside of existing urban areas;	This issue is addressed in Appendix F2 in the WICT EIS which demonstrates general compliance with the Curtis Coast Plan.
j) urban development does not occur within erosion prone areas, significant coastal wetlands, riparian areas, sites containing important coastal resources of economic, social, cultural and ecological value or areas identified as having, or the potential to have unacceptable risk from coastal hazards.	This issue is addressed in Appendix F2 in the WICT EIS which demonstrates general compliance with the Curtis Coast Plan.
3. The overall outcomes sought for the North West Locality are:	Project Compatibility
k) Public access to the coast is maintained;	The Project will not have an impact on the current level of public access to the harbour foreshores and watercourses. As stated in the WICT EIS, the environment of the banks of the Calliope River and Anabranch and other waterways will be protected by the implementation of suitable mitigation measures.
l) ground and surface water quality is maintained;	This issue is addressed in Appendix F2 in the WICT EIS which demonstrates general compliance with the Curtis Coast Plan.
m) conflicts between Strategic Port Land and the Gladstone State Development area and new development on adjoining land is minimised to protect the integrity and function of these areas;	The Project is partially located within and adjacent to Strategic Port Land and Gladstone State Development Area. The Project is a major infrastructure development intended to support both the coal industry and proposed industrial developments and will protect the integrity and function of these areas.
n) protect areas of high scenic landscape values (including islands and off-shore features, coastal wetland and headlands, estuaries and inlets, riverine corridors and creeks, shorelines and sand dunes) from incompatible development such that the visual quality and recreational amenity of these areas is maintained;	This issue is addressed in Appendix F2 in the WICT EIS which demonstrates general compliance with the Curtis Coast Plan and Section 22 (Visual Amenity and Landscape Character) of the WICT EIS.
o) the open space zoned land directly to the east of the Gladstone Power Station site provides a buffer to protect against potential adverse effects from development on land within the proximity and any encroachment of land uses which may impact on the operational integrity of activity on land in strategic part;	Not applicable.
p) existing approvals for reclamation associated with the Wiggins Island Project are recognised through a zoning of Major Industry and Infrastructure.	The Project complies with this outcome.

Major industry and infrastructure zone code

The compliance of the WICT Project with the overall outcomes relating to the Major Industry and Infrastructure Zone Code is described in Table 5.3.

Table 5.3 Overall Outcomes of the Major Infrastructure Zone Code

Specific Outcomes	Project Compatibility
P1 The operational integrity and expansion capability of major industries is protected by:	
(i) preserving land in the Local Industry Zone, Major Industry and Infrastructure Zone and strategic port land for future industry and infrastructure free from the constraining effects of encroaching incompatible land uses;	The Project is a major infrastructure development to support industrial development within the zones and will not be an incompatible land use.
(ii) providing adequate buffers, including open space to separate major industries and major infrastructure from other land use areas and types, particularly land use types that are likely to be affected adversely by the operation of major industry and major infrastructure;	As stated in the WICT EIS, the surrounding natural environment will be protected by the implementation of suitable mitigation measures. Due to the industrial nature of the locality there is no other particular land use types that could benefit from a buffer. The site is an adequate distance from Gladstone.
(iii) including mitigation measures to minimise the potential for reverse amenity issues to be incorporated into potentially sensitive development;	Not applicable, the Project is not a potentially sensitive development.
(iv) preserves land likely to be required for major infrastructure development from other types of development unless agreement to other uses has been reached with the relevant State Agency; and	Not applicable, the Project is located on land/tidal areas zoned Major Industry and Infrastructure, and the Project is a major infrastructure development to support both the coal industry and proposed industrial developments.
(v) making provision for extension of the City's arterial road network.	Not applicable, the necessary works will occur to Hanson Road to accommodate the Project (refer Section 3).
P2 Development on land abutting the Major Industry and Major Infrastructure Zone is protected by providing a landscaped buffer along the common boundary to achieve an effective screen to the abutting sites.	There are no directly abutting sites that contain sensitive receptors to warrant the need for landscaping to screen the Project from site. However, a landscaped buffer will be provided to the south of the proposed rail loop (refer Section 3).

Cultural Heritage Code

While this code applies to all land within the GCC area, all land "on premises comprising predominantly industrial activities" is Exempt Development for the purposes of this code. The project area does not include a place on the Local Heritage List or a Significant Tree as listed in Schedule 3 of the Gladstone IPA Plan.

Airport Noise and Safety Overlay Code

The project area within the GCC's jurisdiction is located entirely within the *Obstacle Limitation Surface Plan*. The compliance of the Project with the overall outcomes of the *Airport Noise and Safety Overlay Code* is described in Table 5.4.

Table 5.4 Compliance with Airport Noise and Safety Overlay Code

Specific Outcomes	Acceptable Solutions	Project Compatibility
Self Assessable and Assessable Development		
Height Limitations		
P1 The height of any building or structure or trees that can reach a significant height located in the Obstacle Surface Limitation area of the airport is below the corresponding limit set for the site such that the safe and efficient operations of the airport is protected. Note: Where development would, by reason of the height of any building or other structure, penetrate the Obstacle Limitation Surface, such development is carried out only after advice from the Civil Aviation Safety Authority (CASA) has been sought and where approval of the Airport Operator has been obtained.	S1.1 Where for a residential building, the maximum height of the building and associated structures and landscaping in the Obstacle Surface Limitation area is no more than 2 storeys (9 m) in height from natural ground level; otherwise	Does not apply as the proposal is not for a residential building.
	S1.2 The maximum height of any building or structure and the expected height of mature trees associated with landscaping in the Obstacle Surface Limitation area is less than the height specified for the site as shown in the Gladstone Airport Environs Obstacle Limitation Surface (OLS) Plan	It is likely that the proposed WICT Project will not have a significant impact upon the operational airspace as long as the appropriate precautionary measures are taken prior to construction. Detailed design drawings will include all appropriate safety measure (eg safety lighting, painting the facility) to enable safe construction and operation of the WICT Project.
P2 Development does not cause the operation of transient activities that can reach a significant height, such as hot air ballooning.	S2 No solution specified.	In accordance with P2 the proposed development will not cause the operation of transient activities that can reach a significant height, such as hot air ballooning.
Assessable Development		
Intrusive Lighting		
P3 The fixing, operation, strength and direction of any lighting, including any external lighting fixed to a building or other structure does not interfere with air navigation aids essential for the safe movement of aircraft at night or create glare or be a distraction.	S3.1 The fixing of any external lighting (excluding residential lighting), other bright light sources or straight parallel lines of lighting 500 m to 1000 m long, within 6 km of an airport runway are avoided; or S3.2 External lighting is designed so that it does not increase the risk of an aircraft incident and comply with the CASA guideline 'Lighting in the vicinity of aerodromes: Advice to lighting designers'	External lighting will be designed so that it will not increase the risk of an aircraft incident and comply with the CASA guideline 'Lighting in the vicinity of aerodromes: Advice to lighting designers'.
Gaseous Plumes		
P4 Development does not cause the emission into the OLS of any potentially hazardous gaseous plumes.	S4 Development does not cause the emission into the OLS of any gaseous plumes at a velocity exceeding 4.3m per second.	In accordance with S4, the proposed development will not cause the emission into the OLS of any gaseous plumes at a velocity exceeding 4.3m per second.

Specific Outcomes	Acceptable Solutions	Project Compatibility
Self Assessable and Assessable Development		
Protection of uses from Aircraft noise		
P1 The effective and safe use of the development is not unduly affected by aircraft noise and the continued operation of the airport is not limited by the encroachment of uses which are sensitive to the effects of aircraft noise. Note: Development involving the construction of buildings above the 20 ANEF contour complies with *AS2021 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction'.*	S1 Land uses proposed on premises avoid the following: (i) residential other than a detached dwelling or community use where located on land within the 20 ANEF contour; (ii) long term residential or community use (more than 4 months per year) where located on land within the 25 ANEF contour; (iii) short term (occupation 4 months or less in calendar year) residential use where located on land within the 25 - 30 ANEF contour; and (iv) commercial uses where located on land within the 25 - 35 ANEF contour.	The Project is not a sensitive receptor (eg residential use).
Air Safety Zones		
Assessable Development		
P2 Minimise the potential effects in the event of an aircraft crash resulting from takeoff and landing.	S2 New development within the Air Safety Zone does not introduce or intensify residential, community, commercial, industrial or other uses or result in the use of premises for the manufacture or bulk storage of hazardous (explosive or noxious) or flammable materials.	The storage of hazardous or flammable materials (if required) will be undertaken in accordance with relevant approval conditions and standards.
Self Assessable and Assessable Development		
Protection of uses from aircraft noise		
P1 Premises within the OLS envelope do not cause a potential hazard to aircraft movement associated with the airport by avoiding activities which attract birds or bats to the area.	S1.1 Development that generates uses requiring the disposal of putrescible waste is not located within 13km of airport runways.	The Project will not result in the disposal of putrescible waste.
	S1.2 The following uses are: (i) not located within 3 km of an airport runway and; (ii) if located between 3 km and 8 km of an airport runway, manage waste/food sources and include wildlife deterrence measures: – aquaculture; – food handling; – stock handling facilities – piggeries; – fruit tree farming; – turf farming; and – wildlife sanctuaries.	The Project does not include any of the uses listed in S1.2.

Specific Outcomes	Acceptable Solutions	Project Compatibility
	S1.3 (i) The use of premises within 3 km of the centre of the airport site represent activities which do not attract birds or bats and these activities include the following. – aquaculture; – fruit tree farming; – turf farming; – piggeries; – wildlife sanctuaries; – horse riding centres; – race tracks; – fair grounds;	The Project is not one of the uses listed in S1.3.
Self Assessable and Assessable Development		
Protection of uses from aircraft noise		
P1 Development does not impair the function of aviation facilities (VOR and NDB – refer Airport Overlay Code Plan) by creating: (i) 'physical' line of sight obstructions; (ii) electrical or electro-magnetic interference; or (iii) deflection of signals.	S1.1 Development is not located within the NDB facility buffer zone (as indicated on the Airport Overlay code Plan) if they involve, by their nature: (i) electrical or electromagnetic interference (e.g. arc welding); or (ii) within 60m of the aviation facility: (a) buildings, structures or other works; (iii) within 60m and 150 m of the aviation facility: (a) metallic buildings or structures; (b) buildings or structures with any dimension greater than 2.5m; or (c) other works exceeding 3m in height; (iv) within 150m and 500m of the aviation facility: or (a) buildings structures of other works which exceed 7.9m in height.	Development is not located within the NDB facility buffer zone which is located toward the eastern end of Gladstone Airport, well away from the proposed WICT area.

Specific Outcomes	Acceptable Solutions	Project Compatibility
	S1.2 Development is not located within the VOR facility buffer zone (as indicated on the Airport Overlay code Plan) if they involve, by their nature; (i) fences exceeding 2.5m in height; (ii) overhead powerlines exceeding 5m in height; (iii) metallic structures exceeding 8m in height; (iv) trees and open lattice towers exceeding 10m in height; or (v) wooden structures exceeding 13m in height.	Development is not located within the VOR facility buffer zone which does affect the south eastern corner of Black Harry's Island but does not overlay the proposed WICT area.

Acid Sulfate Soils (ASS) Overlay Code

The WICT project area within the GCC's jurisdiction is located almost entirely within the *Acid Sulfate Soils (ASS) Overlay* area. The purpose of this overlay is to implement the *Planning and Managing Development Involving Acid Sulfate Soils (State Planning Policy 2/02).* The compliance of the Project with this State Planning Policy is contained in the WICT EIS (refer Section 4 and Appendix F2).

Coastal Management Overlay Code

According to the Gladstone IPA Plan, "The Coastal Management Overlay Code applies to development on premises located within the Coastal Wetland Communities or 100 m Buffer Area or Erosion Prone Areas identified on the Coastal Management Overlay Code Plans". The project area within the GCC's jurisdiction is almost entirely located within the Coastal Wetland area and 100 m buffer (refer Figure 5.2) and also crosses through Erosion Prone Areas. The compliance of the Project with the coastal issues is described in the WICT EIS (refer Section 11 and Appendix F2). Potential coastal management impacts will be mitigated by preparing and implementing an EMP which has taken the Coastal Management Overlay Codes into consideration.

5.6 Compliance with the Calliope Shire Planning Scheme 2007

The following definition applies to the part of the WICT Project in the CSC area and GSDA:

"Major Infrastructure" (Industry (High Impact)) <u>means the use of premises for the purpose of the provision of facilities and services providing services such as</u> electricity, gas, raw water, <u>transport (air, rail, road and sea), rail terminals, pipelines and conveyors,</u> and telecommunications which is likely to have a notable impact.

The following Calliope IPA Plan definition would apply to the section of the WICT Project (eg coal terminal area) in the CSC area:

"Port Facilities" (Transport and Storage) means the use of premises for the purpose of handling, loading, unloading or storage of materials on to ships for transportation elsewhere. The term also includes facilities for the berthing, maintenance, storage and repair of boats and ships. The term does not include transport infrastructure situated on other premises.

5.6.1 Localities and Zones

The CSC area is divided into five geographic `Localities'. Each Locality has a particular character or characteristics that require particular development outcomes. The section of the WICT Project in the CSC area is located entirely within the Rural Locality and the GSDA Locality. The applicable code is the Calliope Rural Locality Code. Table 5.5 illustrates the Project's compatibility with the overall outcomes of this code.

The Calliope IPA Plan further divides each Locality into zones. The existing rail corridor land required for the Project is either in unzoned road reserve or zoned 'Major Infrastructure'. Lot 365 on FTY1160 is zoned Forestry, Lot 541 on NPW740 is zoned Conservation and Lot 2 on SP163783 is zoned Rural. The zoning provisions form part of the Calliope Rural Locality Code. The applicable sections of the Calliope Rural Locality Code are Tables 6-3, 6-4 and 6-5. Table 5.5 illustrates the Project's compatibility with the overall outcomes of this code.

5.6.2 Level of Assessment

Under the Calliope IPA Plan, a development application for *Major Infrastructure (Industry (High Impact))* located within any zone in the Rural Locality is Impact Assessable under IPA.

5.6.3 Applicable Codes

There are codes for:

- Each locality, zone and overlay;
- General matters applicable to all localities; and
- Development for a stated purpose or development of a stated type.

Calliope Rural Locality Code

The compliance of the WICT Project with the Calliope Rural Locality Code is described in Table 5.5.

Table 5.5 Compliance with Calliope Rural Locality Code

Specific Outcomes		Project Compatibility
Table 6-3 Compatibility with development in the rural zone, conservation zone and open space and recreation zone		
O3	Development in the Rural Zone retains the rural character of the locality by:	
(i)	good quality agricultural land in the Boyne River valley, Bracewell, East End and Yarwun areas and grazing lands, have been conserved for continued agricultural use and protected from subdivision into allotments that fragment otherwise productive rural land;	Not applicable. The Project will not subdivide GQAL lots.
(ii)	amalgamation of good quality agricultural land into sustainable and productive holdings;	Not applicable, the Project will not affect the sustainability of existing holdings.
(iii)	accommodating the establishment of new and sustainable rural industries and activities where those activities cannot meet the development outcomes for the Village Zone;	Not applicable.

Specific Outcomes		Project Compatibility
(iv)	agricultural land uses being protected from potentially incompatible land uses;	Only Lot 2 on SP163783 (within the Rail Loop Precinct) is used for rural purposes. The northern half of Lot 2 on SP163783 is classified as *A1 Crop land - suitable for rain fed cropping.* The southern half of Lot 2 on SP163783 is classified *C3 Pastoral Land - suitable for light grazing of native pastures*. The construction and operation of the WICT Project will result in rural pursuits on these properties being unviable. Land use options within the rail loop would be limited to rail activities. However, the impact of the loss of agricultural land within this area is minimised due to the isolated nature of the area which is completely land locked by non-rural uses on all sides (except Lot 2 on RP602532 owned by the same owner). Not only is use of the area for industrial purposes consistent with the existing and future land uses of the area, there is an overriding need for the WICT Project in terms of community and economic benefits.
(v)	ongoing agricultural productivity and the resulting social and economic benefits to the community are an overriding factor in considering the establishment of uses which may impinge on agricultural productivity;	
(vi)	rural activities such as mining, forestry and quarrying being conducted safely, efficiently and with as little impact as possible upon the environment;	Not applicable.
(vii)	promoting the sustainable use of surface and groundwater and soil productivity;	Not applicable.
(viii)	rural land use practices reflecting sustainable management techniques to prevent soil erosion, protect the quality of land and water resources, maintain habitat values of water courses, and native timber and forest areas; and	Not applicable as the Project is not for a rural land use.
(ix)	retaining timbered ridgelines, areas of native bushland, riparian corridors and other areas of habitat value in their natural state.	The Project is on a site which does not include an area of native bushland, timbered ridgeline or riparian corridor. However, the area does have habitat value. The WICT Project, however retains the vast majority of the mangroves on Golding Point and the marine plants associated with Wiggins Island.
O4	The impact of development on the rural environment in the Rural Zone, the Conservation Zone and the Open Space and Recreation Zone is restricted by:	
(i)	facilitating the development of sustainable low key ecological and nature based tourism and recreation in the locality, particularly on Curtis Island;	Not applicable.
(ii)	development activities within and on land adjoining the Rural Zone, Open Space and Recreation Zone and the Conservation Zone adopt appropriate site management measures, including rehabilitation, to prevent soil erosion and sedimentation of watercourses; and	Refer Sections 23 and 24 of the SEIS for the proposed mitigation measures to address soil and erosion control issues.

Specific Outcomes	Project Compatibility
(iii) areas of high conservation values are retained in their natural state and suitable measures put in place to ensure their ongoing conservation. Note: Areas of important conservation, habitat or landscape values within the Rural Zone, Open Space and Recreation Zone and the Conservation Zone are preserved including the: (i) Rundle Island and Hummocky Island (ii) Castle Tower, Kroombit Tops, Rundle Range and Curtis Island National Parks; (iii) area of State Forest on the mainland and Curtis Island; (iv) prominent mountains such as Mt Alma, Mt Larcom, Mt Booboolba and Mt Gindiwarra; and (v) tidal lands and wetlands of The Narrows and Balaclava Island; (vi) Mackay-Capricorn State Marine Park; (vii) Colosseum and Wild Cattle Island Fish Habitat areas; (viii) timbered ridgelines, areas of native bushland, riparian and wildlife corridors; and (ix) integration of open space infrastructure corridors which traverse much of the land in the Rural Zone.	The WICT Project retains the vast majority of the mangroves on Golding Point and the marine plants associated with Wiggins Island. Vegetation loss offsets directly adjacent to the existing State Forest (Lot 1 on RP602532) will be provided to replace vegetation removed from the Mount Stowe State Forest (refer Section 15 of SEIS).
Table 6-4 Development within the Forestry Zone	
O1 Protect and promote the sustainable and sensitive use of forest resources within the Forestry Zone for their multiple values for the shire including: (i) aesthetic; (ii) catchment protection; (iii) habitat; and (iv) landscape values including forested ranges and hillsides.	The WICT Project will utilise vegetation loss offsets directly adjacent to the existing State Forest (Lot 1 on RP602532) to replace any vegetation removed from the State Forest.
O2 Protect resources within the Forestry zone from the affects of incompatible activities such as urban development and agriculture.	
Table 6-5 Development adjacent and within the Major Industry Zone, Major Infrastructure Zone and Strategic Port Land	
O1 Development on land adjacent to or within the Major Industry Zone, Major Infrastructure Zone or Strategic Port Land, will be designed to mitigate reverse amenity issues in regards to noise, dust, odours, traffic and other potential impacts from the nearby industrial activities including: (i) adopting suitable buffer distances; (ii) incorporating visual screening (planting of vegetation and fencing) to provide an effective screen and visual outlook; (iii) incorporating noise attenuation materials in the construction of dwelling units; and (iv) siting sensitive uses away from likely sources of dust, noise and odours.	Not applicable as the Project is not a sensitive receptor.

Specific Outcomes	Project Compatibility
O2 The operational and expansion requirements of the major industrial areas and major infrastructure facilities listed below will not be compromised by encroachment of inappropriate development: (i) major transmission lines; (ii) Awoonga Dam; (iii) Gladstone State Development Area; (iv) Bruce Highway; (v) Dawson Highway; (vi) Gladstone Mt Larcom Road; (vii) Gladstone Monto Road; (viii) North Coast Railway; (ix) Moura short railway; (x) State railway linking the limestone mine at East End with the cement plant at Fisherman's Landing; (xi) Expanding port facilities at Fisherman's Landing; (xii) Future airport to be developed on Kangaroo Island; (xiii) Queensland Cement Development; and (xiv) Shale Oil Development.	The Project will not impact on the operational and expansion requirements of the major industrial areas and major infrastructure facilities.
O3 Suitable activities on premises adjoining the Gladstone State Development Area (GSDA) and the GSDA materials handling and transport corridor comprise compatible rural activities.	The Project is for infrastructure services that will service future industries, including possible future development within GSDA.

5.7 Compliance with GSDA Development Scheme

5.7.1 Background of GSDA

During 1991 the Gladstone Industrial Land Study identified appropriate areas for future industrial development to the west of Gladstone City.

In December 1997, the Government declared the existing State Development Area at Aldoga, the Materials Transportation and Services Corridor, a buffer area surrounding part of the Corridor and the Yarwun Industrial Estate to be a State Development Area known as the Gladstone State Development Area (GSDA). The GSDA was further expanded in December 2001 with the inclusion of the Clinton Precinct which is located at the mouth of the Calliope River and within the Gladstone City. The Targinie Precinct was established to encourage the establishment of industrial development (regional, State or national significant developments) that require access to strategic logistics and maritime facilities. The CG has now included one new land area into the Aldoga Precinct of the GSDA and two new areas into the Yarwun Precinct in April 2007.

The GSDA is administered by the CG assisted by the Gladstone Economic Industrial Development Board (GEIDB).

5.7.2 Background of Development Scheme for the GSDA (2001)

Under the *State Development and Public Works Organisation Act 1971* (SDPWO Act), a Development Scheme for the GSDA was prepared in 2001 to manage development within the GSDA. The Development Scheme provides an identical function to a local government planning scheme made under the IPA. It is a statutory land use document, administered by the CG for the GSDA, rather than a local government. The Development Scheme applies to a Material Change of Use (MCU) on land within the GSDA.

5.7.3 Background of Development Scheme for the GSDA (2006)

The CG reviewed the GSDA Development Scheme, which resulted in the formulation of the current Development Scheme which was approved by the Governor in Council on 4 April 2007.

5.7.4 Compliance with the Development Scheme for the GSDA

The GSDA Development Scheme (2006) is predominantly based on the previous scheme, with the format and much of the previous scheme retained. A key change is the deletion of Sections 9.1(3) and (4) of the Development Scheme (2001), with no similar clauses to replace these sections. Under Section 9.1(3) of the previous scheme a public sector entity was exempt from the requirement to make a MCU application under the GSDA Scheme, if the use was in relation to community infrastructure for which land had been reserved or identified. This subsection stated:

" (3) Subject to subsection (4) a public sector entity is exempt from making an application under subsection (1) where the proposed material change of use is in relation to community infrastructure on land identified or reserved for community infrastructure in the Gladstone State Development Area. (For example, existing State Controlled Roads, railways, power line easements and land for water treatment and distribution)."

The term "community infrastructure" within the GSDA Development Scheme has the same definition given by the IPA. With this section deleted from the GSDA Development Scheme there is no longer an exemption for public sector entities undertaking community infrastructure projects. Therefore the WICT Project within the GSDA requires an MCU approval under the GSDA Development Scheme.

Under Section 9.1 (7) of the GSDA Development Scheme (2006):

(7) The Coordinator-General may decide that sections 9.2, 9.3 and 9.4 do not apply in whole or in part to an application:

(a) accompanied by an Environmental Impact Statement for which a report evaluating the Environmental Impact Statement has been prepared; or
(b) accompanied by a planning report that is an Impact Assessment Study prepared pursuant to section 26 of the Act and accepted as a final Impact Assessment Study by a responsible authority; or
(c) for which the proponent has provided an Environmental Impact Statement and a report evaluating the Environmental Impact Statement has been prepared; or
(d) accompanied by documentation providing sufficient information for the Coordinator-General to be satisfied no further information is needed to assess the application; or
(e) that has already been subject to some form of referral to stakeholders or public consultation that is deemed to satisfy the requirements of section 9.2, 9.3 or 9.4; or
(f) in relation to the Stuart Oil Shale Resource Preservation Area, for a temporary use ancillary to an approved use within another land use designation in the Gladstone State Development Area,

to avoid duplication of referral and public notification processes undertaken in preparing an Environmental Impact Statement or similar documentation.

It would appear that because the WICT Project has involved the preparation of an EIS the CG may decide to proceed to the Decision Stage of IDAS. This will be confirmed with the CG during the detailed design phase of the Project.

However, under Section 9.1 (8) of the Development Scheme (2006):

(8) In making a decision under section 9.1(7) that section 9.2 does not apply or applies only in part, the Coordinator-General must obtain confirmation from referral agencies that they do not require referral under section 9.2.

Under Section 2 – Explanatory Definitions of the Development Scheme (2006) it states:

"referral agency" for an application means:

(a) an agency that would have been an advice agency or concurrence agency if the application had been one for a development approval under the Integrated Planning Act 1997; and
(b) Calliope Shire Council and Gladstone City Council; and
(c) where applicable, any other agency nominated by the Coordinator-General,

Compatibility with the Development Scheme for the GSDA

A Precinct Map forms part of the Development Scheme, and divides land within the GSDA between the Yarwun, Aldoga, Targinie and Clinton Precincts as well as the Stuart Oil Shale Preservation Area. It also identifies a dedicated Materials Transportation and Services Corridor and buffer area separating the Corridor from land use outside the GSDA. The GSDA Development Scheme identifies which GSDA precincts are considered broadly suitable for various types of industrial and infrastructure development.

The project area traverses the Yarwun Precinct, Materials Transportation and Services Corridor and Buffer Area. The project area does not traverse the Clinton, Targinie and Aldoga Precincts, and Stuart Oil Shale Preservation Area.

Under the GSDA Scheme, the WICT Project is defined as a:

"Public utility" - Any of the following undertakings, namely:-
(1) A railway, tramway, road or air transport, wharf, harbour or river undertaking;
(2) Undertakings for the supply of water, hydraulic power, electricity or gas, or the provision of radio broadcasting, television, telephone, sewerage or drainage services.

Schedule 1 – Aldoga Precinct, Schedule 2 – Yarwun Precinct and Schedule both designate "Public Utility" developments as "Uses that are considered highly likely to meet the purpose of the land use designation".

All three precincts (Yarwun Precinct, Materials Transportation and Services Corridor and Buffer Area) have several purposes, including: "*To provide for infrastructure that may or may not be associated with activities within the Gladstone State Development Area*".

The proposed WICT infrastructure is generally a compatible use within these three precincts.

5.8 Assessment Processes

IPA establishes two frameworks for assessing new development applications: the Integrated Development Assessment System (IDAS) and the Community Infrastructure Designation (CID) process. Planning approval through the EIS process is the preferred planning mechanism for large infrastructure projects that require consideration of planning and environmental issues at the regional or State level. The WICT Project will utilise both the IDAS and EIS assessment processes to obtain a decision on the Project.

IDAS allows multiple assessments to be integrated in the one overall assessment. It is a four stage assessment process, including:

1. Application Stage;
2. Information and Referral Stage;
3. Notification Stage; and
4. Decision Stage.

However, not all stages or parts of stages are required for all applications, particularly where a project has been declared a "significant project" pursuant to Section 26 of the SDPWO Act. In this instance, the EIS process for the WICT Project is being undertaken before an IDAS application is made. Upon completion of the EIS process, an IDAS application for MCU skips the Information and Referral Stage and Decision Stage and the application proceeds directly from the Application Stage to the Decision Stage.

In effect, the SDWPO Act EIS process replaces the Information and Referral Stages, and the Notification Stage of the IDAS process under Section 37 of IPA for applications which are defined as MCU.

Upon completion of the EIS, the Project will be designed and constructed as two separate projects, including:

- Wiggins Island Coal Terminal and associated conveyor works; and
- New railway transport infrastructure.

As a result the planning and environmental approvals will be obtained separately.

5.8.1 Wiggins Island Coal Terminal and Associated Conveyor Works made Assessable under a Planning Scheme

At the completion of the EIS process, the CG Evaluation Report will be taken as being a Concurrence Agency response under IPA and will be provided to the Assessment Manager to consider when issuing a Decision Notice.

Under the Gladstone IPA Plan and Calliope IPA Plan the proposed WICT is defined as:

"Major Infrastructure" (Industry (High Impact)) <u>means the use of premises for the purpose of the provision of facilities and services providing services such as</u> electricity, gas, raw water, <u>transport (air, rail, road and sea), rail terminals, pipelines and conveyors,</u> and telecommunications which is likely to have a notable impact.

Schedule 8A of IPA contains six tables which identify the Assessment Manager for development applications based on the type and location of the proposed development. When Tables 1-4 and 6 do not apply, then in accordance with Table 5, the Minister for Local Government and Planning must decide the Assessment Manager.

The proposed coal terminal and associated conveyor works are predominantly located within the planning jurisdictions of CQPA and GCC, but some works are in the planning jurisdiction of CSC and CG (for GSDA). The planning jurisdictions of the various lots that comprise this part of the WICT Project are described in Table 5.6.

Table 5.6 Jurisdiction of Statutory Authorities over WICT and Associated Conveyer Works

<table>
<tr><th>Lot</th><th>Plan number</th><th>Tenure</th><th>Tenure type</th><th>Project Component</th><th>Planning Jurisdiction</th></tr>
<tr><td>98</td><td>CTN279</td><td rowspan="3">Freehold</td><td rowspan="3">Strategic Port Land</td><td rowspan="3">Coal Terminal</td><td rowspan="4">CQPA</td></tr>
<tr><td>99</td><td>CTN279</td></tr>
<tr><td>100</td><td>CTN279</td></tr>
<tr><td>28</td><td>CTN279</td><td>Freehold</td><td>Strategic Port Land</td><td>Access Road</td></tr>
<tr><td colspan="4">N/A. Reclamation Area B. Currently land below High Water Mark. To be reclaimed under existing reclamation approval.</td><td rowspan="2">Material Conveyor System</td><td>GCC (for Operational Works in Local Government Tidal Area), CQPA on Strategic Port Land in Tidal Area</td></tr>
<tr><td colspan="4">N/A. Reclamation Area C. Currently land below High Water Mark. To be reclaimed under existing reclamation approval.</td><td>CG (for Material Change of Use in GSDA) and GCC (for Operational Works in GSDA)</td></tr>
<tr><td>3</td><td rowspan="2">SP165453</td><td rowspan="8">State land</td><td rowspan="8">GSDA</td><td rowspan="8">Borrow Pit and access tracks</td><td rowspan="8">CG (for Material Change of Use in GSDA) and CSC (for Operational Works in GSDA)</td></tr>
<tr><td>4</td></tr>
<tr><td>21</td><td rowspan="6">SP159091</td></tr>
<tr><td>22</td></tr>
<tr><td>23</td></tr>
<tr><td>24</td></tr>
<tr><td>25</td></tr>
<tr><td>26</td></tr>
<tr><td>51</td><td>SP122248</td><td>Lease hold</td><td>Perpetuity</td><td>Overland Conveyor System and Dump Station</td><td>CSC</td></tr>
</table>

Due to the complex cross-jurisdictional nature of the proposed WICT Project, it is not possible at this stage to determine the Assessment Manager, as the Project involves a MCU application spanning two local government areas as well as Strategic Port Land. As a result Tables 1-4 of Schedule 8A of IPA do not apply. These tables only apply to situations involving two jurisdictions at most, rather than three. The Assessment Manager will therefore need to be determined by the Minister for Local Government and Planning in accordance with Schedule 8A of IPA.

5.8.2 Railway Transport Infrastructure made Exempt from Assessment under a Planning Scheme

The proposed rail infrastructure is located entirely within the GSDA and the CSC area. Under IPA *"All aspects of development for community infrastructure prescribed under a regulation"* are exempt from assessment under a Planning Scheme.

Under the *Integrated Planning Regulation 1998* (Schedule 11 - Development for community infrastructure exempt under schedule 9, table 5, item 5 of the Act), the following is Exempt Development:

Table 2 Other transport infrastructure
"*All aspects of development for the maintenance, repair, upgrading, augmentation or duplication of- (a) rail transport infrastructure under the Transport Infrastructure Act 1994*"

Under the *Transport Infrastructure Act 1994* rail transport infrastructure is defined as:

rail transport infrastructure *means facilities necessary for*

operating a railway, including—
(a) railway track and works built for the railway, including, for example—

- *cuttings*
- *drainage works*
- *excavations*
- *land fill*
- *track support earthworks*

Development for the purposes of upgrading, augmenting or duplicating the existing rail transport infrastructure (not including other rail infrastructure such as rail maintenance yards) would therefore be 'Exempt Development' and would not require assessment under the Calliope IPA Plan. However, it will still require MCU assessment under the GSDA Development Scheme (refer Section 5.7).

The proposed rail loop, which requires construction of new rail infrastructure, is not exempt under Schedule 11, Table 2 of the IPA Regulation. Therefore, the rail loop will require a MCU approval from CSC under the Calliope IPA Plan.

5.8.3 Operational Works made Assessable under a Planning Scheme - Exemption

Schedule 9 Table 4 of IPA stipulates that operational works carried out "by or on behalf of a public sector entity authorised under State law to carry out the work", which are made Assessable Development under a planning scheme, are Exempt Development. CQPA and QR both comply to this requirement as they are both government owned corporations. This does not apply to operational works made Assessable Development under Schedule 8 of IPA.

5.8.4 Building Works made Assessable under a Planning Scheme –Self Assessment

Schedule 8, Part 2, Table 1 of IPA stipulates that *"Building work carried out by or on behalf of the State, a public sector entity or a local government, other than building work declared under the Building Act 1975 to be exempt development"* is Self Assessable Development. In this instance CQPA and QR must ensure that any Building Works at the detailed design phase continue to comply with the relevant provisions of the Gladstone IPA Plan and the Calliope IPA Plan. It should also be noted that the WICT Project within the GSDA for the purposes of Operational Works, Building Works and Reconfiguration of a Lot still falls under CSC's planning jurisdiction under IPA.

Whilst some Building Works are made Assessable under the CSC planning scheme, they are Self Assessable when carried out by CQPA and QR. Building Works within the GSDA must comply with the Calliope IPA Plan's GSDA Locality Code and the Environment and Infrastructure Code. Where applicable, in detailed design phase, CQPA and QR must "self-assess" any such Building Works against the relevant provisions of the Gladstone IPA Plan and the Calliope IPA Plan.

5.8.5 Operational Works made Assessable under Schedule 8 of IPA – Assessable Development

Schedule 8 of IPA prescribes certain developments to be Assessable or Self-Assessable. Development that is prescribed by the State in Schedule 8 requires application for development approval under IPA, with the Assessment Manager identified in Schedule 8A of IPA. A preliminary assessment of the various Coastal Works defined as either a Material Change of Use or Operational Works is outlined below.

5.9 Summary of Environmental Legislative Requirements

Given the regional and state significance of the WICT and the nature of environmental elements traversed, there are a number of Commonwealth and State environmental legislative requirements which need to be addressed prior to construction commencing. Project changes have resulted in some changes to the likely planning and environmental approvals required for the Project. A summary of these approvals is provided in Table 5.7 (coal terminal) and Table 5.8 (rail infrastructure).

Table 5.7 Summary of Likely Approvals Required for Port Infrastructure

Legislation	Administering Authority	Applicability to Project	Project Response
Commonwealth			
Environment Protection and Biodiversity Conservation Act 1999	Department of Environment and Water Resources Commonwealth Environment Minister	Impact on matter of NES: Section 12 and 15A (World Heritage); Section 18 and 18A (Listed threatened species and communities); and Section 20 and 20A (Listed migratory species).	Commonwealth Environment Minister declared the Project a controlled action
Native Title Act 1993	Any Department or Local Government making a decision which may impact on Native Title.	Any action on Crown Land (including ocean) over which a registered native title claim exists. Following Federal Court decision of *Lardil Peoples and Ors v QLD* it is unlikely that a claim to native title over the ocean will preclude commercial activity in the claim area.	Onshore works will be carried out within the existing terminal boundaries which are freehold land. Native title therefore not applicable. Offshore works most likely not affected by native title due to *Lardil* decision but further investigation and legal advice needed. Reclamation works will be partially undertaken on land not identified as being SPL, which may have native title implications. If native title applies, notification of proposed activity to Native Title Claimants will be required
State			
State Development and Public Works Organisation Act 1971	Coordinator-General	Initial Advice Statement prepared by the Proponents, identified the level of investment necessary for the Project, employment opportunities provided by the Project, potential impact on the environment, potential effects on relevant infrastructure and the significance of the Project to the region and State	Coordinator-General declared the Project a significant project. Project requires Coordinator-General approval (Evaluation Report)
State Development and Public Works Organisation Act 1971	Coordinator-General	Part of the reclamation and conveyor between the dump station and coal terminal traverses the GSDA, therefore the GSDA Development Scheme applies to works within the GSDA.	MCU application needs to be lodged with Department of Infrastructure
Integrated Planning Act 1997	Gladstone City Council Calliope Shire Council QT	Development which requires approval under the Gladstone/Calliope Planning Schemes and land use designations.	For works undertaken within boundaries of the SPL the IPA does not apply. Approval under IPA may be required for reclamation works on land not identified as being SPL.
Dangerous Goods Safety Management Act 2001	DES	Large dangerous goods location established	Notify the Chief Executive (DES). Emergency Plans and Procedures to be prepared

Legislation	Administering Authority	Applicability to Project	Project Response
Aboriginal Cultural Heritage Act 2003	DNRW	Duty of care to take all reasonable and practicable measures not to harm Aboriginal cultural heritage	Aboriginal cultural heritage investigation and Cultural Heritage Management Plan required under s87 if EIS proposed under the *State Development and Public Works Organisation Act 1972*
Coastal Protection and Management Act 1995	EPA	The removal of quarry material from State coastal land below the high water mark in a coastal management district. Operational work that is undertaking tidal works; or works (including land reclamation under tidal water) within a coastal management district.	Development Permit for Operational Work to be obtained
Environmental Protection Act 1994	EPA	Construction ERAs • ERA 7: Storing chemicals (other than crude oil, natural gas and petroleum products) • ERA 20(c): Extracting rock or other material • ERA 22: Screening, washing, crushing, grinding, milling, sizing or separating material extracted from the earth • ERA 28: Motor vehicle workshop • ERA 62: Concrete batching	Development Permits and Registration Certificates to be obtained
Environmental Protection Act 1994	EPA	Operational ERAs • ERA 7: Storing chemicals (other than crude oil, natural gas and petroleum products) • ERA 11: Crude oil or petroleum product storing in tanks or containers having a combined total storage capacity 500,000L or more • ERA 15(a): Operating a sewage treatment plant to have a peak design capacity to treat sewage of 100 or more equivalent persons but less than 1,500 equivalent persons • ERA 23(a): Abrasive blasting, commercially cleaning equipment or structures using a stream of abrasives • ERA 28: Motor vehicle workshop • ERA 71: Operating a port (other than an airport) under the *Transport Infrastructure Act 1994*	Development Permits and Registration Certificates to be obtained
		• ERA 74: Commercially loading, unloading or stockpiling materials or goods, in association with an activity mentioned in ERA 71 • ERA 83: Regulated waste transport	

Legislation	Administering Authority	Applicability to Project	Project Response
Explosives Act 1999	DNRW	Possession, storage and use of explosives	Blasting required for fill material Authority required for possession (s34), storage (s44) and use (s53) of explosives
Fisheries Act 1994 and *Integrated Planning Act 1997*	DPIF	Work in areas causing removal, destruction or damage to marine plants	Development Permit for Operational Works to be obtained
		The construction or raising of a waterway barrier	Development Permit for Operational Works to be obtained
Nature Conservation Act 1992	EPA	Taking, using, keeping or interfering with a protected animal or plant (Sections 88 and 89).	Licence/Permit to be obtained if removal of or interference with protected plants or animals is proposed
Vegetation Management Act 1999 and *Integrated Planning Act 1997*	DNRW	Removal of Regional Ecosystems as defined by the EPA under the Act	Development Permit for Operational Works to be obtained
Transport Infrastructure Act 1994	CQPA QT	Any reclamation works which encroach on land not identified as being SPL, will have land use and land tenure implications. If CQPA has title over the encroached area, then CQPA will be required to modify the Gladstone Land Use Plan to reflect the change in land use arising from the encroachment. Section 285 requires CQPA to consult with the public and local government prior to it amending the plan. In order to take effect, the amended plan must be approved by the Minister for Transport, followed by gazette notification (s286). If CQPA does not hold title over the encroached area, it must acquire the land first before it can be approved as SPL.	CQPA to amend Port Land Use Plan and receive approval from Minister for Transport
Transport Infrastructure Act 1994 and Integrated Planning Act 1997	DMR	Undertaking Operational Works on land contiguous to a State-controlled road (Schedule 2 Table 3 *Integrated Planning Regulations* 1997), Includes work that is: • Associated with access to State-controlled road; • Involves filling or excavation; or • Results in redirection or intensification of site stormwater through a pipe with diameter greater than 625 cm^2. Operational Works on SPL do not trigger a referral to DMR. Works that constitute a Material Change of Use on SPL triggers the development assessment process (Schedule 2, table 2 *Integrated Planning Regulations 1997*).	For Operational Works on SPL, development application is not required. For works on land other than SPL, development application to be submitted to DMR for approval.

Legislation	Administering Authority	Applicability to Project	Project Response
Transport Infrastructure Act 1994 and Integrated Planning Act 1997	CQPA Harbour Master/QT	Development below high water mark and within the limits of a Port under the *Transport Infrastructure Act 1994.*	Operational impacts on marine navigation associated with the movement of vessels within Port Limits. Approval from CQPA and Harbour Master/QT primarily due to navigational issues (Schedule 2 *Integrated Planning Regulation 1998*).
Transport Operations (Road Use Management) Regulations 1995	QT DMR	Transportation by road of vehicles of a size or weight exceeds the legal limit (s11A). Carrying dangerous goods as defined under the Australian Code for the transportation of dangerous goods by road or rail, or prescribed by Regulations (s154).	Approval to be obtained if applicable.
Civil Aviation Act 1988 and Regulations	Civil Aviation Safety Authority and Gladstone-Calliope Aerodrome Board	Object that penetrates the obstacle limitation surface of Gladstone Aerodrome	Obtain approval if required
		Lighting within 6km radius of the aerodrome	Obtain approval if required
Water Act 2000 and Integrated Planning Act 1997	DNRW	Taking water from a watercourse, lake, spring or underground water (s237). Taking, getting or removing or otherwise interfering with quarry material in or from a watercourse or lake (s280). These activities are assessable development under Schedule 8 of IPA.	Development permit for operational works required if taking water form a watercourse, lake, spring or underground water is proposed. Development permit required if taking, getting, removed or interfering with quarry material from a watercourse or lake is proposed.
Integrated Planning Amendment Regulation (No.3) 2002 and State Planning Policy 2/02 (Acid Sulphate Soils)	DNRW	Development assessable where the surface of the land is at or below 5m AHD or the development involves filling the development site with 1,000m^3 or more of material. Assessing acid sulphate soil matters under IPA does not apply to SPL (IPA Guide 11). For SPL, development is only assessable if there is a Material Change of Use made assessable under a planning scheme or there is a reconfiguration of a lot.	All works undertaken within boundaries of SPL do not require consent. This issue will be referred to DNRM as an Advice Agency for a Development Permit for Operational Works for reclamation works on land outside of SPL. Acid Sulphate Soil management needs to be addressed as part of environmental due diligence under the *Environmental Protection Act 1994*
Transport Operations (Road Use Management/Dangerous Goods) Regulations 1998	DMR QT	Transport of empty drums that previously held materials classed as Dangerous Goods (Part 18).	Approval to be obtained if applicable.
Transport Operations (Marine Pollution) Act 1995	CQPA	Regulates disposal of waste from vessels.	

Legislation	Administering Authority	Applicability to Project	Project Response
Dangerous Goods Safety Management Regulation 2001	DES	Storage of goods/materials in quantities exceeding the levels outlined in the Regulation.	If facility is a Large Dangerous Goods Location then notification only to DES is required. If facility is a Major Hazard Facility then it will be necessary to notify DES and seek approval under IPA.

Table Notes:

DES	= Department of Emergency Services	ERA	= Environmentally Relevant Activity
DPIF	= Department of Primary Industries and Fisheries	CLR	= Contaminated Land Register
EPA	= Environmental Protection Agency	EMR	= Environmental Management Register
NES	= National Environmental Significance	DNRW	= Department of Natural Resources and Water
DMR	= Department of Main Roads	SPL	= Strategic Port Land
CQPA	= Central Queensland Port Authority	QT	= Queensland Transport

Table 5.8 Summary of Likely Approvals for Rail Infrastructure

Legislation	Administering Authority	Applicability to Project	Project Response
Commonwealth			
Environment Protection and Biodiversity Conservation Act 1999	Department of Environment and Water Resources Commonwealth Environment Minister	Impact on matter of NES: Section 12 and 15A (World Heritage); Section 18 and 18A (Listed threatened species and communities); and Section 20 and 20A (Listed migratory species).	Commonwealth Environment Minister declared the Project a controlled action
Native Title Act 1993	Any Department or Local Government making a decision which may impact on Native Title	Any action on Crown Land (including ocean) over which a registered native title claim exists. Following Federal Court decision of *Lardil Peoples and Ors vs QLD* it is unlikely that a claim to native title over the ocean will preclude commercial activity in the claim area.	Rail infrastructure on Crown Land will need Native Title to be addressed during the QR property acquisition process
State			
State Development and Public Works Organisation Act 1971	Coordinator-General	Initial Advice Statement prepared by the Proponents, identified the level of investment necessary for the Project, employment opportunities provided by the Project, potential impact on the environment, potential effects on relevant infrastructure and the significance of the Project to the region and State	Coordinator-General declared the Project a significant project. Project requires Coordinator-General approval (Evaluation Report)
Integrated Planning Act 1997	Calliope Shire Council	Development which requires approval under the Calliope Planning Scheme	MCU approval required from Calliope Shire
Aboriginal Cultural Heritage Act 2003	DNRW	Duty of care to take all reasonable and practicable measures not to harm Aboriginal cultural heritage	Aboriginal cultural heritage investigation and Cultural Heritage Management Plan required under s87 if EIS proposed under the *State Development and Public Works Organisation Act 1972.*
Environmental Protection Act 1994	EPA	Construction ERAs • ERA 20: Extracting rock or other material • ERA 22: Screening, washing, crushing, grinding, milling, sizing or separating material extracted from the earth • ERA 62: Concrete batching • ERA 83: Regulated waste transport	Development Permits and Registration Certificates to be obtained

Legislation	Administering Authority	Applicability to Project	Project Response
Explosives Act 1999	DNRW	Possession, storage and use of explosives	Blasting required for fill material Authority required for possession (s34), storage (s44) and use (s53) of explosives
Nature Conservation Act 1992	EPA	Taking, using, keeping or interfering with a protected animal or plant (Sections 88 and 89)	Licence/Permit to be obtained if removal or interference with protected plants or animals is proposed
		Activities within a Protected Area Calliope Conservation Park Mount Stowe State Forest	Approval under the NC Act from the administering authority to undertake proposed works (ie clearing of vegetation) Obtain approval under Section 63 of *the Nature Conservation (Protected Areas Management) Regulation 2006* and Section 27 of the *Forestry Regulation 1988*
Vegetation Management Act 1999 and *Integrated Planning Act 1997*	DNRW	Removal of Regional Ecosystems as defined by the EPA under the Act	Development Permit for Operational Works to be obtained
Water Act 2000 and Integrated Planning Act 1997	DNRW	Taking water from a watercourse, lake, spring or underground water (s237). Taking, getting, removing, or otherwise interfering with quarry material in or from a watercourse or lake (s280). These activities are assessable development under Schedule 8 of IPA.	Development Permit for Operational Works required if taking water from a watercourse, lake, spring or underground water is proposed. Development Permit required if taking, getting, removed or interfering with quarry material from a watercourse or lake is proposed.
Transport Operation (Road Use Management) Regulation 1995	QT DMR	Transportation by road of vehicles of a size or weight which exceed the legal limit (s1A). Carrying dangerous goods as defined under the Australian Code for the transportation of dangerous goods by road or rail, or prescribed by Regulations (s154).	Approval to be obtained if applicable.
Transport Infrastructure (Dangerous Goods by Rail) Regulation 2002	QT		Approval to be obtained if applicable
Transport Operations (Road Use Management/Dangerous Goods) Regulations 1998	DMR QT	Transport of empty drums that previously held materials classed as Dangerous Goods (Part 18).	Approval to be obtained if applicable
Civil Aviation Act 1988 and Regulations	Civil Aviation Safety Authority and Gladstone-Calliope Aerodrome Board	Object that penetrates the obstacle limitation surface.	Obtain approval if required
		Lighting within 6km radius of the aerodrome	Obtain approval if required

Legislation	Administering Authority	Applicability to Project	Project Response
Integrated Planning Amendment Regulation (No.3) 2002 and State Planning Policy 2.02 (Acid Sulphate Soils)	DNRW	Development assessable where the surface of the land is at or below 5m AHD or the development involves filling the development site with 1,000m^3 or more of material.	Acid Sulphate Soil management needs to be addressed as part of environmental due diligence under the *Environmental Protection Act 1994*

Table Notes:

DES = Department of Emergency Services
DPIF = Department of Primary Industries and Fisheries
EPA = Environmental Protection Agency
DNRW = Department of Natural Resources and Water
ERA = Environmentally Relevant Activity
CLR = Contaminated Land Register
EMR = Environmental Management Register
NC Act = *Nature Conservation Act 1992*

5.10 Approvals Required for Coastal Tidal Works

The Coastal Protection and Management Act 1995 (Coastal Act) provides for the protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity. The Coastal Act triggers several items of Assessable Development under Schedule 8 of IPA.

5.10.1 Tidal Works and Works within a Coastal Management District made Assessable under Schedule 8 of IPA

Under Schedule 8 of IPA Table 4 (Item 5) Tidal works are assessable. Tidal works are defined under the Coastal Act as:

Operational work, other than excluded work, that is—

1 Tidal works means work in, on or above land under tidal water, or land that will or may be under tidal water because of development on or near the land.

2 Tidal works includes the construction of a basin, boat ramp, breakwater, bridge, dam, dock, dockyard, embankment, groyne, jetty, pipeline, pontoon, power line, seawall, slip, small craft facility, training wall or wharf and works in tidal water necessarily associated with the construction.

Excluded work refers to:

4 Tidal works does not include—

(a) erecting a sign or other structure, including, for example, a navigational aid or sign for maritime navigation, under a direction made under another Act; or

(b) building an open drain that—

(i) is less than 1m deep; and

(ii) has a cross sectional area less than 2.5m^2; or

(c) assessable development under the Integrated Planning Act 1997, schedule 8, part 1, table 4, item *5(b); or*

(d) removing quarry material that has accumulated within the boundaries of, or in an area adjoining, a previously approved tidal work to allow the work to be used for the function for which it was approved; or

(e) removing quarry material from land under tidal water, if the removal is for no other purpose than the sale of the material or use of the material to reclaim land.

The reference in the definition of Excluded work to Schedule 8, Part 1, Table 4, Item 5(b) refers to Operational Works in a Coastal Management District.

Under Schedule 8 of IPA Table 4 (Item 5b) work within a coastal management district is assessable if:

Operational work, that is—

(b) *any of the following carried out completely or partly within a coastal management district—*
- (i) *interfering with quarry material on State coastal land above high-water mark;*
- (ii) *disposing of dredge spoil or other solid waste material in tidal water;*
- (iii) *draining or allowing drainage or flow of water or other matter across State coastal land above high-water mark;*
- (iv) *constructing or installing works in a watercourse and not assessable under item 3 or 4;*
- (v) *reclaiming land under tidal water;*
- (vi) *constructing an artificial waterway associated with the reconfiguration of a lot;*
- (vii) *constructing an artificial waterway not associated with the reconfiguring of a lot on land, other than State coastal land, above high-water mark if the maximum surface area of water on the waterway is at least 5000m2*
- (viii) *constructing a bank or bund wall to establish a ponded pasture on land, other than State coastal land, above high-water mark;*
- (ix) *removing or interfering with coastal dunes on land, other than State coastal land, that is in a erosion prone area and above high-water mark.*

Table 5.9 summarises the IPA Schedule 8 coastal work triggers which will require Operational Works approval.

Table 5.9 Summary of Potential Coastal Works Approvals

Approval Type	Activity/Works	IPA Schedule 8 Reference	Relevance to WICT Project
Tidal Works / Works in a Coastal Management District	Reclamation	Table 4: Operational Works, Item 5 (a) and Item 5(b) (v)	Approval under this trigger of IPA has been issued under the Harbours Act 1955 for Reclamation Areas B and C. Reclamation works outside these areas (refer Figure 3.8) will require approval under this IPA trigger.
	Dredging and Disposal of Spoil	Table 4: Operational Works, Item 5 (a) and 5 (b) (ii)	Applies to dredging in a tidal area and disposal of dredge spoil in tidal waters which will be carried out as a result of dredging works
	Marine structures (Wharf, Jetty and associated structures)	Table 4: Operational Works, Item 5 (a)	The construction of the wharf, jetty and associated structures in Port Curtis.
	Works within a watercourse (not assessable under items 3 or 4 of Table 4)	Table 4: Operational Works, Item 5 (b) (iv)	Works within a tidal watercourse.

5.10.2 Assessment Process for Coastal Works

Schedule 8A of IPA identifies the Assessment Manager for various applications. Table 4, Item 7 states that the Chief Executive administering the Coastal Act (EPA) is the Assessment Manager:

If tables 1, 2 and 3 do not apply and the application is for—

(a) *operational work for 1 or more of the following—*
- (i) *constructing or raising a waterway barrier works;*
- (ii) *the removal, destruction or damage of a marine plant; and*

(b) *operational work that is tidal work or work carried out completely or partly within a coastal management district; and*

(c) *no other assessable development.*

Tables 1, 2 and 3 do not apply to the WICT Project as the Operational Works applications will occur within the planning jurisdictional boundaries of GCC, CSC, CQPA and CG (for GSDA). As the applications for tidal works/works in a coastal management district will also involve waterway barrier works and marine plant removal, then the EPA will be the Assessment Manager for the applications.

In addition to works made Assessable under the Coastal Act, the works for the WICT and associated overland conveyor system in a coastal area will trigger several other items of Assessable Development under various legislation. Schedule 2 of the *Integrated Planning Regulation 1998* makes the agencies responsible for assessing these activities Referral Agencies under IPA. Table 5.10 identifies the various Referral Agencies that will be triggered under Schedule 2 of the *Integrated Planning Regulation 1998*.

Table 5.10 Summary of Potential Referral Agencies for Operational Works (Coastal Works) Application

Referral Trigger	Schedule 2 (IPA Regulation) Trigger Item No.	Referral Agency (and type)	Referral Jurisdiction	Likelihood of Referral
State-Controlled Road	*3 Operational work not associated with a material change of use mentioned in table 3, item 1, or a reconfiguration mentioned in item 2 of this table that—* *(a) is associated with access to the State-controlled road; or* *(b) is for filling or excavation; or* *(c) involves the redirection or intensification of site stormwater from the land, through a pipe with a cross-sectional area greater than 625cm2 that directs stormwater to a State-controlled road*	Department of Main Roads (Concurrence Agency or Advice Agency)	The purposes of the *Transport Infrastructure Act 1994*	Should the coastal works application include works that involve changes to the access (road/rail) to Hanson Road, referral will be required. For reclamation, any filling or excavation works that exceed 10,000 t per annum will trigger Main Roads as an advice agency. Any filling or excavation works that exceed 50,001 t per annum will trigger Main Roads as a concurrence agency.
Tidal Works/ Disposal of dredge spoil/ reclamation of land/ construction of a canal.	14 Operational work made assessable under the Act, schedule 8, part 1, table 4, item 5, that is— (a) tidal work; or (b) disposing of dredge spoil or other solid waste material in tidal water; or (c) reclaiming land under tidal water; or (d) constructing a canal, if the canal is associated with reconfiguring a lot	The chief executive under the *Transport Operations (Marine Safety) Act 1994*—as a concurrence agency	The purposes of the *Transport Operations (Marine Safety) Act 1994*	Three of the four triggers are met for Item 14, so the application will require referral to QT for marine safety
Development within a Port	15 Development on land below high water mark and within the limits of a port under the *Transport Infrastructure Act 1994* if the development is—	CQPA (The chief executive of the port authority for the land—as a concurrence	Port authority functions under the *Transport Infrastructure Act 1994*, chapter 8, part	The Project will be within 1,000 m of a planned port facility (WICT) identified in the GPA (now CQPA) Port Land Use Plan. CQPA will therefore be

Referral Trigger	Schedule 2 (IPA Regulation) Trigger Item No.	Referral Agency (and type)	Referral Jurisdiction	Likelihood of Referral
	(a) within 200m of a shipping channel or an entry and exit shipping corridor for the port; or (b) within 1000m of a swing basin, a commercial shipping wharf, a mooring, anchorage or spoil grounds; or (c) within 1000m of a planned port facility identified in a land use plan	agency)		concurrence agency for this application
Waterway Barrier Works	28 Operational work that is the constructing or raising of a waterway barrier works— (a) made assessable under the Act, schedule 8, part 1, table 4, item 6; and (b) for which the chief executive (fisheries) is not the assessment manager	Department of Primary Industries and Fisheries (Concurrence Agency)	The purposes of the *Fisheries Act 1994*	Could be referred to DPIF as part of an integrated application (will be dependent on the timing of the application)
Marine Plant Removal	29 Operational work that is the removal, destruction or damage of marine plants— (a) made assessable under the Act, schedule 8, part 1, table 4, item 8; and (b) for which the chief executive (fisheries) is not the assessment manager	Department of Primary Industries and Fisheries (Concurrence Agency)	The purposes of the *Fisheries Act 1994*	Could be referred to DPIF as part of an integrated application (will be dependent on the timing of the application)

Reclamation Requirements for Application

CQPA has an existing Development Permit (3 October 1991) issued by the Queensland Transport under the *Harbours Act 1955*, with a currency period of 20 years from the date of issue. While this act has since been repealed, the transitional provisions of Chapter 6, Part 4 of the Coastal Act allow this existing approval to have force and effect under the Coastal Act.

The Coastal Act states:

Division 2 Authorities, permits and approvals under Harbours Act, Beach Protection Act and Canals Act 171 Continuing effect of authorities under Harbours Act

(1) This section applies to a following authority in force immediately before the commencement of the section—
  - *(a) a sanction to carry out works given under the Harbours Act, section 86;*
  - *(b) an authorisation to reclaim land given under the Harbours Act, section 91.*

(2) From the commencement, the authority, and any conditions of the authority, have effect as if the authority were a development approval in the form of a development permit for operational work under the Integrated Planning Act 1997, Schedule 8, Part 1, Table 4, item 5.

(3) Subsection (2) applies only to the extent the carrying out of the operational work could have been sanctioned or authorized under the Harbours Act, section 86 or 91.

The reference to Schedule 8, Part 1, Table 4, Item 5 of IPA refers to tidal works and works in a coastal management district. CQPA therefore has a valid Development Permit for the reclamation of land as shown on Plan No: H-466 (in particular Reclamation Areas A, B and C). However, a change in design means that Reclamation Area A is no longer required for reclamation, but additional areas adjacent to Reclamation Areas B and C are required. The reclamation area changes are shown in Table 5.6 and Figure 3.8 These additional reclamation areas will require approval under IPA.

Table 5.11 Reclamation of Tidal Areas

Reclamation Area	Existing Approved Area (ha)	Additional Area Required Adjacent to Reclamation Area (ha)
A	56.8	Not required
B	193 (approximately)	To be confirmed
C	140 (approximately)	To be confirmed
Total	389.8 (approximately)	To be confirmed

5.10.3 Dredging Requirements for the Application

The removal of quarry material from State coastal land below high water mark in a coastal management district is regulated by means of either a resource allocation (Chapter 2, Part 5, Division 1) or a dredge management plan (Chapter 2, Part 5, Division 2). Approval of either authorisation is assessed against Section 75 of the Coastal Act, the State Coastal Plan and the *Curtis Coast Regional Coastal Management Plan 2003* (the Curtis Coastal Plan). An allocation notice or an approved dredge management plan authorises the holder, during the period the notice or plan is in force (nominally six (6) years), to access quarry material (s 100A).

In accordance with Section 100A, after obtaining either a resource allocation or an approved dredge management plan:

100A Removal of quarry material is subject to other approvals

(1) An allocation notice or an approved dredge management plan authorises the holder, during the period the notice or plan is in force, to access quarry material.

<u>*(2) However, the holder is not authorised to remove any quarry material under the notice or plan until the holder has obtained—*</u>

<u>*(a) if the holder must have a development permit for the removal of the quarry material—a development permit; and*</u>

(b) if the removal of the quarry material is an environmentally relevant activity—the required authority.

For the proposed dredging works to proceed, the Development Permit for Operational Works must be obtained. There is also a requirement to either have an allocation notice or an approved dredge management plan prior to submission of the development application. Otherwise the Chief Executive must grant written consent to the development application proceeding. The Coastal Act states:

(4) The application must be supported by—

(a) evidence of an allocation notice or an approved dredge management plan for the removal of the quarry material mentioned in the application; or

(b) the written consent of the chief executive to the application.

(5) However, the chief executive may refuse to consent if—

(a) the person is not the holder of an allocation notice or an approved dredge management plan; or

> (b) *the person is the holder of an allocation notice or an approved dredge management plan but the works to which the application relates are not consistent with the notice or plan.*

(6) Also, subsection (2)(a) does not apply to the holder of an approved dredge management plan if section 100B applies to the plan.

Alternatively approval under IPA for the dredging may not be required if all the requirements of Section 100B of the Coastal Act are complied with:

100B Relationship with Integrated Planning Act 1997

(1) This section applies to a person who has an approved dredge management plan dealing with operational work mentioned in the Integrated Planning Act 1997, schedule 8, part 1, table 4, item 5.

(2) Despite the Integrated Planning Act 1997, section 3.1.4, the person is not required to have a development approval for the work if—

> *(a) the chief executive would be the assessment manager for the work under that Act; and*
>
> *(b) an entity that would be a referral agency for the work under that Act has advised the chief executive it has no requirements for the work or its requirements for the work have been incorporated into the plan.*

(3) Also, despite the Integrated Planning Act 1997, section 3.3.3, the person is not required to refer a development application for the work to the chief executive if the chief executive is a referral agency for the work.

(4) Subsections (2) and (3) apply only to the extent the operational works have been approved under the plan.

6. Transport

6.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to traffic and transport issues are outlined below:

- Proposed transport routes require greater detail. In particular, it needs to discuss how many vehicles will be travelling to and from the site to collect wastes, the type and size of those vehicles, the route that they will be travelling (particularly to the Benaraby Landfill) and the likely impact of this additional traffic on the road network;
- The traffic assessment generally addresses the ToR requirements, however there are a number of items within the ToR that have not been addressed in the EIS. Specifically:
  - Impacts on road users and road safety have not been discussed;
  - The adequacy of existing product spill contingency plans (specific to potential spillages along transport routes) has not been discussed;
  - Impacts on pedestrian and cycle networks have not been discussed; and
  - The impacts of construction phase alterations to the road network and the consequent interruptions to traffic have not been discussed.
- Further analysis and discussion on the manner and type of transportation to be utilised by the construction workforce is required including car sharing, bus routes and organisation, incentive programs, route selection etc; and
- No draft Road Use Management Plan (RUMP) has been included in the EIS although a Traffic Management Plan is proposed as part of the Environmental Management Plan. A Road Use Management Plan should be prepared by the proponent to address mitigation measures such as temporary access to adjoining works, temporary haul roads across Hanson Road, proposed side tracks for Hanson Road, monitoring of the materials transportation on the road network, safety management of the roadworks, notification measures, advising road users of planned traffic restrictions, roadside clean up measures for accidents, communication management, traffic management and so on for each of the construction phases of the project.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

6.2 Project Changes

The changes to the Project layout have resulted in a removal of the impacts of traffic and transport within certain areas.

The major change to the Project is the relocation of QR's rollingstock maintenance and provisioning yard and associated infrastructure, previously located to the south west of the North Coast Line, to a location in the north of the GSDA. This has resulted in a significant reduction in the rail infrastructure required in the project area, including the removal of the rail bridge crossing of the Calliope River (refer Figure 3.0.1 for overall scheme layout). This Project change will reduce the volume of traffic (construction and operation) accessing and/or utilising Reid Road and Mount Miller Road as identified in the WICT EIS.

This relocated infrastructure (outside of the EIS project area) now forms a parallel project, which is to be examined under separate environmental studies and is no longer under consideration in this Supplementary EIS.

The Project changes also include the incorporation of a conveyor system to transport coal between the North Coast Line dump station and the coal terminal, which will impact on the existing configuration of Hanson Road between the Calliope River Anabranch and Reid Road. The conveyor system will underpass the existing and proposed additional northern Hanson Road carriageways. Minor raising of

Hanson Road is required to allow the underpass to be established clear of the gas pipeline, and with floor levels above tidal influences, thereby allowing free drainage. The "road over rail" overpass (4-lane carriageway) identified in the WICT EIS will no longer be required.

As per the WICT EIS, a dedicated access to WICT is preferable as it provides a more direct access point to the site. The access to the proposed coal terminal will be from Hanson Road using a T-intersection with a seagull treatment (refer Appendix B: Figure B17), with WICT access being the minor leg of the T-intersection. This replaces the 4 leg roundabout configuration identified in the WICT EIS which was to provide access to the coal terminal and the rail loop located to the southern side of Hanson Road.

The Project changes exclude the need to further integrate the North Coast Line and Moura Line (ie additional bridging of the Calliope River is no longer required) and also the expansion of the Moura Line between the Calliope River and Jefferis Road. Hence, the proposed upgrade of Jefferis Road and the proposed access road to Byellee Wetlands identified in the WICT EIS is no longer required. The changes will not impact on the existing volume of rail traffic accessing the Byellee area.

In addition, the Project changes are unlikely to directly impact on the existing volume of rail traffic along the Moura Line in the Gladstone/Calliope area. The changes to the Project will ensure that the volume of traffic will be predominantly transferred to the upgraded North Coast Line in the northern GSDA area.

Cardno Eppell Olsen, a specialist traffic consultant, is undertaking a Supplementary Traffic Report, providing a detailed traffic and transport assessment in accordance with the DMR Guidelines for the Assessment of Road Impacts of Development Proposals (November 2000). The Report shall address the comments received during the EIS consultation period and impacts on the traffic and transport infrastructure as a result of the Project changes.

The Supplementary Traffic Report was to be completed and issued as appendix to the Supplementary EIS, however due to delays in finalising construction workforces and materials tonnages associated with the revised project scope, the issue of the Report has been delayed. The Department of Infrastructure has approved for the Supplementary Traffic Report to be issued as an Addendum to the Supplementary EIS. The addendum is expected to be available in late August at which time Advisory Agencies will be forwarded a CD containing the addendum (a hard copy will also be available on request). Agencies will be given the opportunity to consider the addendum prior to finalisation of the CG Report.

The strategy adopted in the revised impact assessment includes the changed project scope associated with the WICT project, and modified traffic generation resulting from construction and operational phases.

6.3 Transport Routes

The likely transport routes for the transportation of waste material during the construction and operational phases of the WICT Project are discussed in Section 13 and will be assessed further during the detailed design phase. This includes service routes such as waste disposal and bus services for the coal terminal (ie it is anticipated that the waste transport route will bypass Gladstone and access Benaraby Landfill via Gladstone-Mt Larcom Road, Calliope River Road, Dawson Highway and the Bruce Highway).

The road network surrounding the proposed development site and key major links will be described in detail in the Supplementary Traffic Report.

6.4 Potential Construction Impacts on Road Users and Road Safety

The mode share assumptions are based upon achieved mode trends at similar sites in the Gladstone area (eg Comalco Refinery had a total of 2,200 workers at the construction peak with an average occupancy of 1.8 persons per car).

During the construction activities it is expected that approximately 67% of construction staff will travel to and from the site by private bus operated by the Project. The remaining 33% will travel to and from the site in private vehicles with an assumed average occupancy of two persons per vehicle.

The number of workers travelling by car can be discouraged by the provision of a high quality bus service, limiting the available car parking available at the Project construction site and measures/incentive to ensure car pooling (average of two people/car). Details associated with the bus service system and methods/incentives to limit traffic movement will be finalised during the detailed design phase of the Project, including the transport routes and pick up locations.

CQPA proposes to undertake all major import and export of materials and product for the WICT Project via either rail or sea. A breakdown of materials likely to be transported along existing road networks during the construction and operational phases of the Project will be outlined in the Supplementary Traffic Report (ie the majority of the concrete and road pavement will be transported to site via Gladstone Mt Larcom Road, Calliope River Road and the Bruce Highway). The volume of material will be finalised in the detailed design, including the volume of waste material to be disposed of at regional landfills (eg Benaraby) and the frequency of traffic movement.

The number of deliveries during the operational phase has been estimated to represent approximately 20% of the off peak traffic.

6.5 Impacts on Local Road Networks

6.5.1 Intersection Assessment

Information relating to intersection analysis, cumulative impacts and proposed upgrade layouts will be outlined in the Supplementary Traffic Report (which is to be issued as an addendum to the Supplementary EIS).

6.5.2 Mid-Block Link Capacity Assessment

The Supplementary Traffic Report will assess the impacts associated with the increase in traffic associated with the various stages of the projects on each road segment in comparison to the existing (2006) traffic volumes. The report will provide a detailed description of the impacts and mitigation measures.

State Controlled Road Network

Sections of the State Controlled Roads that will require upgrading in future years due to the expected growth in background traffic volumes are:

- Bruce Highway, north of Gladstone-Mt Larcom Road will require the addition of overtaking lanes by 2019;
- Hanson Road, between Red Rover Road and Blain Drive will require four lanes by 2030;
- Hanson Road, between Red Rover Road and Landing Road, requires overtaking lanes by 2014; and
- Dawson Highway, between Clinton (Harvey Road/Chapman Drive) and Don Young Drive will require four lanes by 2019.

It should be noted that all of these upgrades are based upon the expected background traffic volumes and will be required with or without the subject development.

The Supplementary Traffic Report will contain details with respect to impacts of development traffic.

Council Controlled Road Network

Sections of the Council Controlled Roads that will require upgrading in future years due to the expected growth in background traffic volumes comprise:

- Glenlyon Road (south of Dawson Highway) – based on current traffic volumes a need may exist now for 4 laning of Glenlyon Road south to Derby Street. A more detailed traffic assessment would need to be undertaken to confirm this is required; and
- Blain Drive – the northern end connecting to Hanson Road is identified as requiring 4 lanes by approx 2028.

The Supplementary Traffic Report will contain details with respect to impacts of development traffic.

6.5.3 Pavement Impact Assessment

The Supplementary Traffic Report will identify the pavement impacts of the heavy vehicle movements to and from the completed developments. This assessment will be conducted in accordance with DMR's Road Impact Assessment guidelines.

The Supplementary Traffic Report will contain details with respect to impacts of development traffic.

6.6 Pedestrian and Cycle Networks

The WICT Project is unlikely to have an adverse impact on the existing pedestrian and cycle networks and there is the potential to improve cycle access along Hanson Road west of the Calliope River Anabranch, which is currently provided on road via 1.5m wide sealed shoulders.

The WICT Project is unlikely to have an adverse impact on existing pedestrian infrastructure especially along Hanson Road. At this time Hanson Road does not accommodate a pedestrian network due to the high level of risk posed to human safety as a result of road design, traffic movement and volume (ie speed limit is 100km/hour including heavy equipment).

The proposed treatment to Hanson Road from the Calliope River Anabranch west past the Services Corridor allows for the provision of a separate bicycle path located to the southern side of the existing traffic carriageway, generally in accordance with the facility proposed by DMR in their Overtaking Lane Scheme for the section of Hanson Road between the Calliope River Anabranch to Reid Road.

The provision of an off road cycle facility in the Overtaking Lane Scheme may have been driven by the reduction in shoulder width from 1.5m to 0.5m. On a detailed review of the proposed treatment to Hanson Road as part of this Project, and an overall assessment of on road vs off road cycle facilities to service industrial sites west of the Calliope River, it may be preferred to incorporate cycle facilities on road by the provision of a 2.0m wide sealed shoulder (100km/hr design speed), as this will allow for a connection east from the Calliope River Anabranch to the Calliope River. If the design speed is reduced to 80km/hr this option has greater merit.

6.7 Mitigation Measures for Transport and Traffic during Operational Phases

A dedicated access to WICT is the preferable treatment as it provides a more direct access point to the coal terminal. It is considered that DMR comments on the EIS can be addressed by providing a high capacity at-grade solution.

6.7.1 Road Use Management Plan

A Road Use Management Plan will be developed during the detailed design phase of the Project. This document will address key issues and propose management and mitigation measures to ensure all potential impacts from the Project are reduced and/or alleviated through best practice techniques.

The Road Use Management Plan will include consideration of the following:

- Temporary access to adjoining works;
- Temporary haul roads across Hanson Road;
- Proposed side tracks for Hanson Road;
- Monitoring of materials transportation on the road network;
- Safety management of the roadworks;
- Notification measures;
- Advisement of planned traffic restrictions to road users;
- Roadside clean-up measures for accidents;
- Communication management; and
- Traffic management for each phase of construction/lay down areas etc.

6.7.2 Contingencies

CQPA and QR have in place contingency plans and procedures to manage spill and/or leakage of chemicals and hydrocarbons (refer Section 21 of the EIS). During construction the contractor will ensure appropriate procedures are in place to manage the potential risk associated with the spill and/or leakage of chemicals and hydrocarbons. Further details are contained in Sections 9 and 13 of the EIS.

The detailed design phase of the Project will also address measures to mitigate spill and/or leakage of chemicals and hydrocarbons, including the installation of measures to trap and remediate contaminated water such as sumps.

6.8 Conclusions

The WICT Project has the potential to impact upon a number of State and Council Controlled Roads during the construction and operational phases of the development as detailed fully within the Supplementary Traffic Report.

It is proposed that the CQPA enter into an Infrastructure Agreement with the relevant road authorities to address impacts identified by the EIS.

7. Climate

There are no changes to the climate section from Section 7 of the WICT EIS through the changing of the Project footprint. The WICT EIS (November 2006) contains sufficient details relating to climate and climate related issues.

8. Hydrology and Hydraulics

8.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to hydrology and hydraulics issues are outlined below.

- The hydraulic analysis indicated the proposal will likely result in increased flood heights. State Planning Policy 1/03 (Mitigating the adverse impacts of flood, bushfire and landslide) Annex 4 sets out the specific outcomes desired for development to be compatible with the natural hazard – flood. Of particular concern is the potential for increased flood heights to result in adverse impacts on people's safety or the capacity to use land within the floodplain. Additional information is sought on the potential adverse impacts on people and land uses in the floodplain; and
- The EIS also identified that the increased flood heights have the potential to cut the Port Curtis Way. Clarification is sought on the combination of flood conditions that would lead to this circumstance.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

8.2 Project Changes

With the changes to the Project layout there is now no requirement for the bridge over the Calliope River or for land take/use within the Byellee area. The relocation of the rail line and subsequent conveyor system will still require creek crossings adjacent to the proposed Gladstone Pacific Nickel (GPN) site although these impacts should be of a lesser significance.

There will be a requirement for a stormwater collection pond within the rail loop precinct, however the removal of the maintenance and provisioning yards has substantially reduced the likely impacts upon the hydrology and hydraulics within the project area.

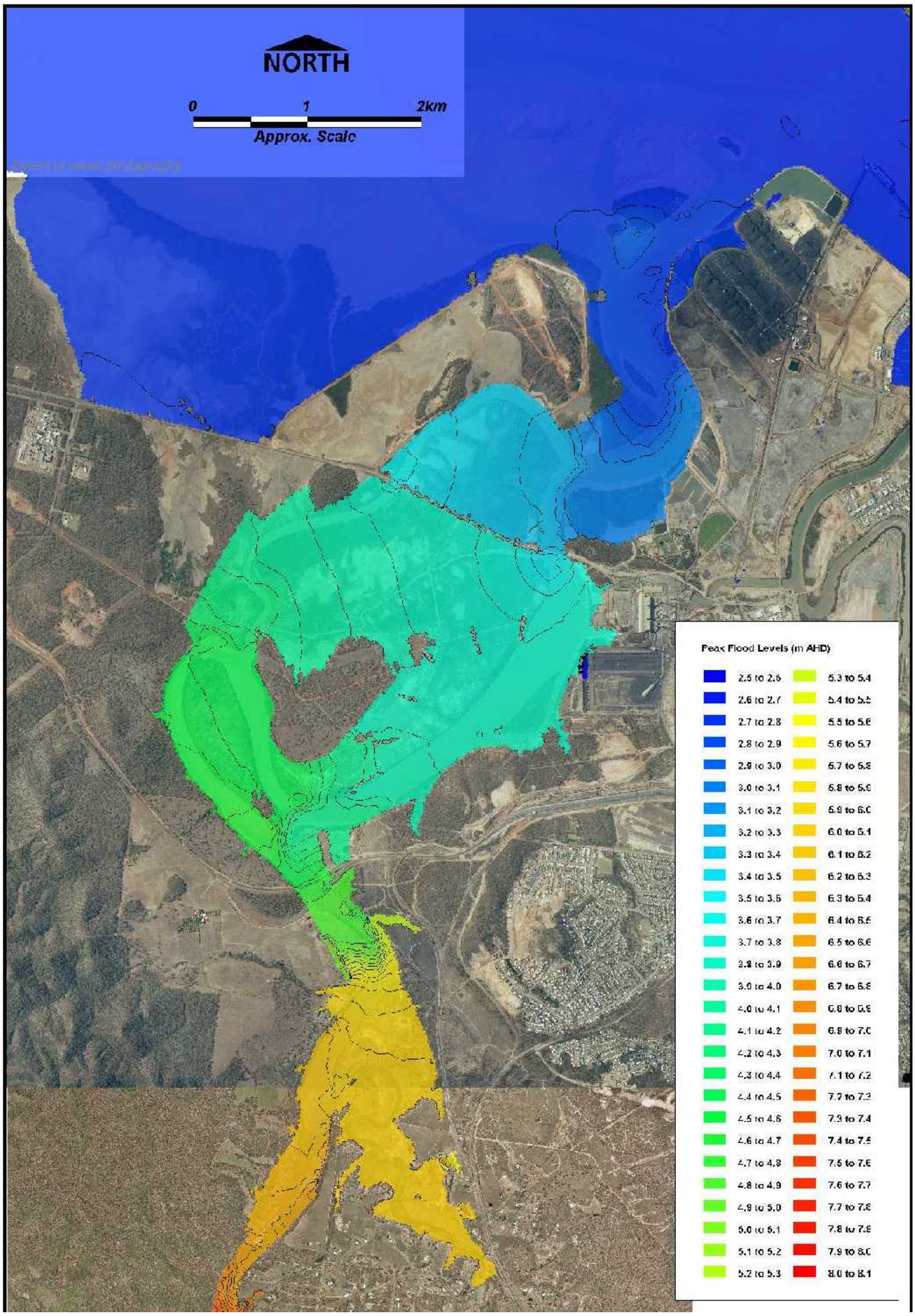
BMT WBM were commissioned to carry out further flood modelling in addition to that undertaken for the WICT EIS. This was done to assess the potential flooding impacts of the development now that the bridge over the Calliope River is no longer required. Filling (dredge spoil and bunds and reclamation etc) and dredging areas have been integrated with the topography in order to represent the revised developed case proposed. Fill is modelled such that the reclamation area is above flood levels for each of the combinations of events.

For this study, four combinations (1, 2, 4 and 6) of inflows and storm tide were used to estimate the flood behaviour in a 100 year Average Recurrence Interval (ARI) flood event (refer Table 8.1). The WICT EIS also simulated the developed case for an additional four combinations (3, 5, 7 and 8), however for impact assessment and design level assessment purposes the four combinations (1, 2 4 and 6) were used.

Table 8.1 Combination of Boundaries

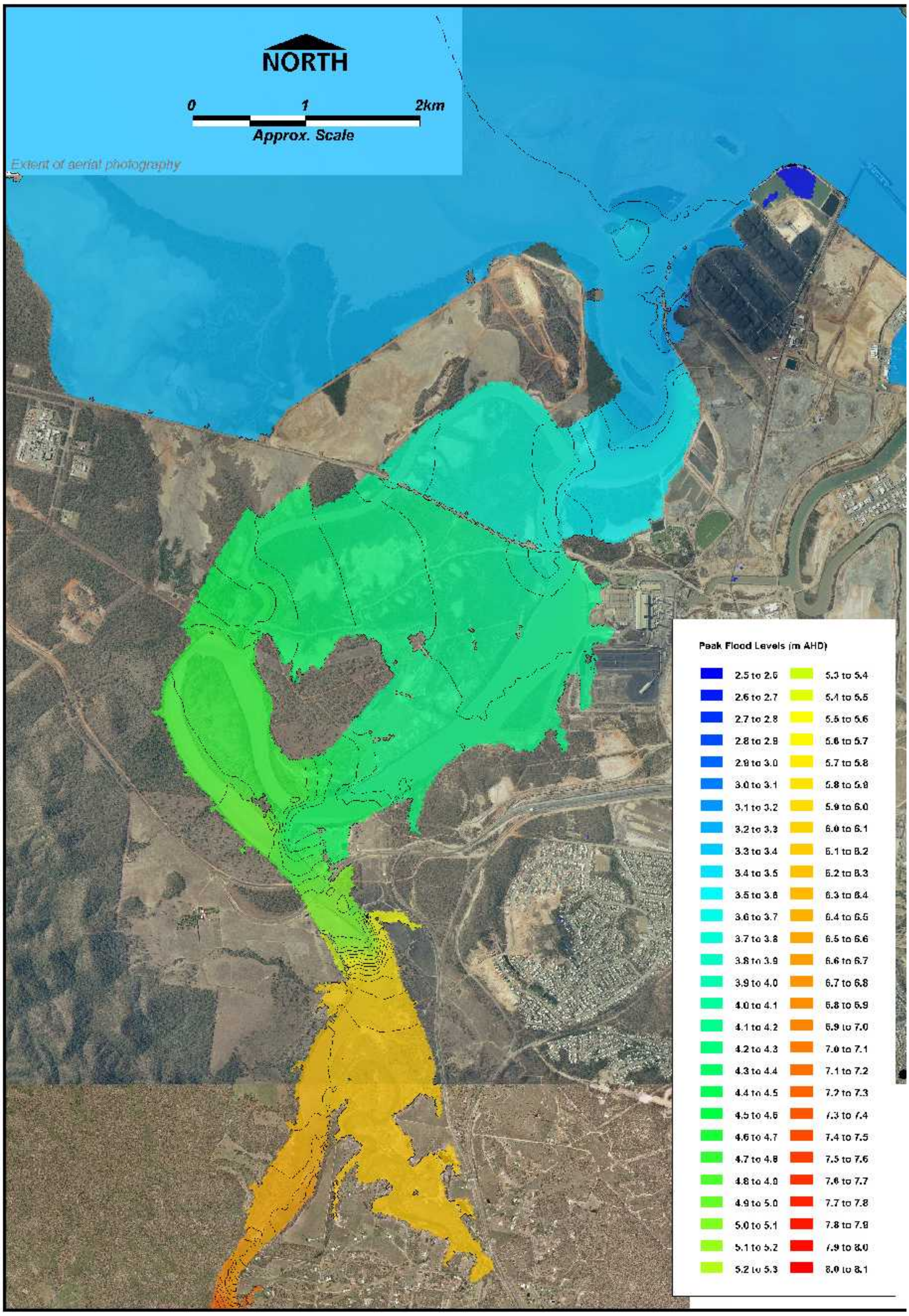
Combination	Inflow	Tide/Storm Surge	Greenhouse Allowance
1	100 year ARI event	50 year ARI event	No
2	100 year ARI event	50 year ARI event	Yes
4	100 year ARI event	Mean Low Water Spring	No
6	20 year ARI event	Mean Low Water Spring	No

The existing case (representing the topography of the current ground levels) and the base case (the proposed layout without embankments) peak flood levels for the four combinations were discussed previously in the WICT EIS (November 2006). The developed case (proposed layout) flooding simulations are explored below and are illustrated in Figures 8.1 to 8.4



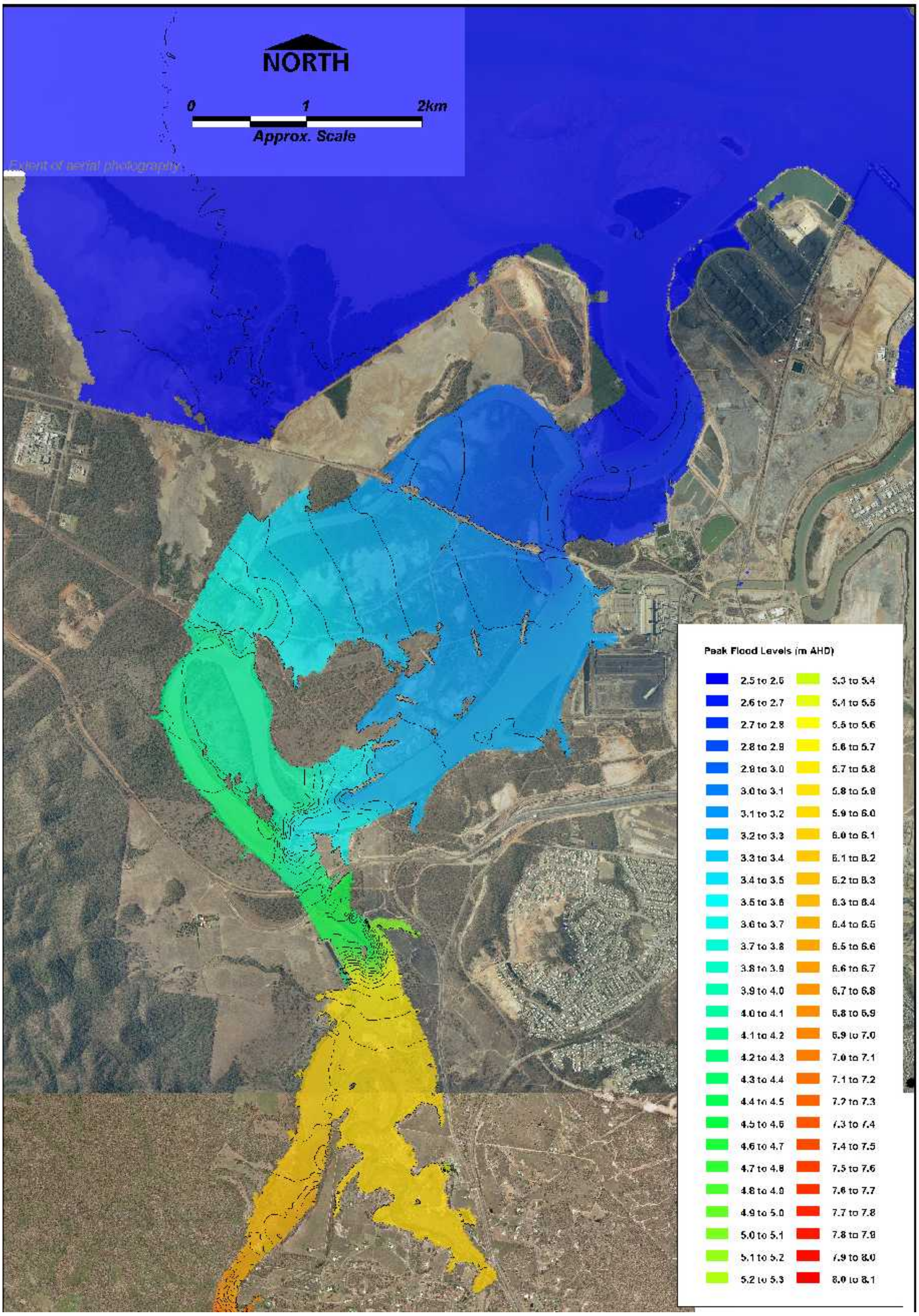
Source: BMT WBM 2007

Figure 8.1 Developed Case – Combination 1 – Flood Peak Levels



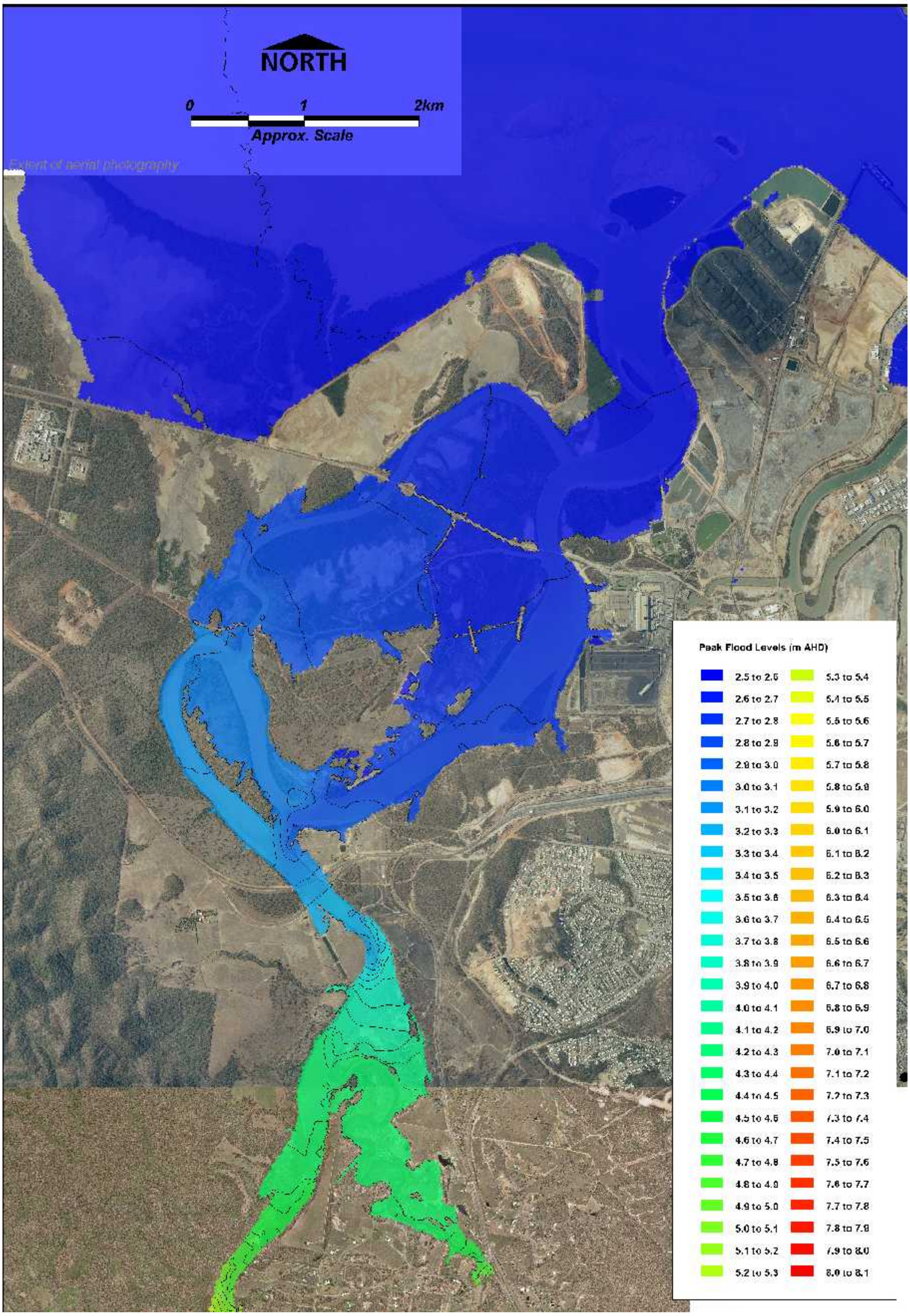
Source: BMT WBM 2007

Figure 8.2 Developed Case – Combination 2 – Peak Flood Levels



Source: BMT WBM 2007

Figure 8.3 Developed Case – Combination 4 – Peak Flood Levels



Source: BMT WBM 2007

Figure 8.4 Developed Case – Combination 6 – Peak Flood Levels

8.2.1 Peak Flood Levels

The findings of the flood modelling for the developed case, for the four combinations (1, 2, 4 and 6) are outlined below:

- For all combinations with a 100 year ARI inflow (Combinations 1, 2 and 4), the highest flood levels on site are predicted to occur for the 100 year ARI inflow with a 50 year ARI tide/storm surge with a greenhouse allowance (ie Combination 2). For this scenario, the peak flood levels on site are predicted to be around 4.65m AHD at the northern point of the Calliope River oxbow, down to 4.10m AHD upstream the Calliope River Anabranch bridge, and 3.75m AHD at the downstream bend in the Anabranch;
- For the combinations without the greenhouse allowance (Combinations 1 and 4), the highest flood levels still occur for the 100 year ARI inflow with a 50 year ARI tide/storm surge (ie Combination 1); and
- Port Curtis Way would still behave as a control structure for the floodplain, although for the developed case no flow is predicted to reach the road eastward of the Anabranch and upstream of the structure due to the proposed filling.

The observations reflect the design case peak flood levels for the four combinations (1, 2, 4 and 6) presented in the WICT EIS.

8.2.2 Maximum Velocities

Maximum velocities for the developed case are outlined in the WICT EIS.

8.3 Potential Flooding Impacts of Development

A revised assessment of the potential impacts of the proposal has been undertaken for combinations 1, 2, 4 and 6 of the developed case against both the base case and the existing case.

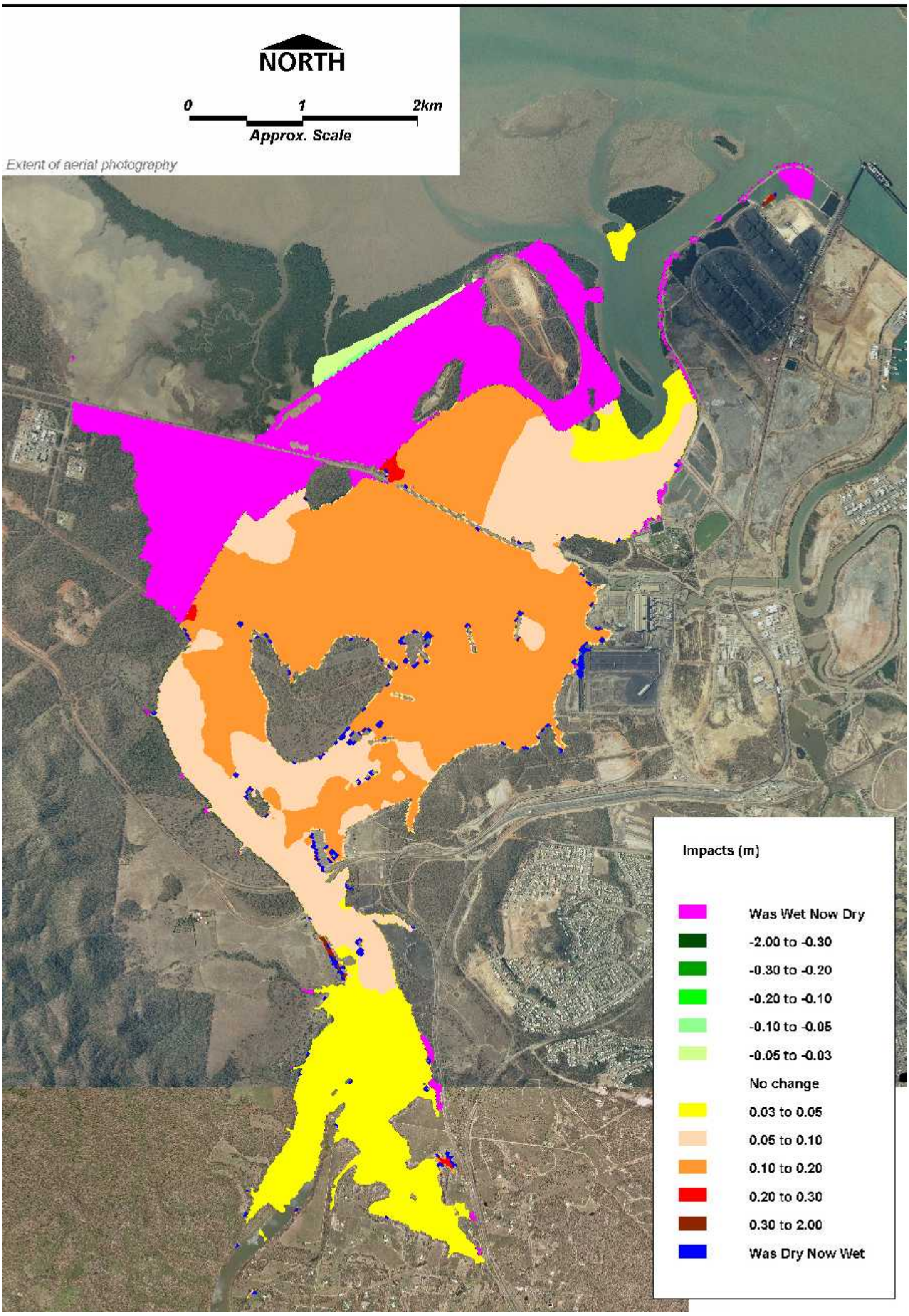
8.3.1 Base Case

A comparison between the base case and the developed case flood peak levels (ie impacts associated with flooding) for the four combinations are illustrated in Figures 8.5 to 8.9. The following issues can be highlighted from these results:

- Impacts predicted for Combination 1 (100 year ARI inflow with 50 year ARI tide/storm surge) and Combination 2 (100 year ARI inflow with 50 year ARI tide/storm surge and a greenhouse allowance) generally range from 0.03m to 0.2m;
- As with the modelling undertaken as part of the WICT EIS the largest impacts are associated with Combination 2 (refer Figure 8.6). A detailed illustration of the impacts of the development on sensitive receptors such as the Gladstone Power Station and Port Curtis Way is outlined in the Figure 8.7
- Impacts along the Gladstone Power Station are predicted to be just over 0.1m for Combination 1, and down to 0.03m for Combination 4 and no change for Combination 6. For Combination 2 these impacts are predicted to be up to approximately 0.12m (refer Figure 8.7). An examination of aerial photography and the extent of inundation indicated that major infrastructure of the Gladstone Power Station would not be inundated by a 100 year ARI flood nor by the additional inundation resulting from the impacts (based on the aerial photography available for this study);
- Elsewhere in the study area, the model results indicate that no infrastructure would be inundated by a 100 year ARI flood nor by the additional inundation resulting from the impacts;

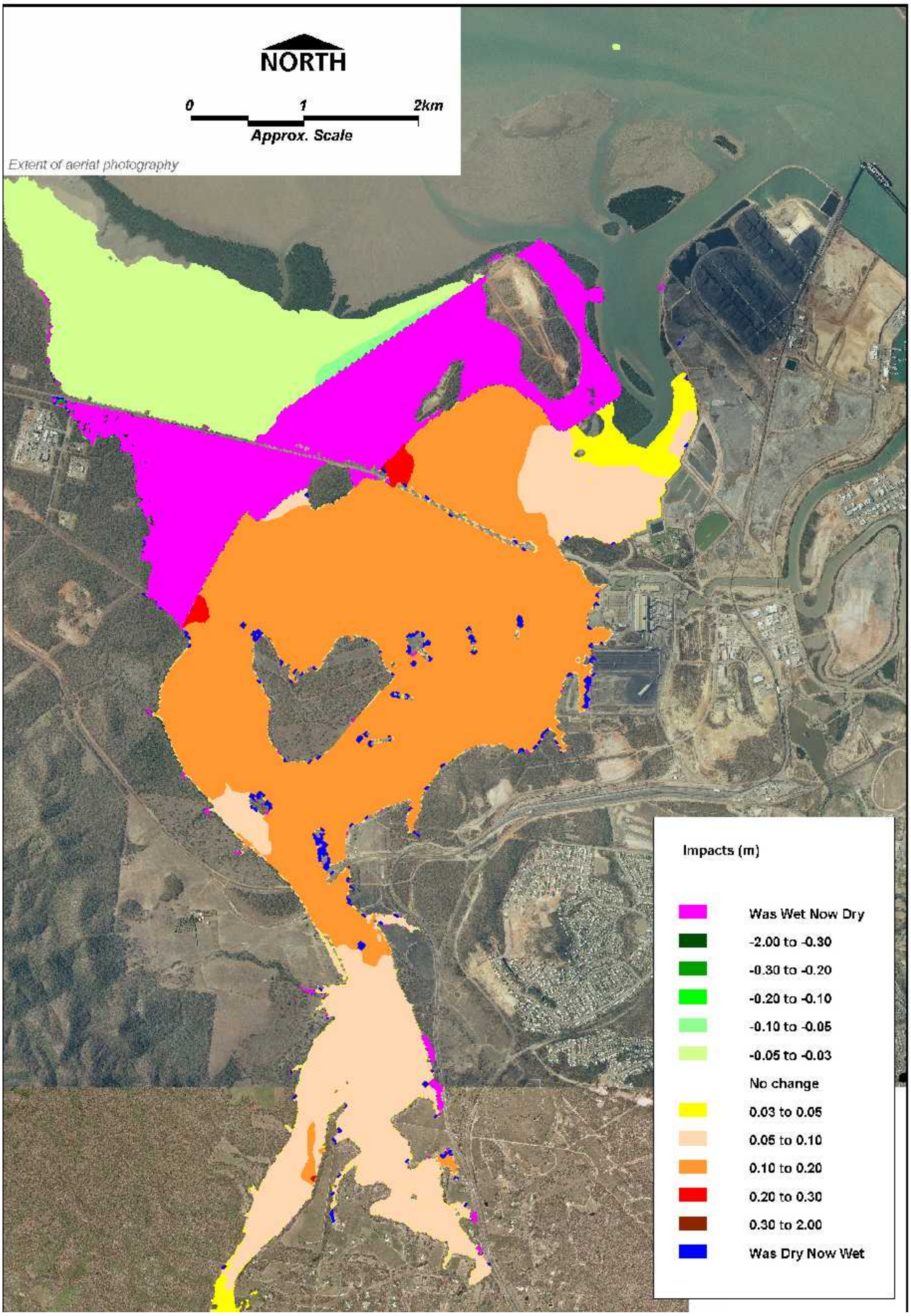
- Based on analysis of the flood model results, the impacts are mainly due to the following two reasons:
  - Filling of the reclamation area above 100 year ARI flood levels would result in blockage of a flowpath that conveys up to 540m^3/s in the base case. The blockage of this flow would result in a redistribution of flow and result in an increase in flow in the main river channel;
  - Filling of the reclamation area above 100 year ARI flood levels would cause a loss of storage on site, with an area of up to 4km^2 west of the Anabranch lost from available floodplain storage. As peak flood levels are higher for Combinations 1 and 2, the loss of storage in terms of volume is more significant, and as a consequence impacts are greater than for Combination 4 (100 year ARI inflow with mean low water spring (MLWS)) or Combination 6 (20 year ARI inflow with MLWS);
- The impacts are predicted to propagate upstream along the Clyde Creek reach for the four combinations, with predicted values in the order of 0.04m for Combination 1, 0.07m for Combination 2, 0.02m for Combination 4 and 0.01m for Combination 6. The flood assessment within the WICT EIS predicted to propagate upstream along the Clyde for a Combination 1 and 2 of up to 0.19m; and
- In general, the impacts to flood levels resulting from the proposed development would not result in any significant increase in the area of land inundated. This is due to the relatively small increase in flood levels and the steep edges of the floodplain. The impacts at the upstream limit of the model are predicted to be less than 0.02m for the four combinations.

It is important note that the some of the figures illustrate wet cells at the Calliope River and Anabranch bridge crossings; this represents flow under the bridges. The decks of the bridges are not predicted to be inundated for the event which represents the highest combination of 100 year ARI flow simulations.



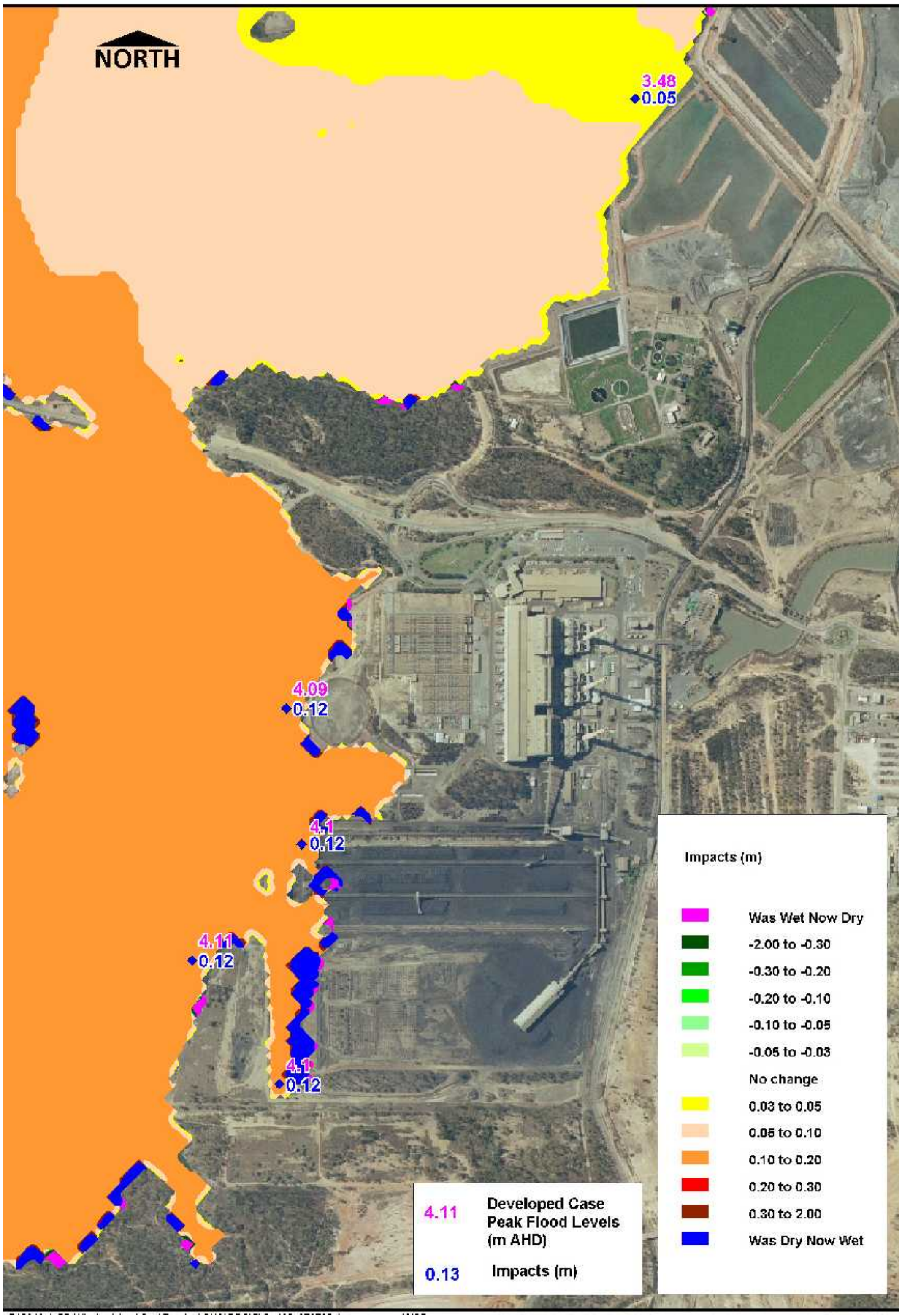
Source: BMT WBM 2007

Figure 8.5 Impacts – Developed vs Base Case – Combination 1



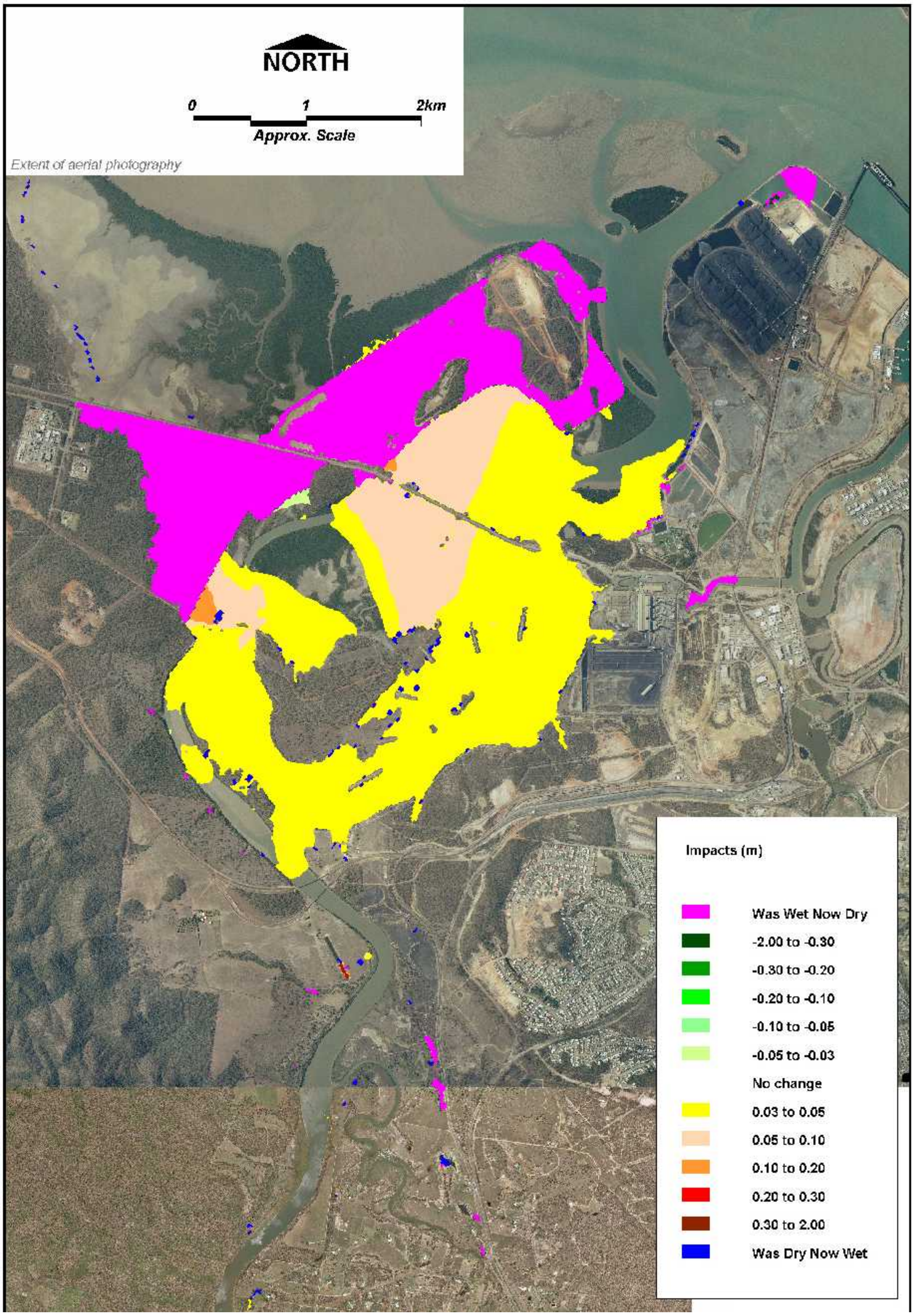
Source: BMT WBM 2007

Figure 8.6 Impacts – Developed vs Base Case – Combination 2



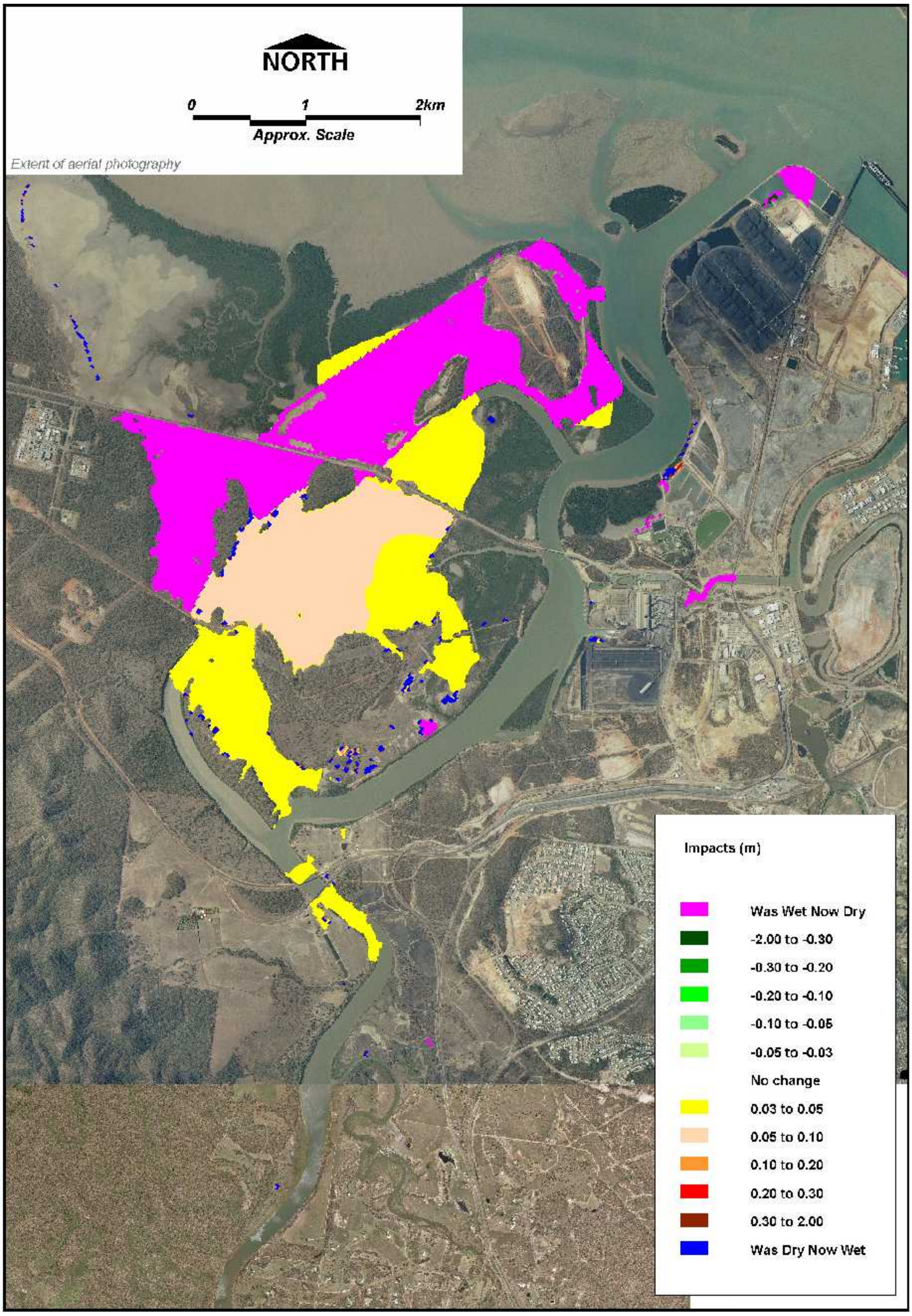
Source: BMT WBM 2007

Figure 8.7 Impacts to Sensitive Receptors – Developed vs Base Case – Combination 2



Source: BMT WBM 2007

Figure 8.8 Impacts – Developed vs Base Case – Combination 4



Source: BMT WBM 2007

Figure 8.9 Impacts – Developed vs Base Case – Combination 6

8.3.2 Existing Case

The revised development has also been assessed against the existing case. The difference in the topography between the existing case and the base case lies in the representation of the existing embankments on the original reclamation area (BMT WBM 2007). The potential impacts of the proposal against the existing case are illustrated in Figures 8.9 to 8.12.

These figures indicate that the potential impacts of the proposal against the existing case are noticeably lower than impacts against the base case. The highest impacts are still predicted to occur for Combination 2 (100 year ARI inflow with 50 year ARI tide/storm surge and a greenhouse allowance), and range from 0.03m to 0.20m. However, the areal extent of impacts is similar.

8.4 Impacts on Port Curtis Way

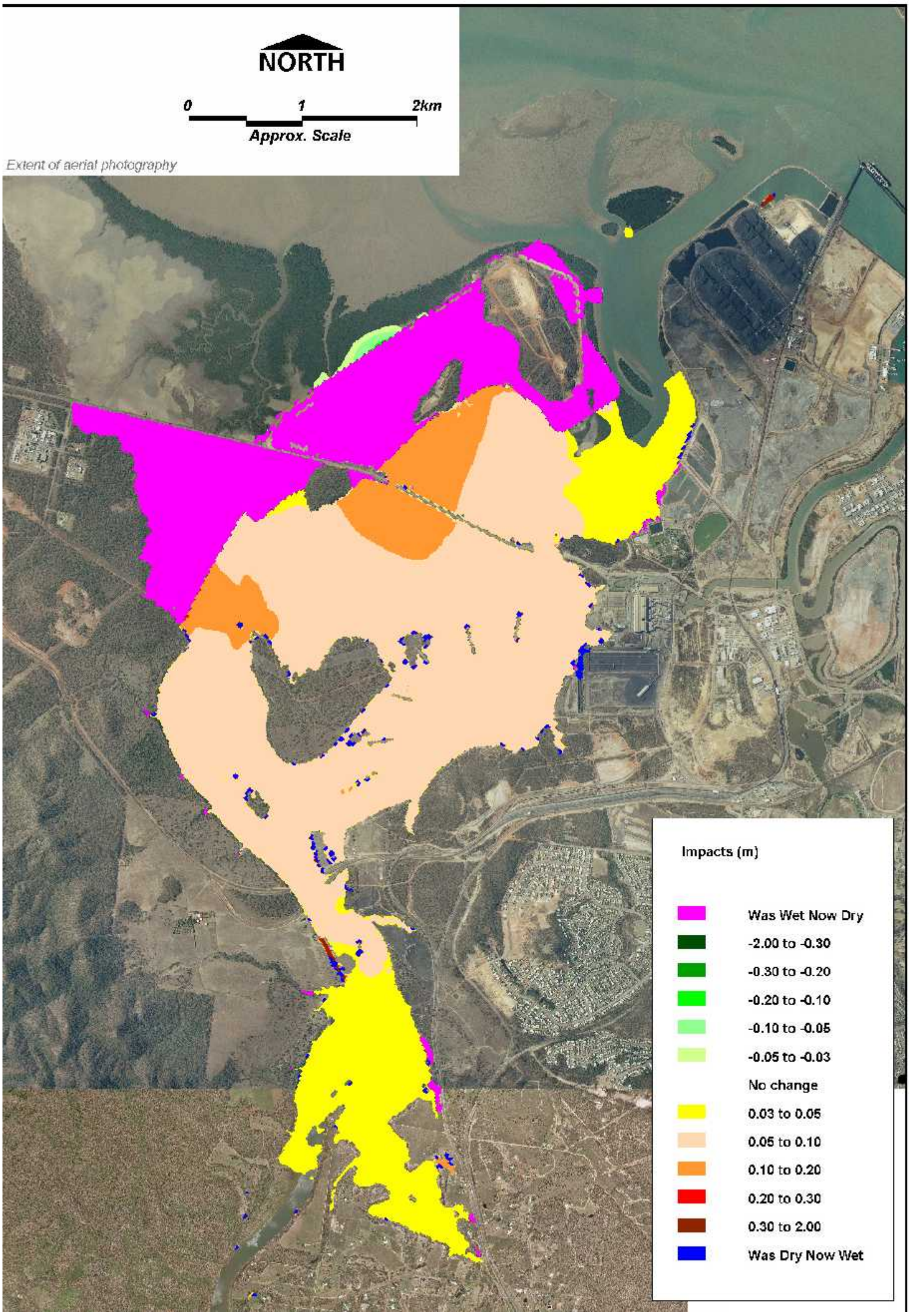
During the WICT EIS consultation process concern was raised on the developments potential impact on Port Curtis Way. The potential impacts on Port Curtis Way based on the flood simulation designs described above are outlined below.

8.4.1 Port Curtis Way (Hanson Road) to the west of the Anabranch

- The lowest point on the road is about RL4.26m AHD;
- For all existing situation design flood simulations with a 100 year ARI flow (Combinations 1 to 4), the road is not overtopped;
- The highest flood level upstream of the road for these simulations is RL4.22m AHD for Combination 2 (100 year ARI flow + 50 year ARI storm tide + greenhouse allowance). This is only just below the lowest point in the crest of the road and therefore this combination represents the limit of immunity for the existing road;
- For the equivalent simulation without a greenhouse allowance (Combination 1), the road has about 0.3m of freeboard;
- No simulations with flows greater than 100 year ARI have been carried out for the existing situation. However, given the above, the road would be overtopped for any flood with flows greater than 100 year ARI combined with a 50 year ARI storm tide and including a greenhouse allowance;
- For the developed case simulations, it has been assumed that bunds for reclamation/dredge spoil disposal will prevent flood flows reaching the upstream side of the road to the west of the Anabranch. Therefore there is no flow to or over the road in any developed case simulations. The potential for the road to be inundated will be dependent on the level and configuration of the bunds in preventing flood waters reaching the lower parts of the road; and
- Further to the west of the project area, the downstream side of the road abuts intertidal land which would still be subject to the influences of storm tides. The development will not influence storm tide levels and based on available information, the minimum road level, is above the 100 year ARI storm tide level including greenhouse allowances in this area (approx RL3.43m AHD).

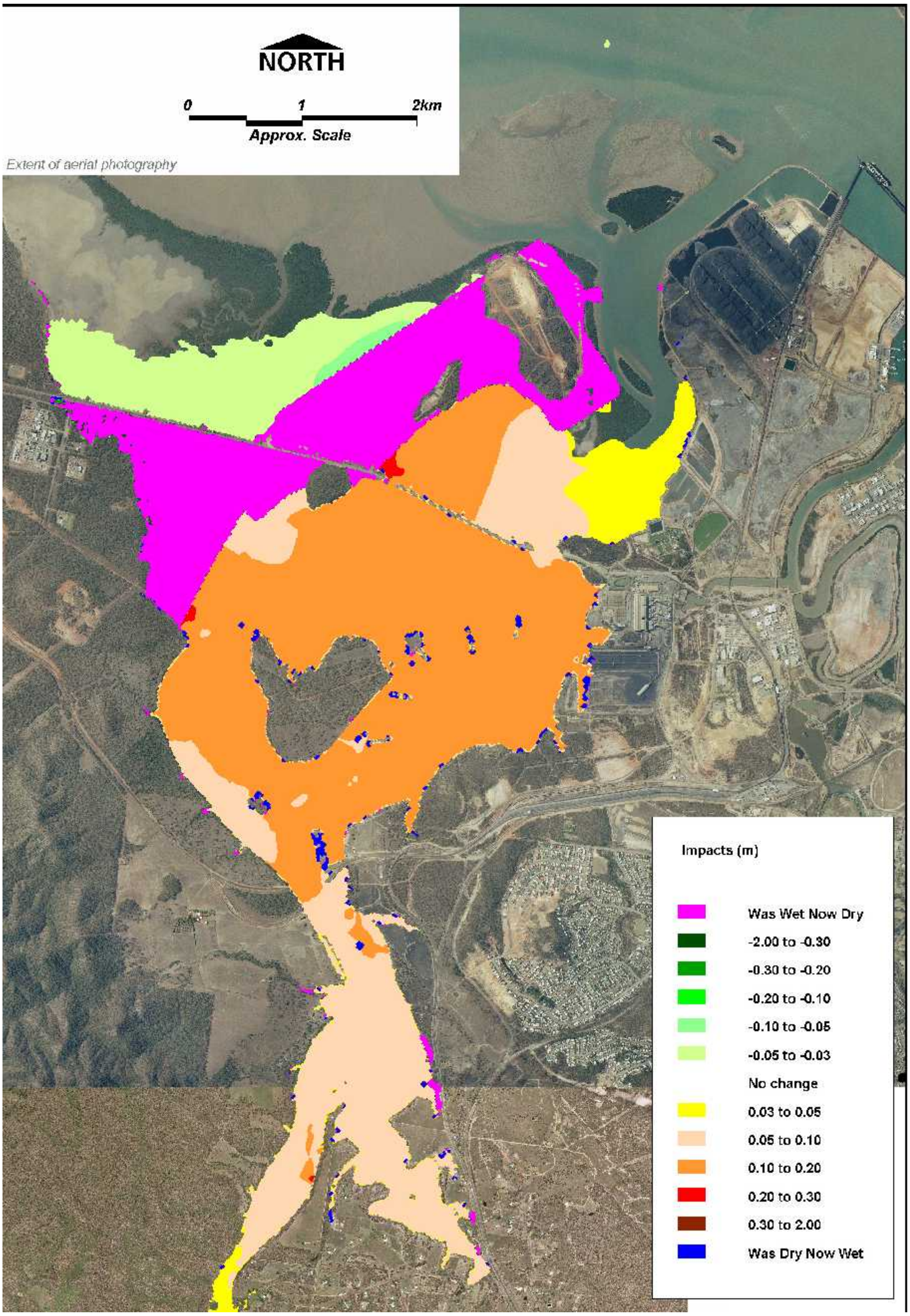
8.4.2 Port Curtis Way (Hanson Road) between the Anabranch and the Calliope River

- The lowest point on the road is about RL4.78m AHD;
- For all existing and developed case design flood simulations with a 100 year ARI flow (Combinations 1 to 4), the road is not overtopped; and
- For the higher developed case simulations, the road is still not overtopped for Combination 7 (500 year ARI flow + 100 year ARI storm tide + greenhouse allowance) but is overtopped for the catastrophic Combination 8 (2000 year ARI flow +100 year ARI storm tide + greenhouse allowance) (refer to WICT EIS).



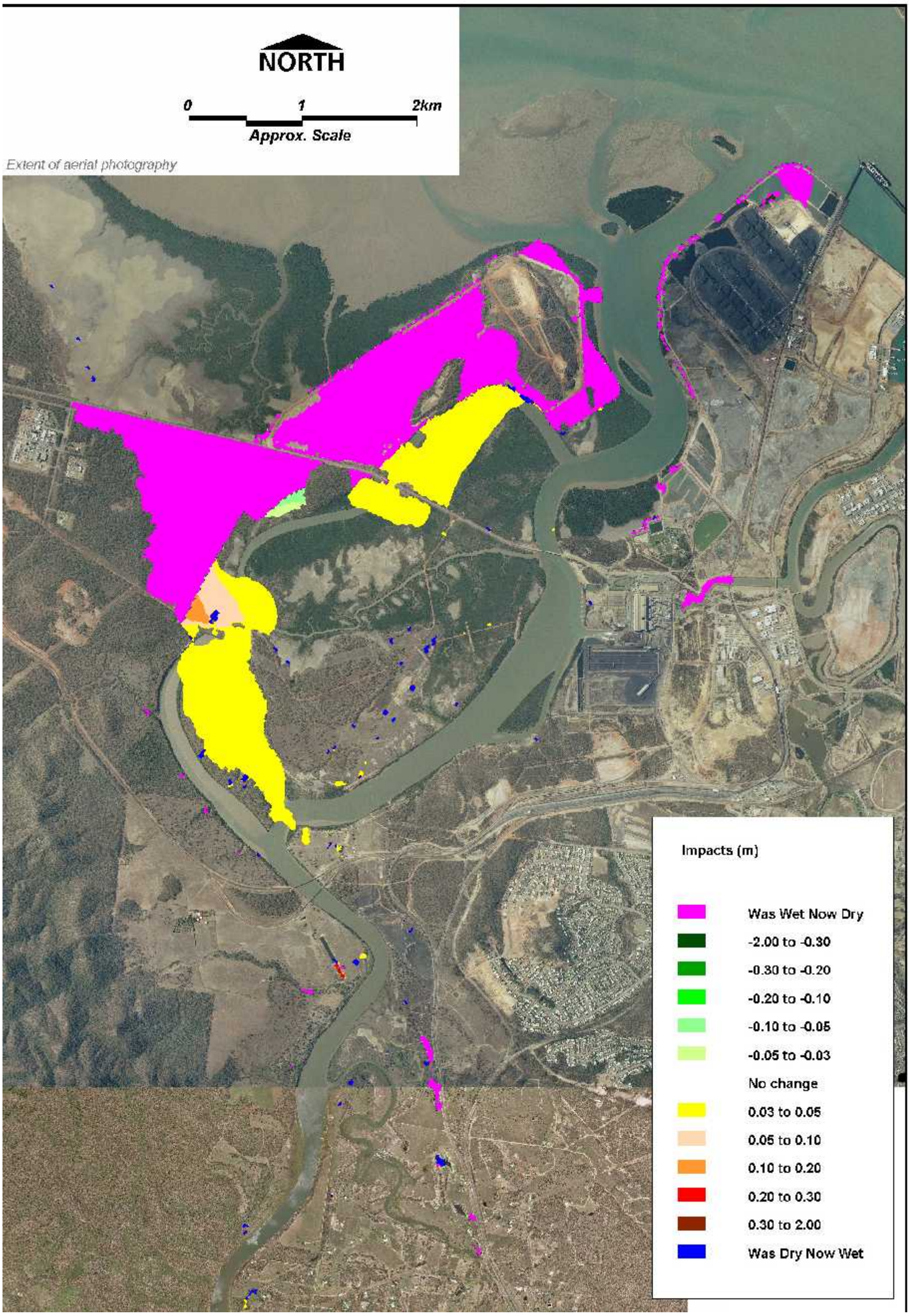
Source: BMT WBM 2007

Figure 8.10 Impacts – Developed vs Existing Case – Combination 1



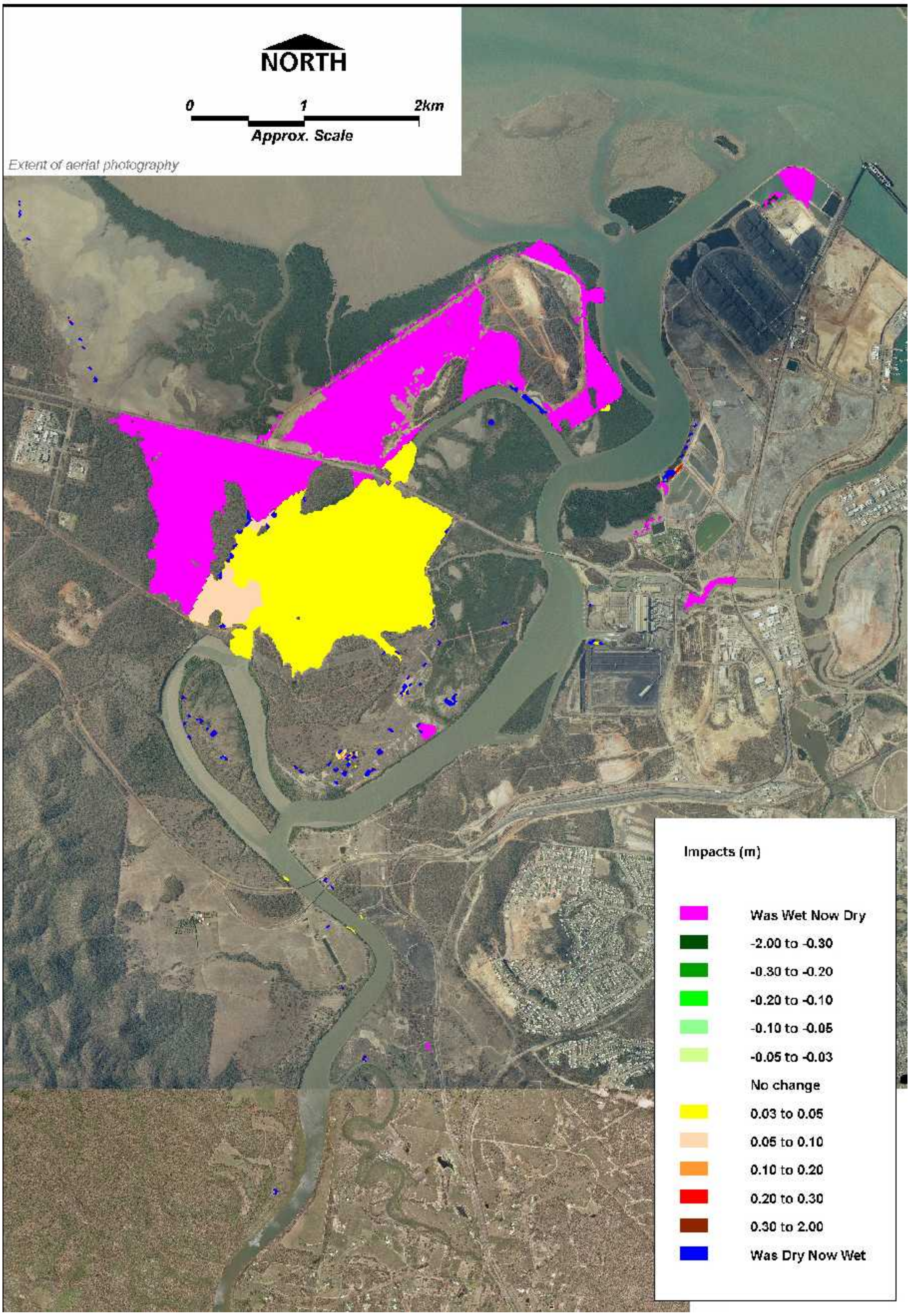
Source: BMT WBM 2007

Figure 8.11 Impacts – Developed vs Existing Case – Combination 2



Source: BMT WBM 2007

Figure 8.12 Impacts – Developed vs Existing Case – Combination 4



Source: BMT WBM 2007

Figure 8.13 Impacts – Developed vs Existing Case – Combination 6

9. Water Quality

9.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process to water quality issues are outlined below.

- Further details of reclamation design required are in order to give assurance that the water quality discharge limits can be assured. This should include an assessment of the residence time, sediment settling rates and consider pond performance, especially near the end of each dredging campaign; and
- Provide design details for the dredge spoil drain water settling system for suspended sediment in the discharge water at the point of discharge. Further information is required to demonstrate that adequate dredge spoil drain water settling time prior to discharge can be achieved for the dredge spoil. A staging plan for the reclamation and ASS treatment in conjunction with staging of dredging should be provided, showing the available drain water treatment capacity.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

9.2 Project Changes

The Project changes have resulted in a reduction in the area of direct disturbance within the catchment. The most significant changes to the Project are associated with the rail infrastructure and include:

- The rail loop connecting the North Coast Line and the coal terminal has been relocated and a new conveyor system proposed;
- The dump station has been relocated to the North Coast Line within the Forest Precinct;
- The rail maintenance and provisioning facilities will not be established as part of this Project; and
- The footprint does not cross the Calliope River or encroach onto the Byellee wetland area.

These Project changes will reduce the risk of the Project impacting the environmental values of the existing freshwater, estuarine and marine ecosystems as:

- The proposed works no longer encroach onto the watercourses and wetlands within the Byellee area;
- Settlement ponds near the dump station as part of the stormwater management of the rail infrastructure;
- Design and implementation of sewage treatments plants; and
- Design measures to limit impact on existing overland and environmental flows.

9.3 Water Quality Guidelines

Potable water is to be provided to the coal terminal via onsite treatment plants. The potable water used during construction and operation of the Project will comply with the National Health and Medical Research Council's (NHMRC) Australian Drinking Water Quality Guidelines 6 (2004).

9.4 Freshwater Existing Environments

9.4.1 Watercourses

In June 2006, as an outcome of the review of the VM Act, four Regional Vegetation Management Codes (VMC) were published for comment. These new VMC are a condensed version of the 24 existing codes published in June 2004, including the Capricorn-Dawson (Brigalow Belt Bioregion) VMC for Ongoing Purposes. For this study the Regional Vegetation Management Codes for Southeast Queensland Bioregion (VMC) will be adopted, in which a watercourse is defined as

"*the area of land between the high banks of a natural channel, whether artificially improved or not, in which water flows permanently or intermittently, that is shown on the most recent version of a 1:100,000 Geoscience Australia topographic map, or where there is no 1:100,000 Geoscience Australia topographic map of the area showing watercourses, on a 1:250,000 Geoscience Australia topographic map of the area showing watercourses*."

In total the revised Project has the potential to further impact on seven watercourses which intersect the project area, including Pyealy Creek (EPA 2006). Figure 9.1 illustrates the watercourses and drainages lines intersecting the project area. This information is based on 1:25,000 Queensland topographic maps (Sheets 9150-31 and 9150-32) together with aerial photography and ground truthing.

The watercourses are primarily ephemeral systems drain north east from the Calliope Conservation Park and Mount Stowe State Forest to the coastal plains of Hanson Road Precinct and the Calliope River.

The WICT EIS concept design (refer Figure 3.0.1 – Option 1) included rail infrastructure crossing the watercourses within the Forest and Rail Maintenance Precincts a number of times. Option 1 also included rail maintenance and provisioning facilities and a number of rail lines which effectively increased the area of direct disturbance and risk to the environmental values of the watercourses and downstream environments.

Overall, the Project changes reduce the number of watercourses which will be directly impacted by the development. Pyealy Creek will be crossed once by the proposed conveyor system and also as a result of the duplication of the North Coast Line. This is due to the removal of works within the Byellee area and also the reduction in the size of the rail loop footprint. The relocation of the rail maintenance and provisioning facilities reduces the degree of risk associated with indirect impacts.

In addition, within the Rail Loop Precinct, the majority of the works intersect the watercourses in areas which have been impacted both historically and through current land use activities (ie riparian vegetation that has been cleared and/or watercourse geomorphology has been altered by damming or works within the watercourse).

However, the upgrade of the North Coast Line will impact on a larger area than that previously identified in the WICT EIS. The impacts are mainly associated with cutting activities along the existing rail alignment and may include soil erosion and sedimentation of watercourses, generally occurring after vegetation removal and/or during excavation and earthworks.

The conveyor system intersects both Pyealy Creek within the Forest Precinct and the drainage lines of the intertidal wetlands adjoining Beales Creek. However, the changes to the Project design reduce the area directly disturbed by the construction and operational works, and the conveyor system will be less intrusive on the watercourses than the previous rail alignment. For example, the conveyor will be able to span the watercourses with limited structures either side of the watercourses compared to the construction of culverts and other bridging structures for the rail loop.

9.4.2 Wetlands

Under the VMC a wetland is defined as:

"the area of land that supports plants that are adapted to and dependent on living in wet conditions for at least part of their life cycle, and is one or more of the following:

- *A regional ecosystem listed Table 13; or*
- *The area on the ground represented as a swamp, lake, marsh, waterhole, wetland, billabong, pool, spring or like, on the most recent version of 1:100,000 Geoscience Australia topographic map showing watercourses, or where there is no 1:100,000 Geoscience Australia topographic map showing watercourses, on a 1:250,000 Geoscience Australia topographic map of the area showing watercourses; or*
- *Listed in: Fensham and Fairfax (2002) 'Queensland springs distribution assessment."*

There are a number of wetland areas, both natural and artificial, within the project area. The majority of wetlands present within the project area are tidal, however there are a number of constructed palustrine (living or thriving in a marshy environment) wetlands.

No lacustrine wetlands (of or relating to lakes) are present within the project area. However, EPA wetland mapping of the area identified the two lacustrine wetlands within the Byellee area.

No direct disturbance on wetland systems will occur as a result of the rail loop. However, a palustrine wetland system occurs directly downstream of the rail loop along the watercourse draining southeast through the Rail Loop Precinct to the Calliope River. There is the potential that the works will impact on this wetland, but it is important to note that the area upstream of the wetland has been dammed limiting the environmental flows within the area and degrading the environmental value of the area. The adjacent land use activities have also impacted on the health of the wetland (ie cattle grazing and clearing/thinning of riparian vegetation has increased the areas susceptibility to edge effects and erosion).

The other wetland systems within and surrounding the project area are associated with artificial activities such as damming of existing watercourse or drainage lines.

The Project changes increases the buffer between the artificial wetlands within the southeast corner of the Rail Loop Precinct. This is due to a reduction in the size of the rail loop footprint compared to the WICT EIS concept design.

9.5 Tidal Influenced Waters Existing Environment

The project area is located within the Calliope River catchment, within and in close proximity to the near shore environments of Port Curtis.

The Project changes have reduced the area of direct disturbance within the catchment with the footprint reduced from approximately 1,300ha to 1,000ha. This reduction in the footprint is mainly associated with the changes to the design of the rail infrastructure, the reduction in the size of the rail loop and the construction of a conveyor system linking the North Coast Line and the coal terminal. The reduction in the area of direct disturbances within the catchment will also assist in buffering potential impacts of the development on downstream environments.

The reclamation activities outlined in the WICT EIS have been amended with no reclamation activities now occurring within the Byellee area (therefore a reduction of approximately 8ha).

No bridging works will occur over the Calliope River (as previously identified within the WICT EIS.) However, there is still the potential risk to the environmental value of Calliope River through indirect impacts associated with the construction and operation of the coal terminal. The relocation of the rail maintenance and provisioning facilities also reduces the risk to the environmental values of the downstream environments.

9.6 Water Quality Impacts

A number of comments were received during the WICT EIS consultation period in regards to water quality. The potential impacts of the Project during the construction and operational phases are addressed below. Mitigation measures to manage these potential impacts are outlined in Sections 9.7, 23 and 24.

9.6.1 Construction Impacts

The changes to the Project design will assist in reducing the risk of environmental harm associated with the construction impacts outlined in the WICT EIS, including:

- The area of direct disturbance within the catchment has been reduced by approximately 15%. The reduction in the area disturbed and the retention of vegetation within the catchment will assist in further buffering anthropogenic activities;
- The number of watercourses directly impacted by the Project has been reduced;
- The reduction in the size of the rail loop and use of a conveyor system has effectively increased the buffer between the anthropogenic activities and the Calliope River and freshwater ecosystems; and
- The works no longer encroach onto the Byellee area.

9.6.2 Operational Impacts

The changes to the Project design will assist in reducing the risk of environmental impacts associated with the operational impacts outlined in the WICT EIS, including:

- The relocation of the rail maintenance facility to an area outside the project area. This will significantly reduce the risk associated with the contamination of receiving environments; and
- Reduction in the area of direct disturbance which effectively increases the area of natural buffering capacity. Rehabilitation of existing degraded areas and vegetation offsets will also increase the buffering capacity of the area.

9.7 Mitigation Measures

Additional information to address comments received in reference to the requirement for water quality mitigation measures and management is provided below.

9.7.1 Dredging

A draft Dredge Environmental Management Plan (DEMP) will be finalised and implemented in response to the need for more specific mitigation measures associated with construction dredging. The draft DEMP is included within Appendix D.

9.7.2 Dewatering

During detailed design a staged plan for the reclamation and Acid Sulfate Soil (ASS) treatment will be developed in parallel with the phased dredging plan and will detail available drain water treatment capacity.

9.7.3 Sedimentation and Runoff

The mitigation measures outlined in the WICT EIS are considered appropriate; however, additional measures to manage the erosion of bunds by stormwater runoff and tidal waters will be developed during detailed design.

The bunds will be monitored on a weekly basis to determine effectiveness. If necessary, the bunds will be reinforced through the re-establishment of marine vegetation and/or rock revetments.

The relocation of the rail maintenance and provisioning facilities will also reduce the risk associated with the stormwater and its management requirements.

9.8 Reclamation Pond Design

The detailed engineering design will address the capacity of the sedimentation ponds adjacent to the proposed dump station and the existing ponds at RGTCT. In order that there will be no net detriment to the water quality within and downstream from the WICT project area the following settlement pond design parameters will be considered:

- Assessment of residence time;
- Sediment settling rates;
- Pond performance;
- Suspended sediment discharge criteria; and
- Correlation of suspended solids with NTU in relation to monitoring discharges.

The sedimentation design will achieve a suspended solids concentration of <50mg/L in the discharging effluent. A polishing pond will be provided within Reclamation Area B to allow for short circuiting or re-suspension of materials, anticipated as mainly occurring in the secondary pond, particularly during re-dredging (refer Section 3.7.4). Reclamation Area C is larger than Reclamation Area B and no re-suspension of materials is anticipated.

10. Groundwater Resources

The Project changes have resulted in the dump station being located adjacent to the North Coast Line. The potential impacts of the dump station on the existing groundwater regime are provided below.

10.1 Location and Description of Dump Station

The dump station is located about 600m west of the Calliope River in a vegetated area adjacent to the North Coast Line as shown on Figure 3.0.4. The elevation of the site varies between about RL17-19m AHD.

The excavation for the station is about 55 x 37m in area and the depth of excavation will be to approximately RL5m. Coal will be transported from the dump station via an overland conveyor. A section through the structure is provided in Appendix B (Figure B4).

10.2 Hydrogeological Regime

The lithological logs from the geotechnical bores and test pits indicate that there is up to 7m of colluvium consisting of silty clays and clayey, sandy gravels overlying bedrock at the site. Bedrock consists of quartzite, mudstone and chert of the Doonside Formation which forms a fractured rock aquifer.

There are very few groundwater bores in the Doonside Formation with those bores that exist being along the Yarrol Fault about 4km to the west of the dump station (refer WICT EIS Figure 10.3). This suggests that the Doonside Formation is of very low permeability except where there are major fracture zones.

There is no data on the groundwater level at the dump station but assuming that the elevation of the water table at the edge of the Calliope River 600m to the east, is RL0m, and that the Doonside Formation is of very low permeability, it is estimated that the water table could be as high as RL10m, that is, 7-9m below ground level at the site. The geotechnical logs of bores 121 and 122 indicate that free groundwater was not observed during auger drilling, however auger drilling only advanced to 1.5m depth (refer Appendix C).

Adopting a water table elevation of RL10m is considered an upper limit and is therefore a conservative approach to the impact assessment in that it assesses maximum dewatering (lowering of the groundwater level) for dump station construction.

Groundwater flow is to the east with discharge being to the Calliope River and dewatering for the dump station is likely to intercept some of this flow.

10.3 Groundwater Inflow – Area Impacted by Dewatering

Dewatering of the dump station during construction will create a “cone of depression” in the water table around the facility. An equation developed by Marinelli and Niccoli (2000) for inflow to a mine pit was used to assess an indicative rate of inflow to the dump station during construction and the area of impact on the water table, that is, the radius of the “cone of depression”. The analytical model presented by Marinelli and Niccoli is shown on Figure 10.1.

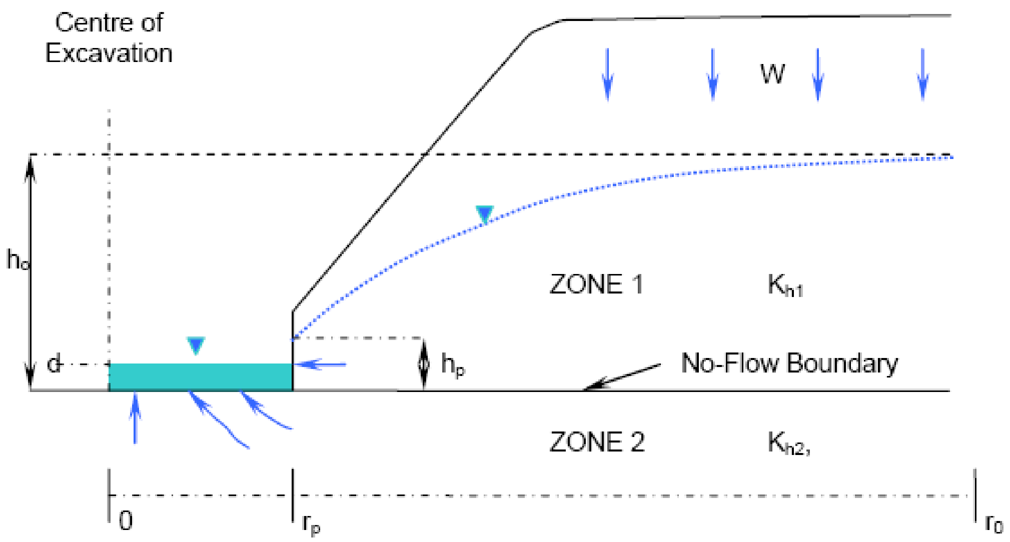


Figure 10.1 Pit Inflow Analytical Model (after Marinelli and Niccoli [2000])

10.3.1 Zone 1 Analytical Solution

The analytical solution for Zone 1 considers steady state, unconfined, horizontal, radial flow, with uniformly distributed recharge at the water table. Additional assumptions to this solution are as follows:

- The excavation walls are approximated as a right circular cylinder;
- Groundwater flow is horizontal. The Dupuit-Forchheimer approximation (McWhorter and Sunada 1977) is used to account for changes in saturated thickness due to depression of the water table;
- The static (pre-mining) water table is approximately horizontal;
- Uniform distributed recharge occurs across the site as a result of surface infiltration. All recharge within the radius of impact (cone of depression), of the excavation is assumed to be captured by the excavation and
- Groundwater flow toward the pit is axially symmetric.

In arriving at an inflow rate, it was further assumed that:

- The hydraulic conductivity (K_{h1}) of the Doonside Formation is 1.0m/day;
- The water table is relatively static at RL10m;
- Rainfall recharge (W) to the Doonside is about 5% of the annual average rainfall, that is about 50mm/year;
- The height of the seepage face in the excavation wall (h_p) is 1m;
- The excavation has dimensions of 55m x 37m and the radius (r_p), of an equivalent cylinder is 25.5m and
- The excavation is dewatered from RL10m to RL4m, that is to a depth of 6m (h_0)

The radius of influence 'r_o', that is the maximum extent of the "cone of depression", was obtained by iteration as 350m. Having obtained 'r_o' the rate of inflow to the pit was determined from the equation.

$$Q_1 = W \pi (r_o^2 - r_p^2) \quad m^3/day$$
$$= 52 \text{ m}^3\text{/day} \quad (0.6\text{L/s})$$

10.3.2 Zone 2 Analytical Solution

The analytical solution for Zone 2 is based on steady state flow to one side of a circular disk of constant and uniform drawdown. The sink represents the bottom of the excavation. This solution is based on the following assumptions:

- Hydraulic head is initially uniform (hydrostatic) throughout Zone 2. Initial head is equal to the elevation of the initial water table in Zone 1;
- The disk sink has a constant hydraulic head (d), equal to the elevation of the water surface in the excavation. If the excavation is completely dewatered, the disk sink head is equal to elevation of the excavation bottom;
- Flow to the disk sink is three-dimensional and axially symmetric and
- Materials within Zone 2 are anisotropic, and the principal coordinate directions for hydraulic conductivity are horizontal and vertical with K_{h2} = 1.0m/day and K_{v2} = 0.1m/day.

The steady-state inflow rate to one side of the disk sink is given by the following equations:

$$Q_2 = 4\, r_p \left\langle \frac{K_{h2}}{m_2} \right\rangle (h_o - d)$$

$$m_2 = \sqrt{\frac{K_{h2}}{K_{v2}}}$$

where Q_2 is the inflow rate to the excavation from Zone 2 (through the bottom of the excavation).

Q_2 = 194 m^3/day (2.2L/s)

The total assessed steady state inflow to the excavation based on the assumptions outlined is:

$Q_1 + Q_2$ = 2.8L/s say 3L/s

10.4 Summary and Conclusions

An assessment of the impact of dewatering the relocated dump station indicates that the radius of influence of dewatering on the groundwater table at steady state will be about 350m. This means that there will be no overlap with any other groundwater users or water bodies in the area, including the Calliope River.

It should also be noted that dewatering at the excavation will extend to a depth of RL4m and hence will be above the level of the Calliope River. A potential impact is that dewatering could intercept up to approximately 3L/s of groundwater flow that would normally discharge to the river, however this relatively small groundwater “flax” to the river is “swamped” by the large flow and tidal movement in the river and is considered to be unimportant in maintaining groundwater dependent ecosystems.

As stated in the WICT EIS, it is considered unlikely that there are any aquatic ecosystems in the area that are totally dependent on groundwater. Rather the aquatic ecosystems will be dependent on the general saline environment of the mud flats and mangroves and tidal inundations.

11. Coastal Environment

11.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to coastal environment issues are outlined below.

- The EIS does not adequately address all significant impacts and mitigation measures associated with the proposed dredging, including: navigation requirements; pumping restraints of the dredge vessels; sediment loading assumed for modelling of the plume generated by a CSD, TSHD, and combined CSD and TSHD. Detailed reasoning behind the use of the TSHD in terms of navigational requirements. Include details such as shipping movements, vessel requirements, depth under keel clearance, etc. Provide further discussion on the pros and cons of pumping ashore from the TSHD by bow coupling with the use of additional booster pumps;
- Clear commitments needed to minimise risk of injury and mortality to turtles and dugong, including use of turtle exclusion devices and practical, enforceable dredge operating procedures;
- The EIS does not address the environmental impact of the temporary placement of sediments upon the seabed. Mitigation measures that are to be employed to minimise any impacts to the marine environment should be discussed. The EIS should also discuss the proportions or amount (ie cubic metres) of dredged material that will be temporarily placed and how the material will be separated from the existing untested berth sediment; and
- The EIS references a Dredge Management Plan in several areas and it would be useful for the proponent to develop a draft Dredge Management Plan for inclusion in the final EIS.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

11.2 Project Changes

In light of the comments received through the WICT EIS consultation process, further options in regards to the dredging method and technique were examined in order to address the comments received from government agencies (such as the EPA and DEW). The comments received were predominantly in relation to the proposed ‘double-handling’ of sediments and the interaction of the cutter-suction (CSD) and trail hopper (TSHD) dredgers.

Following the completion of the RG Tanna expansion it has been determined that there is sufficient land within the site to accommodate the sediments from the area previously earmarked for dredging (and subsequent placing in CSD) by the TSHD. Pumping the sediments to shore will eliminate the requirement for double dredging the sediments within the TSHD area. This will therefore remove all requirements for ‘double-handling’ of the sediments.

11.3 Dredging Methodology

The ultimate dredging (for six berths) could be carried out as a single stage, following the first stage, or in a number of stages to accommodate each additional berth only (refer Section 3.7.4). However, for the purpose of the dredging assessment the WICT EIS has considered a single large Stage 2 dredging scenario to the ultimate case. The total dredged volume at ultimate development is approximately 6.3 million m^3 (total inclusive of the first stage dredging).

The sediment loading assumptions utilised for the TSHD and CSD are conservatively high and based on information provided by dredging experts (Hoogerwerf - Maritime Pty Ltd) together with information on previous TSHD operations in Gladstone by the Port of Brisbane Corporation dredge "Brisbane".

The rate used for the CSD was slightly higher than TSHD due to the higher percentage of fine sediments in the CSD area. The base rates (which are usually higher for TSHD) were reduced on the basis of the ratio of fines to coarse material which were assumed to quickly settle out. The release rates also included sand sized particles and the calculations assumed ~50% of silts and clays in the cutter dredge area and 33% in the trailer dredge area. This gives the following release rates:

- Cutter dredge at head 12.5 x .5 = 6.25kg/s
- Trailer dredge at drag head 3 + overflow 15 = 18 x .33 = 6kg/s

The optimum trailer dredge regime will be more frequent partial loads. For the dredge vessels proposed, each load is predicted to be in the range of 2100tons dry sediment which equates to about 1600m3 insitu. This gives approximately 270 loads. A 90 min cycle time is probably appropriate for the smaller load. This means that the TSHD will be operating for about 18 days.

A summary of the dredging to be undertaken both during Stage 1 and in subsequent stages to ultimate development is given below.

Stage 1 Dredging Methodology

All material is to be disposed to land based reclamation. The dredging will be undertaken predominantly with a CSD with connecting pipelines to the reclamation areas. Due to the pumping distances, additional booster pumps will be necessary to carry-out the dredging works to convey the stiff clays and gravels. The majority of sediments will be pumped ashore to the WICT reclamation areas. However, the dredging work at the eastern extremity of the Departure Channel and remote northern areas of the swing basin will be carried out with a TSHD and will have its sediments pumped from this area to the RGTCT reclamation pond.

All material will be transported to the reclamation areas. The transport water used in the dredging process will require settlement of fines to acceptable levels of suspended solids before release to the Calliope River Anabranch and Port Curtis at the envisaged outfall location(s).

Stage 2 Dredging Methodology

The ultimate dredging scenario completes and corresponds to a deepening and widening of the wharf infrastructure to accommodate six berths. It is proposed to undertake the deepening before construction of any additional wharfs at some point of time in the future. Again a large CSD would be necessary with connecting pipelines to the land based reclamation areas.

The ultimate dredging could be carried out as a single stage, following the first stage, or in a number of stages to accommodate each additional berth only. However, for the purpose of the dredging assessment a single large Stage 2 dredging scenario to the ultimate case has been considered.

11.4 Sediment Sampling and Laboratory Testing

A background review highlighted two offshore environmental sampling investigations undertaken previously in the Port of Gladstone by the CQPA. These were:

- Report on Soils Investigation, Proposed Dredging Works, Existing Shipping Channels, Gladstone. September 2005, Douglas Partners for Central Queensland Ports Authority; and
- Report on Geotechnical, Environmental and Acid Sulfate Soils Investigation, Proposed Berth 4 Outloading Conveyor and Dredging Clinton Coal Wharf, RG Tanna Coal Terminal, Gladstone. 18 May 2005, Douglas Partners for Central Queensland Ports Authority.

Both of the investigations documented in these reports involved a full suite of environmental sampling and concluded that all tests for metals, metalloids, and organic tests were below published threshold values and were mostly below the level of reporting of the analytical laboratories. It should be noted that these investigations did find two (2) results that exceeded testing levels. The two (2) exceptions were samples of silty clay, which were reported to have arsenic levels marginally in excess of the Screening Level presented in the Disposal Guidelines for Dredged Spoil. Statistical analysis of all the arsenic test results, however, resulted in a 95% UCL value below the Screening Level.

Environmental testing was carried for the WICT proposed dredge area on bores C1, D2 to D6, D8 to D10, W5, W7, W8 and W10. In summary, the results indicated the following:

- Individual test results for six (6) different metals and metalloids exceeded either the screening level (NODGDM) or the ecological investigation level (NEPC Guideline). The exceeding analytes were antimony, cadmium, copper, silver, zinc and arsenic;
- After calculating the 95% value (the value which only 5% of the test range exceeds) for each of these analytes, it was found that exceedance occurred in silver only. Thus silver exceeded the offshore screening and maximum levels but is not represented in the onshore disposal guidelines. It is suggested, however, from the geomorphology of the area and the depths of exceeding samples, that such silver is a natural occurrence and too deep to represent contamination;
- All PAH, pesticides and PCB results were below the respective levels of reporting of the laboratory and also below the screening levels (NODGDM); and
- All tributyltin results, after being normalised to 1% total organic carbon, in accordance with the offshore disposal guidelines, were below the screening level for such guidelines.

Based upon the previous study and as there is now no requirement for 'double-handling' of the sediments and all sediments will be pumped ashore on dredging, no further environmental testing is proposed. Further geotechnical investigations are proposed as part of the detailed design phase of the project. The timing of the sediment borehole collection is driven predominantly by the availability of a suitable sampling vessel.

The draft Dredge Environmental Management Plan (refer Appendix D) will be finalised once the detailed engineering design is completed in late 2007. The draft plan will also require modification once a dredging contractor has been selected.

12. Air Quality

12.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to air quality issues are outlined below.

- Coal dust and release of coal dust from the trains, the conveyors and the Port equipment;
- Dust nuisance and potential health problems; and
- Automation of dust suppression systems, including Weather Station control of stockyard water sprays and misting systems, and moisture content analysis and water addition throughout the coal handling system.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

12.2 Project Changes

This section has been prepared to quantify the potential impact of the proposed WICT on ambient air quality, taking into account the amendments to the design of the railyard inloading facilities. This supplementary air quality assessment has been prepared using methodologies consistent with those described in the WICT EIS, and addresses the WICT EIS requirements as specified in Section 4.6 of the Terms of Reference.

Additional air quality assessments were undertaken in order to assess the changes to the Project layout. The supplementary air quality impact assessment study is included as Appendix E.

12.3 Existing Environment

12.3.1 Dust Sources within the Gladstone Region

Gladstone is highly industrialised with a number of industries reporting to the National Pollutant Inventory (NPI). For the purposes of the air quality assessment of the WICT, the focus is on particulate emissions.

Airborne dust particles may be introduced into the local airshed as a result of stack emissions (as is the case for the NRG power station and the QAL alumina plant) or they may be fugitive emissions (ie associated with advection by the wind field of particulates originating from land-based stockpiles), for example those of the CQPA such as the BPCT and the RGTCT. The power plant and alumina plant also have fugitive dust emissions from stockpiles.

The only proposed new industry in the area that could impact on dust levels is the Gladstone Nickel Project (GPN), to be located near the proposed WICT. The air quality assessment component of the EIS for the GPN indicates that the maximum 24-hour average PM_{10} concentration that is predicted to occur in Gladstone due to the Project is less than 2$\mu g/m^3$. PM_{10} emission rates reported in the GPN EIS (URS 2007).

12.3.2 Background Dust Levels

A detailed analysis of the factors that affect dust in Gladstone and a summary of the existing levels of PM_{10}, total suspended particulates (TSP) and dust deposition rates is presented in the WICT EIS and the supplementary air quality study (refer Appendix E). Background levels of PM_{10}, TSP and dust deposition rates that will be used in this study, and which have been determined based on the analysis presented in these preceding documents are presented in Table 12.1.

Table 12.1 Background Dust Levels

Dust type	Averaging Period	Units	Value
PM_{10}	24-hour	µg/m³	26.8
	Annual	µg/m³	16.1
TSP	Annual	µg/m³	32
Dust deposition rate	Annual	mg/m²/day	30-50

12.4 Potential Impacts

12.4.1 Dust from Coal Terminal Operations

Methodology for Estimating Dust Emissions

Activities that are associated with the most significant dust emissions from coal terminals are rail receival, coal conveyors, coal stockpiles, stacking, reclaiming and shiploading. Minor amounts of wind-blown dust are also associated with vehicular activity onsite and wind erosion of dust from bare ground.

Dust emission rates from WICT, RGTCT and BPCT were calculated using emission factors published by the USEPA in their AP-42 documents and studies undertaken at existing sites in Queensland such as Dalrymple Bay Coal Terminal and Hay Point Coal Terminal. For this report these estimates have been further refined using measured coal dust deposition rates from the CQPA monitoring network.

Details of the methodology for estimating dust emissions are included in the supplementary air quality study (refer Appendix E).

Comparison of Dust Emissions from Existing and Future Activities

Table 12.2 presents the average dust emission rate estimated for the WICT, RGTCT and BPCT. The Gladstone Power Station coal stockpiles were also considered in the modelling as the only other exposed dust source near to WICT. The emissions were based on similar methodology to the stockpile emissions from the coal terminals. The average emission rate was determined to be 5.2g/s. A detailed description of the methodology that was used to calculate emission rates of dust is included in the supplementary air quality study (refer Appendix E).

Table 12.2 highlights those dust sources at the WICT that have changed as a result of recent changes to the design of the Project. Table 12.2 indicates that the emission rate of dust is higher for the amended proposal as a result of the longer inloading conveyors and additional transfer points that are part of the amended design. The emission rate of dust from the WICT rail loop has been quantified and modelled explicitly in the supplementary air quality study. In the WICT EIS this emission source was considered with reference to available monitoring data for coal transport by rail.

Table 12.2 Average Dust Emission Rates (g/s) for Important Dust Producing Activities at the Proposed WICT, RGTCT and BPCT

Activity	RGTCT (g/s)		BPCT (g/s)	WICT (g/s)	
	43 Mtpa[1]	70 Mtpa[2]		70 Mtpa[3]	84 Mtpa[4]
Rail receival	0.10	0.16	0.01	0.16	0.20
Inloading conveyors – including transfer points	1.24	1.54	0.61	5.88	5.89
Stacking	12.25	15.32	1.08	1.58	1.89
Reclaiming	5.71	6.66	5.93	2.86	3.81
Stockpile liftoff	8.53	11.13	0.87	7.40	7.40
Outloading conveyors and transfer points	2.19	3.26	0.113	1.83	1.84
Ship loading	1.44	1.51	0.06	1.48	1.49
Surge bins	0	0	0	0.20	0.24
Other site activities – including traffic	0.22	0.36	0.03	0.36	0.36
WICT Rail Loop	-	-	-	0.20	0.23
Total	**31.68**	**39.95**	**8.71**	**21.94**	**23.35**

Table Notes:
1 RGTCT, current operating capacity.
2 RGTCT, current approved capacity.
3 WICT, proposed capacity – normal operations.
4 WICT, proposed capacity – peak operations.

Dispersion Modelling Methodology for Quantifying Dust Impacts

Three dispersion modelling scenarios have been considered:

Existing: Existing approved operations of RGTCT (70 Mtpa), BPCT, coal stockpiles at Gladstone Power Station plus background;
WICT 1: Existing with inclusion of WICT at 70 Mtpa; and
WICT 2: Existing with inclusion of WICT at 84 Mtpa.

Dust Levels in Residential Areas due to the Proposed WICT

The Calpuff dispersion model has been used to predict ground-level concentrations of total suspended particulates (TSP), PM_{10} and dust deposition rates in residential areas. These were compared with the goals defined in the EPP (Air) and the standards defined in the NEPM (Air).

Figure 12.1 shows the locations of the residential areas that have been specifically considered in the air quality study and the location CQPA dust deposition gauges. These locations are representative of the nearest residential receptors to the proposed WICT.

Total Suspended Particulates, Annual Average

A summary of predicted annual average ground-level concentrations of TSP due to the proposed WICT operating in conjunction with the RGTCT (at 70 Mtpa), the BPCT and the coal stockpiles at Gladstone Power Station is presented in Table 12.3. A background level of 32µg/m^3 has been included in these results.

Results show that the WICT proposal is unlikely to result in the ground-level concentration of TSP exceeding the EPA goal of 90µg/m^3 in residential areas.

There is a minor increase (<2%) in annual average concentration of TSP at the nearest residences in Gladstone and 5% increase at Tide Island for WICT at 84 Mtpa.

Table 12.3 Predicted Annual Average Ground-Level Concentration of TSP (µg/m³) due to Existing Operations and the Proposed WICT at 70 Mtpa and 84 Mtpa (background level of 32 µg/m³ applied)

Location (refer Figure 12.1)	Existing (µg/m³)	WICT 1 WICT 70 Mtpa plus existing (µg/m³)	WICT 2 WICT 84 Mtpa plus existing (µg/m³)
Tide Island	43.3	45.1 (+4.1%)	45.5 (+5.1%)
Marina	46.5	46.9 (+0.9%)	47.0 (+1.1%)
GladA	42.9	43.1 (+0.5%)	43.2 (+0.7%)
GladB	38.0	38.3 (+0.8%)	38.3 (+0.8%)
GladC	35.7	36.0 (+0.8%)	36.1 (+1.0%)

Figure 12.2A shows the predicted annual average ground-level concentration of TSP for the existing approved operations of the RGTCT, BPCT and Gladstone Power Station coal stockpiles. Figure 12.2B and Figure 12.2C also show the predicted annual average ground-level concentrations of TSP for WICT operating at 70 Mtpa and 84 Mtpa in conjunction with the existing approved industries.

In residential areas the predicted annual average concentration of TSP is relatively similar for the existing approved industries and for the proposed WICT facility.

TSP concentrations that are associated with the WICT rail loop are unlikely to be evident at residential locations.

PM_{10}, Maximum 24-hour Average

A summary of predicted maximum 24-hour average ground-level concentrations of PM_{10} due to the proposed WICT operating in conjunction with the RGTCT (at 70 Mtpa), BPCT and the coal stockpiles at Gladstone Power Station are presented in Table 12.4. A background level of 26.8µg/m³ has been included in these results.

Results show that the ground-level concentrations of (50 µg/m³) are well below the EPP (Air) goal of 150µg/m³ but may occasionally exceed the NEPM (Air) standard due to existing activities. Given that the dust emission rates from the RGTCT and the BPCT are likely to be overestimated, it is considered unlikely that such exceedances would occur in practice due to these facilities alone.

The WICT proposal is likely to result in a minor increase (<3%) in maximum 24-hour average PM_{10} concentrations in Gladstone and 4% increase at Tide Island for WICT at 84 Mtpa.

Table 12.4 Predicted maximum 24-hour average ground-level concentrations of PM_{10} ($\mu g/m^3$) due to existing operations and the proposed WICT at 70 Mtpa and 84 Mtpa (background level of 26.8 $\mu g/m^3$ applied)

Location (refer Figure 12.1)	Existing ($\mu g/m^3$)	WICT 1 WICT 70 Mtpa plus existing ($\mu g/m^3$)	WICT 2 WICT 84 Mtpa plus existing ($\mu g/m^3$)
Tide Island	50.1	51.9 (+3.6%)	52.1 (+4%)
Marina	69.5	70.6 (+1.6)	70.8 (+1.9)
GladA	47.4	48.2 (+1.7)	48.4 (2.1)
GladB	51.7	52.5 (+1.9)	52.7 (+1.9)
GladC	49.2	50.1 (+1.8)	50.3 (+2.2)

Figure 12.3A shows the predicted maximum 24-hour average ground-level concentration of PM_{10} for the existing approved operations of the RGTCT, BPCT and Gladstone Power Station stockpiles. Figure 12.3B and Figure 12.3C also show the predicted maximum 24-hour average ground-level concentration of PM_{10} for WICT operating at 70 Mtpa and 84 Mtpa. In residential areas the predicted maximum 24-hour average concentrations of PM_{10} are relatively similar for the existing approved industries and for the proposed WICT facility.

PM_{10} concentrations that are associated with the WICT rail loop are unlikely to be evident at residential locations.

PM_{10} Annual Average

A summary of predicted annual average ground-level concentrations of PM_{10} due to the proposed WICT operating in conjunction with the RGTCT (at 70 Mtpa), BPCT and the stockpiles at the Gladstone Power Station is presented in Table 12.5. A background level of 16.1$\mu g/m^3$ has been included in these results.

Results show that the ground-level concentrations of PM_{10} due to WICT operating in conjunction with the existing industries are well below the EPP (Air) goal of 50 $\mu g/m^3$.

The results show that the WICT proposal is likely to result in a minor increase (<2%) in annual average PM_{10} concentrations in Gladstone and 5% increase at Tide Island for WICT at 84 Mtpa.

Table 12.5 Predicted annual average ground-level concentrations of PM_{10} ($\mu g/m^3$) due to existing operations and the proposed WICT at 70 Mtpa and 84 Mtpa (background level of 16.1 $\mu g/m^3$ applied)

Location (refer Figure 12.1)	Existing ($\mu g/m^3$)	WICT 1 WICT 70 Mtpa plus existing ($\mu g/m^3$)	WICT 2 WICT 84 Mtpa plus existing ($\mu g/m^3$)
Tide Island	21.2	22.1 (+4.2%)	22.3 (+5.2%)
Marina	22.4	22.7 (+1.3%)	22.7 (+1.3%)
GladA	21.2	21.3 (+0.5%)	21.3 (+0.5%)
GladB	19.1	19.3 (+1.0%)	19.3 (+1.0%)
GladC	18.2	18.3 (+0.5%)	18.4 (+1.1%)

Figure 12.4A shows the predicted annual average ground-level concentrations of PM_{10} for the existing approved operations of RGTCT, BPCT and Gladstone Power Station coal stockpiles. Figure 12.4B and Figure 12.4C show the predicted annual average ground-level concentrations of PM_{10} for WICT operating at 70 Mtpa and 84 Mtpa.

In residential areas the predicted annual average ground-level concentrations of PM_{10} are relatively similar for the existing operations and for the proposed WICT facility.

PM_{10} concentrations that are associated with the WICT rail loop are unlikely to be evident at residential locations.

Dust Deposition Rate

A summary of the predicted annual average dust deposition rates due to the proposed WICT operating in conjunction with the RGTCT, BPCT and the coal stockpiles at Gladstone Power Station is presented in Table 12.6. A background level of 50 mg/m²/day has been included in these results.

Results show that the dust deposition rates due to the WICT operating in conjunction with the existing industries are well below the EPA's recommended guideline of 120 mg/m²/day.

The results show that the WICT proposal is likely to result in a minor increase (<1%) in annual average dust deposition rates in Gladstone and approximately a 3% increase at Tide Island for WICT at 84 Mtpa.

Table 12.6 Predicted annual average dust deposition rates (mg/m²/day) due to existing operations and the proposed WICT at 70 Mtpa and 84 Mtpa (background level of 50 mg/m²/day applied)

Location (refer Figure 12.1)	Existing (mg/m²/day)	WICT 1 WICT 70 Mtpa plus existing (mg/m²/day)	WICT 2 WICT 84 Mtpa plus existing (mg/m²/day)
Tide Island	61.1	62.7 (+2.6%)	63.0 (+3.1%)
Marina	65.1	65.4 (+0.5%)	65.5 (+0.6%)
GladA	61.1	61.2 (+0.2%)	61.2 (+0.2%)
GladB	56.0	56.1 (+0.2%)	56.2 (+0.4%)
GladC	53.2	53.3 (+0.2%)	53.4 (+0.4%)

Figure 12.5A shows that the predicted annual average dust deposition rates for the existing approved operations of RGTCT, BPCT and Gladstone Power Station coal stockpiles. Figure 12.5B and Figure 12.5C also show the predicted annual average dust deposition rates for WICT operating at 70 Mtpa and 84 Mtpa.

In residential areas the annual average dust deposition rates are relatively similar for the existing approved operations and for the proposed WICT facility.

The dust deposition rate that is associated with the WICT rail loop is unlikely to be evident at residential locations.

Figure 12.6 shows the predicted annual average dust deposition rates at each of the CQPA dust monitoring sites and residential locations. Only a minor increase is anticipated at each of these locations, with the greatest increase anticipated at the dust deposition monitoring sites nearest to the WICT (Sites 1 to 5).

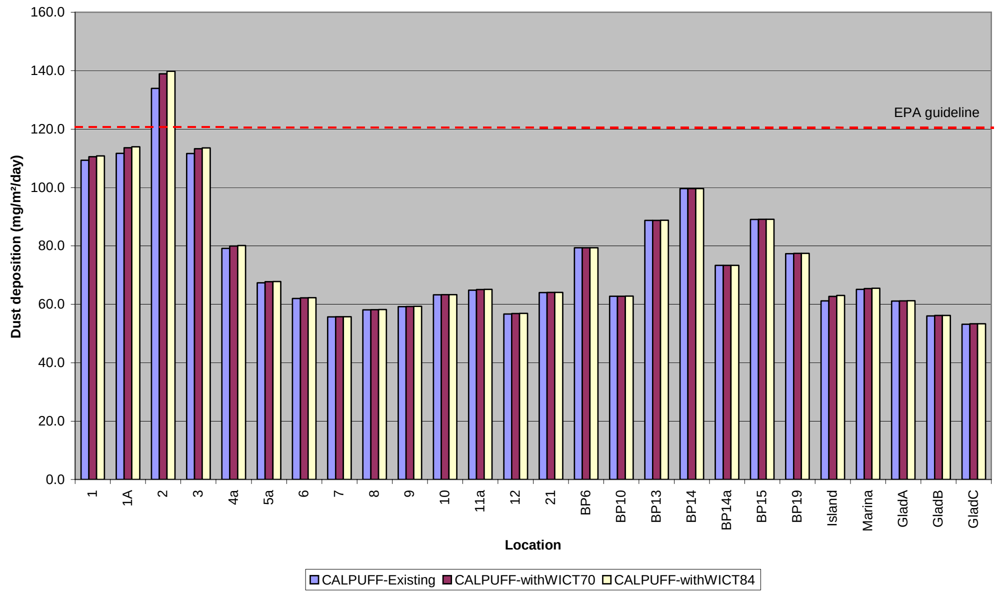


Figure 12.6 Comparison between the Predicted Coal Dust Deposition Rates for each Scenario Modelled at each of the CQPA Dust Monitoring Sites and Residential Areas

12.4.2 Dust from Future Developments

An EIS has recently been prepared for the GPN on a site to the south west of the WICT. The air quality assessment for this proposal indicates that the maximum predicted 24-hour average PM_{10} concentration at residences in Gladstone City is less than 2µg/m³. Consequently, cumulative dust levels due to the WICT and GPN are unlikely to cause an adverse air quality impact in Gladstone City.

The Aldoga Aluminium Smelter proposal has received development approval but it is currently unknown whether this proposal will proceed. The dust impacts from this proposal are expected to be small and given that the proposed Aldoga Aluminium Smelter is located more than 13km from the WICT proposal and Gladstone City, the impact of the smelter on additional dust levels in Gladstone City will be extremely small.

No other major development proposals are currently declared with the Queensland Government for the Gladstone region.

12.5 Mitigation Measures

The WICT EIS provides a summary of the best practice design features of the proposed WICT. Dust emissions from the WICT will be minimised by the diligent application and maintenance of these design features.

In addition to the above, additional mitigation measures have been incorporated into the design of the WICT as a result of consultation on the WICT EIS . These include:

- Automated dust suppression systems;
- Water application by the stockyard water sprays and misting systems will be triggered under adverse meteorological conditions based on the onsite measurements of a meteorological monitoring station;
- Dust emissions from coal handling will be minimised by monitoring the moisture content of the coal and maintaining the moisture level at or above the dust extinction moisture level (DEM) with controlled water addition;

- Treated or recycled water will be reused for dust suppression and irrigation purposes where appropriate; and
- CQPA's dust monitoring network will be expanded to include Tapered Element Oscillating Microbalance (TEOM) to provide real-time measurements of PM_{10} as well as the installation of two dust deposition gauges. The data collected from the expanded air quality monitoring system will be actively used on a daily basis to assist with dust management programmes.

12.6 Conclusions

In conclusion, the revised air quality assessment for the amended for the Project demonstrated the following:

- The amended design of the WICT will result in minor changes in dust emissions due to longer inloading conveyors and associated infrastructure;
- A dispersion modelling study has been undertaken for the amended design of the WICT to estimate ground-level concentrations of TSP, PM_{10} and dust deposition rates due to the WICT operating at 70 Mtpa and 84 Mtpa. Based on this study the following conclusions can be drawn:
  - Predicted annual average ground-level concentrations of TSP are well below the EPP (Air) goal (90µg/m³) at nearest residential locations with the WICT operating in conjunction with the existing sources of dust;
  - Ground-level concentrations of TSP are predicted to rise slightly (less than 2%) in residential areas of Gladstone due to the proposal;
  - Predicted maximum 24-hour average ground-level concentrations of PM_{10} are well below the EPP (Air) goal (150µg/m³) at nearest residential locations with the WICT operating in conjunction with the existing and proposed future sources of dust;
  - Ground-level concentrations of PM_{10} are predicted to rise slightly (less than 3%) in residential areas of Gladstone due to the proposal;
  - Maximum 24-hour average ground-level concentrations of PM_{10} are predicted to be marginally above the NEPM (Air) standard (50µg/m³) due to existing activities at some of the residences that are close to the proposed WICT. Given that the emissions from the RGTCT and the BPCT are likely to be overestimated, these exceedances are not expected to occur in practice;
  - Given the minor change in maximum 24-hour average ground-level concentrations of PM_{10} that are predicted in this study due to the WICT, additional exceedances of the NEPM (Air) standard are not expected to occur in residential areas of Gladstone due to the operation of the WICT at 70 Mtpa or 84 Mtpa;
  - Predicted annual average ground-level concentrations of PM_{10} are well below the EPP (Air) goal (150µg/m³) at nearest residential locations with the WICT operating in conjunction with the existing and proposed future sources of dust;
  - Ground-level concentrations of PM_{10} are predicted to rise slightly (less than 2%) in residential areas of Gladstone due to the proposal;
  - Predicted annual average dust deposition rates are well below the EPA's recommended guideline (120mg/m²/day) at nearest residential locations with the WICT operating in conjunction with the existing and proposed future sources of dust;
  - Dust deposition rates are predicted to rise slightly (less than 1%) in residential areas of Gladstone due to the proposal; and
  - Dust levels associated with coal trains are unlikely to be evident at residential locations.
- The proposed WICT will utilise a range of best practice measures to minimise dust emissions. Additional measures that have been identified through the EIS process that will also be undertaken include:
  - Automated dust suppression systems;
  - Stockyard sprays triggered by adverse meteorological measurements;
  - Moisture management to meet DEM;
  - Treated/recycled water for dust suppression where appropriate; and
  - Expansion of dust monitoring networks.

13. Waste

13.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to waste issues are outlined below.

- Further details are needed of the waste management principles outlined in the *Environmental Protection (Waste Management) Policy 2000*. The principles of waste avoidance, reuse, recycling, treatment and disposal need to be discussed, along with how those principles will be applied to waste management during the construction and operational phases of the development; and
- The EIS states that the preferred strategy is to install onsite sewage treatment plants at the coal terminal, rail provisioning and rollingstock maintenance facilities, however there is insufficient discussion/definition of whether this is suitable/feasible and what the environmental impacts may be. Information regarding the level of treatment that will be achieved, the resulting water quality, dosing rates, and area of irrigation, soil suitability, and ongoing monitoring requirements are required. Given the proximity of these sites to Port Curtis and the Calliope River as well as the location of the Byellee wetlands within the upstream tidal influence, potential impacts on water quality should be discussed.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

13.2 Project Changes

The changes to the Project will effectively reduce the volume of waste generated during construction and operation. This includes:

- The area of direct disturbance has been reduced which reduces the likely volume of vegetation to be cleared and managed;
- Spoil generated as a result of cutting activities associated with the rail infrastructure has been reduced (ie area of cutting has been reduced as a result of the changes to the Project), including potential acid sulfate soils (refer Section 4);
- The overall construction requirements have been reduced as a result of the changes to the Project, including the relocation of the rail infrastructure and inclusion of an overland conveyor system, no works within the Byellee area and the Project no longer includes the construction of a rail maintenance and provisioning facility;
- The removal of the rail maintenance and provisioning facilities also reduces the volume and waste streams associated with operational and maintenance activities; and
- An onsite sewage treatment plant is only required for the coal terminal itself.

13.3 Waste Management

Wastes will be generated both during the construction and operational phases of the Project. This section describes the potential waste production and management during these phases. It provides an indicative waste inventory through the identification of likely waste streams. Included in this section is an outline of proposed waste management strategies, having regard to the *Environment Protection (Waste Management) Policy 2000* principles of the waste management hierarchy of waste avoidance, reuse, recycling, treatment and disposal.

Where solid or liquid wastes are to be disposed of offsite, the following details are provided:

- Typical facilities (locations) to which wastes would be sent for disposal;
- Target rates of recycling;

- Indication of how the transport of wastes from the site to the disposal facility will be undertaken;
- Methods for the disposal of hazardous wastes and materials in the event of an accident/incident;
- Onsite storage and treatment requirements for wastes, including waste receptors as per ANZECC guidelines; and
- The impact waste may have on the environment.

The waste management strategies also consider segregation of waste, storage of waste, monitoring and reporting programmes, and cleaner production programs.

13.3.1 Legislative Requirements

The Queensland legislation, regulations and guidelines for waste management include the following:

- *Environmental Protection Act 1994* (EP Act);
- *Environmental Protection Regulation 1998;*
- *Environmental Protection (Waste Management) Policy 2000* (EPP(Waste));
- *Environmental Protection (Waste Management) Regulation 2000; and*
- *Waste Management Strategy for Queensland 1998.*

The *Environmental Protection Regulation 1998* is subordinate to the EP Act. The EPP(Waste) and the *Environmental Protection (Waste Management) Regulation 2000* aim to achieve the objectives of the EP Act by providing additional strategies and guidelines. The policy sets the legislative framework outlined within the waste management strategy.

This framework includes:

- Adoption of the waste management hierarchy;
- Assigning responsibility for waste management;
- Outlining specific mechanisms for waste management planning;
- Outlining state government responsibilities for waste management; and
- Implementing a review system for the policy.

The objective of the EPP (Waste) is to protect Queensland's environment according to the principles of Environmentally Sustainable Development (ESD) as defined in the EP Act.

13.3.2 Waste Streams

The waste streams produced during the construction and operational phases of the WICT will be distinctly different. During the construction phase, significant quantities of waste with varying compositions could be generated from activities, including vegetation clearing and stripping, bulk earthworks, including cut and cover and directional drilling, miscellaneous structures, materials supply, maintenance of construction equipment and construction site/amenities.

Ship Waste

Ship waste generated during construction and operation activities will be collected in accordance with the certified agreement between the Australian Quarantine and Inspection Service and CQPA.

Demolition Wastes

Existing structures located within project area may be demolished during the construction phase. This will include, but not limited to, farm infrastructure, pipe work, vegetation, concrete and bitumen. The wastes to be generated will mostly be concrete-based, glass, steel, metal or plastic pipes and vegetation.

Regulated wastes generated during the demolition activities will be reused or recycled where possible or disposed of in accordance with the Waste Management Plan.

Excavation Wastes

In areas that involve excavation activities, directional drilling and cut and cover will have spoil as one of the major waste streams. A large amount of spoil, largely consisting of soil and rocks, is expected to be removed from construction areas. Management of the spoil, eg storage, re-use and disposal will largely depend on spoil quality. Disposal of clean spoil will be through onsite reuse sites, reuse within other projects or as engineered fill at approved sites. Further waste management strategies will focus on the prevention of dust and wind erosion, sediment run-off, the spread of fire ants and the spread of weeds or other pathogens.

Regulated wastes generated during the demolition activities such as contaminated land and ASS will be reused or recycled where possible or disposed of in accordance with the Waste Management Plan. The potential presence of ASS and contaminated soils has been discussed and assessed in further detail in Section 4.

Packaging Materials

Materials delivered to site often come with packaging materials. This consists largely of timber pallets, crates, cartons, plastics, and wrapping materials, all of which need to be disposed of once the product has been utilised. It should be noted that minimisation of packaging of raw products will be strongly encouraged.

Stormwater Run-off from the Construction Site

During periods of rainfall, runoff has the potential to become contaminated prior to its discharge from the site if not appropriately managed. Also, stormwater can result in siltation of the drainage system and offsite impacts if appropriate sediment and erosion controls are not implemented. This issue is discussed in Section 9.

As the rail maintenance and provisioning facility is no longer part of the Project, a wastewater treatment plant will only be constructed as part of the coal terminal requirement. The location and design of the facility will be finalised during detailed design along with the necessary license conditions.

Wastes from Operation of Construction Equipment

Various heavy vehicles and construction equipment will be utilised for the duration of the construction phase. Liquid hazardous wastes from cleaning, repairing, and maintenance of this equipment will be generated. Likewise leakage or spillage of hydrocarbons and chemicals during construction needs to be managed and disposed of appropriately.

Regulated wastes such as tyres, batteries and hydrocarbons will be reused or recycled where possible or disposed of in accordance with the Waste Management Plan.

Non-hazardous Liquid Wastes

Non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets and kitchen facilities. Where possible facilities will be connected to the Gladstone City Council sewerage system, however where this is not available an appropriate liquid waste disposal systems will be utilised.

As the rail maintenance and provisioning facility is no longer part of the Project, a sewage treatment plant will only be constructed as part of the coal terminal requirements. The location and design of the facility will be finalised during detailed design along with the necessary license conditions. It is intended that the onsite sewerage plant would be constructed prior to the peak construction workforce coming on line. The capacity requirement for the system will be determined during detailed design.

General Wastes

This encompasses office wastes, scrap materials and biodegradable wastes. Due to the variety of waste streams likely to be generated, sorting and segregation will be undertaken. The "recyclability" of the waste, disposal method, storage requirements and volume will be taken into consideration.

During the operational phase of the WICT, wastes could be generated from indiscriminate roadside dumping, operation of substandard vehicles, roadside vehicle repairs and vehicle accidents.

The generation of a detailed Waste Inventory during both construction and operation will aid in monitoring the movement and correct disposal of wastes. At a minimum, the Waste Inventory will contain information on the volumes of waste, type of waste, location of the storage area, disposal method, frequency of disposal and any special requirements or warnings regarding the waste. Table 13.1 is a typical example of a Waste Inventory. Once design and construction details are finalised this inventory can be updated and completed in more detail.

Table 13.1 WICT Waste Inventory

Activity description	Waste generated	Location of storage area	Disposal method and location
Construction Phase			
Construction site office, storage of construction materials and supporting amenities	General and office waste from construction activities.	Recycling and general waste rubbish bins within the compound.	Bins received by licensed waste contractor and taken to a Waste Transfer Station for processing.
	General unused construction materials.	Stored within the construction compound – separated into types of material.	Returned to the supplier where possible or reused on another site.
Earthworks	Vegetation/ timber/weeds from clearing.	Temporary storage at the location of works or within construction compound – separate from other waste.	Mulched and used onsite or other sites or disposal at green waste facilities. Re-use in landscaping, revegetation and rehabilitation activities
	Large quantities of clean spoil.	Temporary storage at the location of works or within the construction compound – separated from other waste material.	Reuse of fill within the Project or other projects.
	Wastewater contaminated with hydrocarbons.	Temporary storage of contaminated wastewater in appropriately bunded facility to ensure runoff water does not enter waterways.	Removal and reuse of bentonite where possible. Treatment of wastewater to remove contaminants. Reuse water and dispose of contaminants in accordance with EPA requirements.
Demolition and removal of existing structures	Timbers, concrete formwork, scrap steel, concrete, insulation materials and asbestos.	Temporary storage within the construction compound. Material separated into various waste streams. Insulation materials according to material classification. Asbestos not stored.	Reuse of materials on site or on other construction sites where possible. Disposal to recycling facilities where possible or disposal to licensed landfill where not possible. Asbestos disposed of directly by licensed contractor to a licensed facility.
Removal and/or treatment of contaminated soil from external sources and accidental spills.	Contaminated soils (including ASS material), contaminated leachate (including acid) and hydrocarbon saturated soils.	Temporary storage in appropriately bunded area to contain runoff.	Appropriate treatment of ASS may permit reuse of the soil. Treatment and disposal of contaminated material by a licensed waste contractor or to a landfill licensed to accept this type of waste. Weeds to be taken to green waste disposal facilities.
Construction of culverts and drains	Concrete, soil and excavated materials.	Storage within construction compound or temporary storage at the location of works.	Reuse of material where possible within the Project or on another project. Disposal to landfill site where not possible (eg Benaraby Landfill).
Road construction including formation, lower sub-base and base	Road materials including soils, gravels, cement stabilised gravels, asphalt prime and bitumen.	Temporary storage within the construction compound. Material separated into various waste streams.	Reuse of materials on site or on other construction sites where possible. Disposal to recycling facilities where possible or disposal to landfill where not (eg Benaraby Landfill)..

Activity description	Waste generated	Location of storage area	Disposal method and location
Rail construction	Rail materials including soils, metal, steel wire, concrete, gravel and ballast	Temporary storage within the construction compound. Material separated into various waste streams.	Reuse of materials on site or on other construction sites where possible. Disposal to recycling facilities where possible or disposal to landfill where not (eg Benaraby Landfill).
Construction stockpiles	Contaminated soil including ASS and weed matter.	Stored within the construction compound. Appropriate bunding and collection of runoff required to ensure contaminated runoff does not enter surrounding waterways.	Appropriate treatment of ASS may permit reuse of the soil. Treatment and disposal of contaminated material at landfill licensed to accept this type of waste. Weeds to be taken to green waste disposal facilities.
	Concrete	Temporary storage of concrete within the construction compound – separated from other materials.	Reuse of concrete onsite or on other sites. Disposal of excess concrete at concrete recycling plant.
	Dust	Dust may be generated from stockpiles material.	Damp down surfaces of stockpiles which may produce dust during windy conditions. The EMP will provide more specific actions.
Materials and Hazardous Goods storage and handling	Spilt or residual hydrocarbons.	Storage of petroleum or oil in appropriately bunded compounds. Refuelling within bunded areas in accordance with AS 1940.	Spills and residues to be contained and treated or collected and disposed to appropriate facilities.
	Spilt or residual chemicals.	Storage of chemicals in appropriately bunded compounds. Use and storage of chemicals in accordance with the Material Safety Data Sheet (MSDS) and AS3780/AS3833.	Spills and residues to be contained and treated or collected and disposed to appropriate facilities and in accordance with MSDS.
	Storage of waste materials prior to reuse, recycling or disposal.	Storage within the construction compound. Waste is to be separated into the separate waste streams to maximise reuse and recycling potential.	Wastes reused where possible. Wastes which can be recycled are to be disposed at the appropriate recycling facility. Wastes that cannot be reused or recycled are to be disposed of an appropriate waste disposal facility.
Operational Phase			
Normal operating condition	Leakage of hydrocarbons into downstream environments and waterways external to the road corridor from vehicles.	Temporary containment of waste.	Use of a range of measures to treat runoff from the road for hydrocarbon collection or removal to prevent contaminated water entering the waterways.
	Inadequate waste management systems and indiscriminate dumping of wastes within the road reserve.	Use of appropriate measures to treat runoff from the road for collection or removal of litter and other wastes including glass to prevent water entering the waterways.	Use of appropriate measures to treat runoff from the road for hydrocarbon collection or removal to prevent contaminated water entering the waterways.

Activity description	Waste generated	Location of storage area	Disposal method and location
Emergency situation	Spillage of hydrocarbons, dangerous goods etc into downstream environments and waterways external to the road corridor due to incidents involving vehicles and dangerous goods vehicles.	Temporary containment of pollutants preferably as close as possible to the source to minimise the contaminated area. Spill containment kits, emergency response and training protocols in place.	Follow the appropriate emergency response plan (QR or CQPA). Disposal of wastes in accordance with the MSDS to the appropriate facility.
Maintenance Phase			
Maintenance of rail infrastructure. For example, repairing damaged sections of rail line	Materials include soils, gravels, ballast, metal, metal wiring and cement.	Temporary storage of wastes at the location of works in appropriately bunded compounds to prevent contaminated runoff leaving the site.	Reuse of materials onsite or on other sites. Disposal to recycling facilities where possible. Final disposal to waste disposal facilities where reuse or recycling not possible.
Resurfacing and repair of damaged surfaces.	Bitumen, asphalt and contaminated surfacing materials.	Temporary storage of wastes at the location of works in appropriately bunded compounds to prevent contaminated runoff leaving the site.	Reuse of materials onsite or on other sites. Disposal to recycling facilities where possible. Final disposal to waste disposal facilities where reuse or recycling not possible. Contaminated wastes to be disposed in accordance with EPA guidelines.
Maintenance of drainage structures. For example removal of sediment from drainage structures and disposing off site.	Contaminated sediment from hydrocarbon based pollutants (oils and greases).	Temporary storage of wastes at the location of works in appropriately bunded compounds to prevent contaminated runoff leaving the site.	Disposal to waste disposal facilities licensed to accept contaminated waste where reuse or recycling not possible. Contaminated wastes to be disposed in accordance with EPA guidelines.

13.3.3 Potential Impacts of Wastes on the Environment

If not managed properly, construction and operation activities could generate a range of different waste streams and quantities, which could potentially cause adverse environmental impacts.

Potential environmental impacts could include:

- Reduction in landfill space due to waste materials generated during construction, operation and maintenance that are unable to be reused (at or within) the Project (eg contaminated materials). This could occur through the mixing of uncontaminated and contaminated wastes;
- Contamination of surface soils, surface water and groundwater within the Project during construction from accidental spillage/leakage of hydrocarbon based wastes and other contaminated materials (eg ASS disturbance, disturbance of *in-situ* soil contaminants);
- Contamination of downstream environments, waterways, and sensitive habitats from uncontrolled runoff resulting from spillage/leakage of hydrocarbon based wastes and contaminated materials or sediment;
- Reduced visual amenity surrounding the WICT resulting from inadequate waste management systems and indiscriminate dumping of wastes; and
- Risk to human and environmental health through the spread of disease or proliferation of pest and/or vector species.

13.4 Waste Management Strategies

The detailed design of the WICT Project will take into account waste minimisation, reuse and cleaner production principles and philosophies to minimise waste production and maximise reuse of any waste produced. The WICT will maximise waste reuse and will engage waste management contractors who will reuse and/or recycle wastes where possible. The hierarchy for waste management as specified in the EPP(Waste) will be followed with emphasis on waste avoidance and reduction where possible, followed by re-use of waste, recycling and finally disposal.

13.4.1 Avoidance

The construction control and reduction factors will be required to identify opportunities for avoiding waste generation. If avoidance is not possible, the construction contractors will be responsible for reducing waste generation on site. Strategies for reducing waste will be detailed in the contractor's waste management plan and may include:

- Consideration of the use of materials and products that have a recycled content wherever cost and performance are competitive, and where environmentally preferable to the non-recycled alternative;
- Arrangements made with suppliers to return any construction materials not used;
- Where possible, goods being ordered in bulk to minimise packaging wastes and packaging material returned to the suppliers wherever practicable; and
- Encouraging employees to avoid and reduce waste wherever possible.

Re-use

Strategies for the re-use of waste products during construction may include where practicable:

- Where possible, chipping and mulching of vegetation cleared during construction and re-use of mulched material for landscaping purposes;
- Use of suitable vegetation in rehabilitation and revegetation strategies (ie hollow bearing logs area suitable habitat for fauna);
- Topsoil free of weeds to be stockpiled and stored for re-use, if possible;
- Waste concrete and pavements re-used during road construction (sub-base layer) or as hard stand areas in construction compounds;
- Re-use of clean spoil in reclamation activities;
- Re-use of concrete from work throughout the duration of the Project;

- Re-use of steel structures in the Project;
- Re-use of structures including culverts, cabling, poles and similar infrastructure; and
- Broken tiles, bricks and other masonry to be used in fill or transferred to a building supply company by transferring to batching plants or use as a select/earthworks coarse layer.

Recycling

Strategies for recycling during construction may include:

- Waste impacted by contaminated soil should be treated prior to recycling to prevent cross contamination of clean material;
- Provision of recycle facilities for general rubbish, eg glass, plastic, waste paper and metals, using colour-coded bins. These facilities will be provided within the construction compound and where possible at construction locations on site. Recycling of general wastes such as aluminium and steel cans within the construction compounds;
- Collection of demolition materials and re-use on site or transport where possible to a recycling depot;
- Collection and transport of steel scraps to a recycling facility. A target of 100% recycling of steel scraps should be met;
- Collection of packaging material (eg pallets) returned to the suppliers wherever practicable;
- Investigation by the contractor of the availability of treated wastewater, runoff or groundwater inflow for use during construction activities for dust suppression or for watering progressive landscape works;
- Incorporation of a closed water recycling system if a concrete and/or asphalt batching plant is to be established on or close to the Project site (although the provision of such plants is not anticipated);
- The use of recycled materials to the limits of design in concrete, roadbase, asphalt and other construction materials;
- Collection and recycling of used oils (motor and hydraulic) by a licensed contractor;
- Empty oil and fuel drums and other containers collected or returned to recycled facilities by a licensed contractor; and
- Training of all relevant employees in the waste management plan and recycling opportunities.

Disposal

Waste unable to be reused or recycled will be disposed of in a certified land fill site under the control and management of Gold Coast City or Calliope Shire Council. Materials will include putrescible wastes from kitchens and lunchrooms, and non-putrescible materials unable to be recycled.

The transport of regulated wastes and contaminated soils or other materials will be conducted by licensed contractors for disposal at licensed facilities, in accordance with legislative requirements.

13.4.2 Waste Storage

Proposed waste storage, treatment and containment areas will be located at each construction laydown area, and will be designed and constructed in accordance with the requirements of the relevant standards and guidelines. For example, Safe Storage and Handling of Dangerous Goods, DES (Department of Emergency Services), Removal and Disposal of Contaminated Soil, EPA, A52714 Storage and Handling of Hazardous Chemical Substances guidelines will be followed for the preparation of containment areas for hazardous and dangerous goods.

13.4.3 Waste Transport

The movement of waste will be governed by the potential impacts on nearby residences. On this basis all site works and surface truck movement (for transport of waste) will be during daylight hours, Monday to Saturday. The movement of hazardous materials and regulated wastes will occur at non-peak times to minimise the possibility of traffic conflicts and associated risks. This will also be timed with the operational hours of the receiving facilities. Where possible hazardous materials and regulated wastes will be temporarily stockpiled on site to minimise the number of transport movements required.

All movement of hazardous materials, dangerous goods and regulated wastes will be in accordance with the relevant regulations and guidelines. A waste tracking system will be in place and this will allow waste to be tracked from the source to the place of storage, recycling, treatment or disposal. In addition to the waste tracking system, transport vehicles will be equipped to take the particular type of waste required and have appropriate signage to minimise any impacts. Similarly, movement of spoil and other non-hazardous wastes will be in accordance with the EP Act. For example, all loads will be covered to minimise dust generation and potential loss of load.

13.4.4 Sewage/Septic Waste

The WICT EIS recommends treatment of sewage by package sewage treatment plants with effluent suitable for irrigation of landscaped areas. Based on the relatively small quantities of sewage generated at the coal terminal stockyard, dump station and wharf, there will be more than adequate areas of landscaping available for irrigation of the effluent. The design of the package treatment plant will be confirmed during detailed design and will include be undertaken in parallel with obtaining the necessary licences and approvals. If it is found during detailed design that a treatment plant is not feasible, then sewage could be conveyed by a new sewerage pipeline to one of the nearby council controlled sewage treatment plants.

13.5 Management of Hazardous Materials or Dangerous Goods

Products likely to be stored at construction compounds include:

- Petroleum or other oil products; and
- Hazardous materials/dangerous goods residues and containers.

The Material Safety Data Sheets (MSDS) will be kept at the storage location of any of these hazardous materials or dangerous goods.

It is not intended to store explosives in the worksites during construction. Explosive materials may be transported to the project area as required by the construction program. Storage and transport of materials will be undertaken according to the following:

- Australian Code for the Transport of Dangerous Goods by Road and Rail;
- AS 1216 Classification, Hazard Identification and Information Systems for Dangerous Goods;
- AS 1678 Emergency Procedure Guides – Transport;
- AS 1940 Storage and Handling of Flammable and Combustible Liquids;
- AS 3780 The Storage and Handling of Corrosive Substances;
- AS 2809 Road Tank Vehicles for Dangerous Goods;
- AS 2931 Selection and Use of Emergency Procedure Guides for Transport of Dangerous Goods; and
- AS 2187 Explosives – Storage, Transport and Use.

All vehicles will be equipped with a spill kit. All vehicle handlers will be fully aware of the spill response plan. Appropriate spill response plans will be prepared.

Contaminated material and ASS will be managed in accordance with Section 4 and the ASSMP (see Appendix C).

14. Noise and Vibration

14.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to noise and vibration issues are outlined below.

- The EIS identifies that there will be exceedances of noise criteria at some sensitive receptors during construction and should night work be required on the rail expansion, and that the proponent would undertake consultation with affected residents. Council requests that implementation of a comprehensive consultation program as well as mitigation and management measures be a condition of the development approval;
- Increased noise for the resident of Tide Island during coal terminal operations. The EIS does not propose mitigation or management measures which address what actions may be undertaken where a reasonable noise outcome cannot be achieved for Tide Island;
- The noise assessment does not include the Moura Rail Line adjacent to Calliope and along the Dawson Highway to Boundary Road (WICT EIS Figures 14.4 and 14.5). Council is concerned about the impacts on residents along this line resulting from increased train traffic, particularly at the Calliope bends; and
- The EIS fails to address specifics of how QR and CQPA intend to mitigate the noise impacts on the residents of Beecher.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

14.2 Project Changes

The Project changes include the relocation of the rail maintenance and provisioning facilities to a site within the GSDA at Aldoga, and associated rail infrastructure connection to the Moura Line relocated to the west (refer Section 3).

14.3 Description of Environmental Values

Additional ambient noise monitoring was conducted near one (1) residential location in the communities surrounding the proposed WICT and associated rail infrastructure corridors. Both attended and unattended noise measurements have been conducted in order to accurately document the existing background noise environment. The established background noise levels are used to determine project noise criteria.

Details of all six noise monitoring locations are provided below and illustrated in Figure 14.1.

14.3.1 Methodology

Additional long-term unattended noise monitoring was undertaken at one (1) location (NM-6) between Friday 15 June and Sunday 24 June 2007. This noise monitoring supplements the noise monitoring programme completed near five (5) residential locations (NM-1 to NM-5) in April 2006. Details of all six noise monitoring locations are provided below and are illustrated in Figure 14.1.

- Location 1 (NM-1) – 12 Lord Street, Gladstone – noise logger located on the property boundary next to letterbox (completed April 2006);
- Location 2 (NM-2) – 68 Flinders Street, Gladstone – noise logger located on property boundary next to driveway (completed April 2006);
- Location 3 (NM-3) – 4 Linhow Crescent, Clinton – noise logger located on property boundary along the Linhow Crescent frontage (completed April 2006);

- Location 4 (NM-4) – 65 Stewart Road, Beecher – noise logger located on the property boundary in the southwest corner (completed April 2006);
- Location 5 (NM-5) – 3 Lindherr Road, Yarwun - noise logger located on property boundary (completed April 2006); and
- Location 6 (NM-6) – Tide Island - noise logger located 10m east of the residence.

Each noise monitoring location is considered to be representative of the residential area in which it is located in terms of the existing noise environment and any potential noise impacts associated with the Project.

14.3.2 Instrumentation

The monitoring at Location 6 was undertaken using an Acoustic Research Laboratories Type EL-316 Environmental Noise Logger programmed to record various statistical noise levels over consecutive 15-minute intervals. Attended measurements were undertaken using a Type 1 Rion NA-27 Precision Sound Level Meter.

All items of acoustic instrumentation employed during the noise measurements were set to 'Fast' response in accordance with the relevant Australian Standards and the EPA's *Noise Measurement Manual*. Each item was checked for calibration before and after each survey with a Rion NC-73 Sound Level Calibrator and no significant drift (greater than 1dBA) in calibration signal was detected on any of the measurement equipment. All items of acoustic instrumentation employed during the noise measurement surveys were designed to comply with AS 1259.2 *Sound Level Meters* and carry current calibration certificates.

14.3.3 Noise Monitoring Results

Unattended Noise Logging

The unattended ambient noise measurements were used to determine the Rating Background Level (RBL) for the daytime (7.00am to 6.00pm), evening (6.00pm to 10.00pm) and night-time (10.00 pm to 7.00am) periods at each location. The RBL is the median of the 90th percentile of the background (L_{A90}) noise levels in each assessment period (ie day, evening and night-time hours) over the duration of the monitoring. Table 14.1 contains the determined RBL for each measurement location (refer Appendix F for full monitoring results).

Table 14.1 Rating Background Levels

Monitoring Location		Rating Background Level (dBA)		
		Day	Evening	Night
NM-1	12 Lord Street, Gladstone	42	45	36
NM-2	68 Flinders Street, Gladstone	38	37	33
NM-3	4 Linhow Crescent, Clinton	38	41	37
NM-4	65 Stewart Road, Beecher	36	33	29
NM-5	3 Lindherr Road, Yarwun	34	34	33
NM-6	Tide Island, Gladstone	41	41	47

The maximum $L_{Aeq(1hour)}$ for each daytime, evening and night-time period was also calculated. The L_{Aeq} is the A-weighted equivalent noise level and is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound. The median maximum $L_{Aeq(1hour)}$ noise levels measured at each location are shown in Table 14.2.

Table 14.2 Measured Maximum $L_{Aeq(1hour)}$ Noise Levels

Monitoring Location (refer Figure 14.1)		Maximum $L_{Aeq(1hour)}$ (dBA)		
		Day	Evening	Night
NM-1	12 Lord Street, Gladstone	61	59	58
NM-2	68 Flinders Street, Gladstone	55	50	47
NM-3	4 Linhow Crescent, Clinton	58	51	47
NM-4	65 Stewart Road, Beecher	53	49	50
NM-5	3 Lindherr Road, Yarwun	56	55	56
NM-6	Tide Island, Gladstone	54	50	55

Graphs showing the statistical noise levels measured at the monitoring locations over the whole monitoring period are presented in Appendix F for each 24-hour period. The graphs show various statistical noise levels, including the background (L_{A90}) and L_{Aeq} noise levels at each site.

Hourly weather data for the additional noise monitoring period at NM-6 (Tide Island) was sourced from the Bureau of Meteorology. The weather conditions were generally fine, with temperatures ranging from 8°C to 23°C and slight breezes (below 5m/s) blowing generally from the south. More than 20mm of rainfall was recorded between 10.00 pm 20 June 2007 and 11.00 am 21 June 2007 and noise measurement results from this period have been excluded from the measurement results in Table 14.1 and Table 14.2. The weather conditions during the remainder of the monitoring period are considered to be suitable for determining background noise levels.

The results in Table 14.1 indicate that the measured night-time RBL was significantly higher than the measured RBLs for the day and evening periods. This result is unusual, especially when compared with the measured RBLs for the other monitoring locations.

Closer examination of the noise measurement results at NM-6 (Tide Island) together with the ambient weather conditions during the measurement period indicate that the measured RBLs at Tide Island are sensitive to the prevailing wind conditions. In particular, a relationship between the measured $L_{A90(15minute)}$ noise level and wind direction was observed, with the highest background noise levels measured when the wind was blowing from the south (from nearby existing industrial facilities to the receiver). Furthermore, the wind direction was subject to some variability during the day and evening periods, whilst at night the wind direction was more consistently from a southerly direction.

It should also be noted that, due to the method of calculation, the measured RBLs are not representative of average background noise levels. Instead, they are representative of the minimum background noise level measured during the monitoring period. For NM-6 (Tide Island) the quietest part of each period (minimum background noise level) typically occurred when the wind was blowing from the north-west (from receiver to existing industrial facilities).

Based on these observations, it is considered that the measured RBLs at NM-6 (Tide Island) for the day and evening periods reflect background noise levels when the wind is blowing from a direction with a northerly component. The measured RBL for the night period reflects background noise levels when the wind is blowing from a direction with a southerly component (ie from the proposed WICT to Tide Island).

Attended Noise Measurements

An attended noise measurement was also conducted at NM-6 during the daytime period to confirm and characterise ambient noise levels and to observe typical noise sources associated with the existing noise environment. The attended noise measurement was conducted on 14 June 2007.

The results of the attended measurement are summarised in Table 14.3.

Table 14.3 Attended Measurement Results – Daytime Period (7.00am – 6.00pm)

Monitoring Location	Date	Time (end of 15 min period)	Measured Noise Level (dBA)			Comments
			L_{A90}	L_{Aeq}	L_{A10}	
NM-6	14/06/07	09.00	52.5	53.1	53.8	RG Tanna Coal Terminal is a significant background noise source, waves also significant, reverse alarm audible, small marine craft audible

Weather conditions during the attended measurements were fine with wind blowing from the south-south-west at approximately 2m/s and a temperature of 15ºC.

14.3.4 Conclusion

RBLs at NM-6 (Tide Island) during the additional noise monitoring period were calculated to be between 41dBA and 47dBA. The attended noise measurement identified existing industrial facilities and wave motion as significant noise sources.

14.4 Recommended Limits and Criteria

14.4.1 Construction Noise

The EPP(Noise) does not include construction noise limits other than those which apply to blasting.

For construction work occurring during normal daytime hours, provided all mechanically powered plant is fitted with appropriate mufflers, specific noise limits are generally not warranted. Where construction noise may affect adjacent residential premises or other residential accommodation (including hotels, motels, serviced units or backpacker accommodation), it is recommended to limit the hours of operation to:

- Monday to Friday 7am – 6pm; and
- Saturday 7am – 1pm.

Outside these hours noise limits, based on the former EPA E1 Environmental Guideline and contemporary sleep disturbance limits, should be applied. Based on the results of the noise monitoring completed to date, the construction noise criteria that would apply at each of the monitoring locations is detailed in Table 14.4.

Table 14.4 Summary of Construction Criteria

Location (refer Figure 14.1)	Time Period			
	Weekdays 7am-6pm; Saturday 7am-1pm	Saturday 1pm-6pm	Monday to Saturday 6pm-10pm	Monday to Saturday 10pm-7am; Sunday all day
		L_{A10} [1] (dBA)	L_{A10} [1] (dBA)	L_{Amax} [2] (dBA)
NM-1: 12 Lord St, Gladstone	No limit	52	55	50
NM-2: 68 Flinders St, Gladstone	No limit	48	47	50
NM-3: 4 Linhow Cres, Clinton	No limit	48	51	50
NM-4: 65 Stewart Rd, Beecher	No limit	46	43	50
NM-5: 3 Lindherr Rd, Yarwun	No limit	44	44	50
NM-6. Tide Island	No limit	51	51	50

Table Notes:

1 Based on background + 10dBA $L_{Amax(adj,15min)}$ (average maximum A-weighted noise level from the construction activity measured over a 15 minute period, with adjustments for tonality or impulsiveness as applicable, as documented in full in AS 1055). For the purpose of measuring construction noise, this is considered equivalent to the measured L_{A10}.

2 Based on a conservative attenuation of 5dBA through an open window, the criterion of 45dB L_{Amax}, internal recommended for sleep disturbance can be interpreted as an $L_{Amax(external)}$ 50dBA assessable at four metres from the building facade.

14.4.2 Operational Noise

Port Operations Criteria

Operational noise levels emitted by the proposed coal terminal at its ultimate capacity will be assessable in accordance with the EPA Ecoaccess Guideline “Planning for Noise Control” (the Guideline). This assessment process takes into account four factors:

- Control and prevention of background creep;
- Determination of planning noise levels;
- Containment of variable and short term noise emissions by setting specific (intrusive) noise levels; and
- Sleep disturbance.

The criteria shown in Table 14.5 have been determined for each measurement location based on the Ecoaccess assessment process. Separate criteria are presented for Background Noise Creep prevention and for Sleep Disturbance. The Design Criteria for each location has been determined as the lower of the Planning Noise Level (PNL) and Specific Noise Level (SNL) for that location.

Table 14.5 Noise Control Criteria (dBA)

Noise Monitoring Location	Background Noise Creep Criteria	Sleep Disturbance Criteria	PNL	SNL	Design Criteria
	$L_{A90\ (1hour)}$	L_{Amax}	$L_{Aeq\ (1hour)}$	$L_{Aeq\ (1hour)}$	$L_{Aeq\ (1hour)}$
Day					
NM-1	42	-	51	45	45
NM-2	43	-	58	41	41
NM-3	43	-	56	41	41
NM-4	41	-	60	39	39
NM-5	39	-	58	37	37
NM-6	43	-	59	44	44
Evening					
NM-1	35	-	49	48	48
NM-2	37	-	53	40	40
NM-3	31	-	53	44	44
NM-4	38	-	54	36	36
NM-5	39	-	47	37	37
NM-6	31	-	53	44	44
Night					
NM-1	26	50	48	39	39
NM-2	30	50	47	36	36
NM-3	27	50	47	40	40
NM-4	34	50	42	32	32
NM-5	30	50	46	36	36
NM-6	37	50	45	50	45

Rail Noise Criteria

The noise impacts associated with the proposed rail infrastructure will result from the proposed rail loop and the additional rail traffic that will be approaching the terminal on the North Coast Line.

The applicable criteria for rail noise are:

- 87dBA L_{Amax}; and
- 65dBA $L_{Aeq\ (24hours)}$.

These are in accordance with the noise guidelines stipulated in both the EPP(Noise) and the Queensland Rail Code of Practice for Railway Noise Management which was endorsed for use by the Minister for the Environment in 1999 in accordance with Section 219 of the *Environmental Protection Act 1994*.

14.4.3 Vibration Limits

Human Comfort

Humans are far more sensitive to vibration than is commonly realised. They can detect and possibly even be annoyed by vibration at levels which are well below those causing any risk of damage to a building or its contents.

Human tactile perception of random motion, as distinct from human comfort considerations, was investigated by Diekmann and subsequently updated in German Standard DIN 4150 Part 2-1975. The standard suggests that people will just be able to feel continuous floor vibration at levels of about 0.15mm/s and that the motion becomes "noticeable" at a level of approximately 1mm/s.

Guidance in relation to assessing the potential human disturbance from ground-borne vibration inside buildings and structures is contained in British Standard 6472-1992 "Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)" (BS 6472). The standard indicates that continuous floor vibration levels above which "adverse comment" in residences and offices may arise during daytime hours ranges from approximately 0.3mm/s to 0.6mm/s.

Construction Vibration

Based British Standard 7385: Part 2–1993 "Evaluation and measurement for vibration in buildings Part 2" and German Standard DIN 4150-3 1999 "Structural Vibration – Part 3: Effects of vibration on structures", safe working distances from buildings are presented in Table 14.6 for typical construction equipment.

Table 14.6 Safe Working Distances for Vibration Intensive Plant Items

Item	"Safe" Working Distance	
	Cosmetic Damage (BS7385)	Human Comfort (BS6472)
Impact Pile Driver	20m to 40m	80m to 120m
Vibratory Pile Driver	5m to 15m	20m to 50m
Pile Boring (<800mm)	2m (nominal)	n/a

14.5 Noise Impact Assessment Approach

The aims of the noise assessment for the proposed WICT and associated rail infrastructure were as follows:

- Identification of all sensitive receivers in the vicinity of the proposed development and associated transport corridors;
- Setting suitable criteria and limits for activities associated with the construction and operation of the proposed development;
- Determination of potential impact on the sensitive receivers under neutral and worst-case meteorological enhancement conditions;
- Evaluation and assessment against criteria and limits; and
- Determination of mitigation measures, if required.

14.5.1 SoundPLAN Modelling

A SoundPLAN (Version 6.3) computer noise model has been used for the prediction of future project noise levels at sensitive receivers. The noise model comprises a digitised ground map containing topography, buildings, all significant plant and relevant noise sources, including emission characteristics and the location of noise sensitive receivers. The computer model calculates the received noise levels, taking into account:

- All noise source sound power levels and frequency spectra;
- Noise propagation variables such as distance attenuation, ground absorption, air absorption and shielding attenuation; and
- Meteorological conditions, including wind effects.

The model was based on the concept design shown in Section 3 of this Supplementary EIS.

Various computation algorithms were utilised within the SoundPLAN model. These are outlined below.

The CONCAWE Standard for Industrial Noise Modelling

CONCAWE is commonly implemented in industry and resource sector projects for environmental noise prediction. It allows for investigation of effects of wind and atmospheric stability on noise propagation.

Nordic Rail Traffic Noise Prediction Method

The Nordic Rail Traffic Noise Prediction Method (Kilde 130) dates from 1984 and is commonly utilised for QR rail noise assessments. It calculates emission noise level based on the number of trains, speed, and length and predicts $L_{Aeq(24hour)}$ and L_{Amax} as required by the EPP(Noise).

14.5.2 General SoundPLAN Modelling Parameters

Assessment Receiver Locations

WICT assessment noise levels have been evaluated at 27 representative receivers throughout the residential areas of Gladstone and Yarwun which surround the proposed project. The noise monitoring sites have been included in the assessment.

The assessment receivers have been selected on the basis of providing good spatial coverage of the surrounding areas, including those receivers closest to and potentially most impacted by the proposed project.

All receivers have been positioned 1.5m above ground and a minimum of 4m from the nearest building façade (ie free field). Rail noise is assessed at a distance of 1m from the most affected façade.

The receivers are grouped by proximity to the nearest representative noise monitoring location and numbered accordingly, and listed in Table 14.7.

Table 14.7 Residential Receivers - Noise

Receiver	Address	Suburb	Land Zoning and Use
NM-1.	12 Lord Street	Gladstone	Residential B, Dwelling
1-a.	Central Queensland University	Gladstone	Not zoned, Harbour industries-Educational
1-b.	15 Flinders Parade	Gladstone	Special Purposes, Dwelling
1-c.	1 Rollo Street	Gladstone	Residential C, Dwelling
NM-2.	68 Flinders Street	Gladstone	Residential C, Dwelling
2-a.	35 Mylne Street	West Gladstone	Residential A, Dwelling
2-b.	51 Park Street	West Gladstone	Residential C, Dwelling
2-c.	1 Starmer Court	West Gladstone	Residential A, Dwelling
2-d.	7 Dawson Hwy	West Gladstone	Special Business, Motels
2-e.	1 Paterson Street	West Gladstone	Residential C, Dwelling
NM-3.	4 Linhow Crescent	Clinton	Residential A, Dwelling
3-a.	54 Aerodrome Rd	Clinton	Residential A Dwelling
3-b.	21 Dunstall Street	Clinton	Residential A Dwelling
3-c.	Lot 1 Plan RP614414	Callemondah	Rural A, Large Homesite - Dwelling
3-d.	5 Julius Crescent	Clinton	Residential A Dwelling
3-e.	24 Barrine Close	Clinton	Residential A Dwelling

Receiver	Address	Suburb	Land Zoning and Use
3-f.	27 Barrine Close	Clinton	Residential A Dwelling
3-g.	4 St Bees Court	Clinton	Residential A Dwelling
NM-4.	65 Stewart Rd	Beecher	Rural A, Large Homesite -Dwelling
4-a.	7 Don Young Drive	Clinton	Not Zoned, Large Homesite -Dwelling
4-b.	808 Dawson Highway	Byellee	Rural A, Large Homesite -Dwelling
4-c.	100 Lagoon Rd	Byellee	Rural A, Large Homesite -Dwelling
NM-5.	3 Lindherr Road	Yarwun	Rural A, Large Homesite -Dwelling
5-a.	18 Lindherr Road	Yarwun	Rural A, Large Homesite -Dwelling
5-b.	339 Gladstone-Mt Larcom Rd	Yarwun	Rural A, Large Homesite –Dwelling
NM-6	Tide Island	Gladstone	Rural A. Dwelling
6-a.	Turtle Island	Gladstone	Rural A. Dwelling

CONCAWE Setup

CONCAWE has been implemented for modelling of the construction activities for the rail infrastructure, coal terminal and port operations.

The requirement in Ecoaccess is for neutral and worst-case meteorological enhancement conditions to be considered for operational noise assessment. For construction only the neutral case is considered.

Nordic Rail Prediction Setup

Noise emission levels were corrected to reflect the local coal rail fleet, based on in-house measurement results.

Wheel and rail noise has been modelled for all trains. Radius corrections were applied where rail curve radii are less than 500m, and the rail was considered to be jointed. Bridges were modelled as concrete with a ballasted deck. Diesel electric locomotive engine and exhaust noise were modelled separately at an elevation of 4m above rail level.

Rail operations were modelled for the WICT Project running at ultimate capacity. The rail traffic shown in Table 14.8 was assumed to be operating.

Table 14.8 Rail Traffic - WICT

Source	Daily Train Numbers	Locomotive	Consist
Blackwater	19	4 x EL / 3 x DEL	86 x 104T wagons
Moura	25	4 x DEL	86 x 104T wagons
Surat	13	4 x DEL	115 x 104T wagons

Table Notes:

EL = Electric Locomotive.
DEL = Diesel Electric Locomotive.

It should be noted that although electric locomotives also run on the North Coast (Blackwater) Line, diesel locomotives have been modelled for all trains as these locomotives generate higher noise levels.

14.6 Construction Noise and Vibration Assessment

14.6.1 Construction Scenarios

Significant construction noise sources typically include blasting, pile driving, rock breaking and mobile equipment (eg earthmoving equipment, air compressors, cranes and trucks).

Full details of the exact equipment to be used for the construction activities are yet to be finalised, however a list of the currently proposed construction equipment with their associated maximum sound power levels is detailed in Section 14 of the WICT EIS.

Two (2) revised representative Stage 1 construction scenarios have been generated that depict two "snapshots" of the proposed construction activities. Subsequent construction stages are expected to be significantly smaller in scope and intensity and therefore Stage 1 construction was deemed to provide the greater potential impact.

Due to the revised rail alignment assessed for this Supplementary EIS, there is no longer any requirement for the operation of heavy construction machinery in close proximity to existing residences and this is reflected in the revised construction scenarios.

Table 14.9 and Table 14.10 are considered to best reflect the proposed methodologies for construction of the proposed coal terminal.

Table 14.9 Summary of Construction Scenario 1

Activity	Locality	Equipment
Dredging	Offshore	1 x Large Cutter Suction Dredge [1]
		1 x Dredge Booster Pump
	Near Golding Point and new jetty	1 x Dredge Booster Pump
	Between dump stations and Hanson Road	1 x Dredge Booster Pump
Terminal Earthworks	New terminal	2 x Cat 825 Compactor
		2 x Cat 12G Grader
Excavate Sedimentation Basin	New terminal	1 x Cat 980 Loader
Road Earthworks	New Hanson Road intersection	1 x Cat 350 Excavator
		5 x Cat 769 Haul Trucks
Rail Earthworks	Coal Rail Loop	4 x Cat 621G Scraper
		2 x Water Cart
Overland Conveyor Earthworks	Conveyor Bund north of Hanson Rd	2 x Cat 621G Scraper
		2 x Cat 769 Haul Truck
		1 x Cat 350 Excavator

Table Note:

1 Dredging will be a combination of Cutter Suction Dredge (CSD) and/or Trailer Suction Hopper Dredge (TSHD). A CSD has been assumed as this has higher noise emissions than a TSHD.

Table 14.10 Summary of Construction Scenario 2

Activity	Locality	Equipment
Construct New Jetty	Offshore	1 x Pile Driver [1]
		1 x Crane
Construct New Berths	Offshore	1 x Pile Driver [1]
Overhead Gantry And Tunnel Access	Coal Terminal	1 x Crane
		1 x Cat 350 Excavator
		1 x Cat 769 Haul Truck
		1 x Crane
Construct Dump Station Discharge Tunnel	Coal Terminal	1 x Cat 350 Excavator
Rail Earthworks	Coal Rail Loop	4 x Cat 621G Scraper
		1 x Water Cart
		1 x Cat 825 Compactor
		1 x Cat 12G Grader
Overland Conveyor Earthworks	Conveyor Bund north of Hanson Rd	2 x Cat 621G Scraper
		2 x Cat 769 Haul Truck
		1 x Cat 350 Excavator

Table Note:
1 Pile Drivers are not expected to be in operation concurrently.

Each scenario has been modelled to represent likely maximum construction noise levels within the communities surrounding the proposed WICT. Each noise source will act within a defined area. For the purposes of noise modelling, noise sources have been located within these areas as close as possible to the nearest residential receivers.

14.6.2 Construction Noise Assessment

Noise levels for both construction scenarios for Stage 1 have been predicted at 27 representative receivers for both neutral and worst-case weather conditions. The predicted noise levels for Scenario 1 are summarised in Table 14.11 and Scenario 2 in Table 14.12. The predicted noise levels assume that no special mitigation measures have been employed to limit noise emissions (eg enclosures around compressors).

Table 14.11 Predicted Noise Levels – Construction Scenario 1 (Stage 1)

Receiver	Neutral Weather Conditions		worst-case Weather Conditions	
	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]
NM-1	22	27	28	33
1-a	21	26	27	32
1-b	24	29	30	35
1-c	23	28	29	34
NM-2	18	23	24	29
2-a	21	26	27	32
2-b	19	24	25	30
2-c	20	25	25	30
2-d	18	23	23	28
2-e	18	23	24	29
NM-3	28	33	34	39

Receiver	Neutral Weather Conditions		worst-case Weather Conditions	
	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]
3-a	20	25	26	31
3-b	30	35	36	41
3-c	39	44	45	50
3-d	25	30	31	36
3-e	26	31	32	37
3-f	26	31	32	37
3-g	25	30	31	36
NM-4	22	27	28	33
4-a	28	33	34	39
4-b	26	31	32	37
4-c	33	38	39	44
NM-5	8	13	14	19
5-a	9	14	14	19
5-b	8	13	13	18
NM-6	47	**52**	**53**	**58**
6-a	28	33	34	39

Table Notes:

1 Relevant to the periods Monday-Saturday 6pm-10pm and Saturday 1pm-6pm.

2 Relevant to the periods Monday-Saturday 10pm-7am and Sunday all day.

Numbers in bold indicate an exceedance of the relevant criterion.

Table 14.12 Predicted Noise Levels – Construction Scenario 2 (Stage 1)

Receiver	Neutral Weather Conditions		worst-case Weather Conditions	
	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]
NM-1	24	29	30	35
1-a	20	25	26	31
1-b	26	31	32	37
1-c	25	30	31	36
NM-2	14	19	20	25
2-a	20	25	25	30
2-b	18	23	24	29
2-c	18	23	24	29
2-d	15	20	20	25
2-e	15	20	20	25
NM-3	24	29	30	35
3-a	19	24	24	29
3-b	25	30	32	37
3-c	33	38	39	44
3-d	14	19	20	25
3-e	15	20	21	26
3-f	19	24	25	30
3-g	19	24	25	30
NM-4	14	19	20	25

Receiver	Neutral Weather Conditions		worst-case Weather Conditions	
	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]	L_{A10} (dBA) [1]	L_{Amax} (dBA) [2]
4-a	19	24	24	29
4-b	17	22	23	28
4-c	23	28	29	34
NM-5	2	7	8	13
5-a	3	8	9	14
5-b	-	0	1	6
NM-6	48	**53**	**53**	**58**
6-a	30	35	37	42

Table Notes:

1 Relevant to the periods Monday-Saturday 6pm-10pm and Saturday 1pm-6pm.

2 Relevant to the periods Monday-Saturday 10pm-7am and Sunday all day.

Numbers in bold indicate an exceedance of the relevant criterion.

The results for both Scenario 1 and Scenario 2 indicate that the construction noise criteria contained in Section 14.4.1 are likely to be met at all locations except one (1) for both neutral and worst-case weather conditions.

It is predicted that the criteria for the night period will be exceeded at Receiver NM-6 (Tide Island) under both neutral and worst-case weather conditions by up to 8dBA. The criteria for Saturday afternoons and evenings are also predicted to be exceeded by 2dBA under worst-case weather conditions for both scenarios.

The predicted construction noise levels in Table 14.11 and Table 14.12 are significantly lower than those contained in Section 14 of the WICT EIS at the receivers characterised by NM-3, NM-4 and NM-5 due to the revised rail alignment.

14.6.3 Construction Vibration Assessment

Safe working distances for typical items of vibration intensive plant are listed above in Table 14.6. Safe working distances are quoted for both “cosmetic” damage and human comfort. The human comfort safe working distances correspond to a “Low Probability of Adverse Comment” response.

The safe working distances given are indicative and will vary depending upon the particular item of plant and local geotechnical conditions, presence of elevated water table, etc. Furthermore, it is noted that the safe working distances for “cosmetic” damage apply to damage of typical buildings and do not address heavy industrial buildings.

The following information in relation to potential sources of ground vibration has been used as the basis for the vibration assessment:

- Pile Driving – Since the sensitive locations are more than 1km from any pile driving site, vibration from pile driving will be imperceptible; and
- Truck Traffic – Vibration levels from truck traffic utilising the roads on site will be well below both “cosmetic damage” and “human comfort” criteria. As most homes are greater than 25m away from the roads, it is expected that any vibration from truck movements would be imperceptible.

14.7 Operational Noise Assessment – Coal Terminal Operations

14.7.1 Operational Scenario

The operational scenario is modelled according to the following assumptions:

- The coal terminal and port operations are considered worst-case when all equipment is assumed to be operating simultaneously at full capacity. This is the equivalent of the completion of Stage 3 of the development;
- The use of low noise idlers and conveyor drives on all conveyors;
- All transfer points were modelled as closed structures, and all conveyors have been modelled as open; and
- All bodies of water and the coal terminal region have been modelled as hard ground. All other areas of the model have been modelled as soft ground.

It should be noted that the overland and jetty conveyors are partially enclosed to achieve air quality objectives. Where the enclosure is not isolated from the conveyor, the enclosure will radiate structure-borne noise similar in magnitude to the attenuation achieved through the enclosure. For this reason, no attenuation though the enclosures has been applied and these conveyors have been modelled as open.

The ventilation fans for the reclaim tunnels were considered to be axial fans in series, located underground within the tunnels.

Noise levels from wagon vibrators within the dump stations have been modelled assuming the conventional approach of using of jackhammers to loosen coal from the wagons. It is understood that it is intended to install a quieter wagon vibrator system therefore this is a conservative representation of noise emissions from the dump stations.

Noise levels and spectra were based on measurements obtained from similar equipment wherever possible.

Due to the revised rail alignment, the revised operational scenario incorporates the addition of three (3) inloading conveyors, each of approximately 5,700m length, between the revised dump station location and the WICT.

14.7.2 Modelling Results

Design Criteria Results

The noise level at each receiver for neutral and worst-case meteorological conditions is shown in Table 14.13 compared with the most critical (lowest) planning and specific (intrusive) noise Design Criteria.

Table 14.13 Predicted Receiver Noise Levels

Receiver	Predicted $L_{Aeq(1hour)}$ (dBA)		Design Criteria $L_{Aeq(1hour)}$ (dBA)
	Neutral	worst-case	
NM-1.	33	38	39
1-a.	35	**40**	39
1-b.	35	**40**	39
1-c.	34	39	39
NM-2.	31	36	36
2-a.	33	**38**	36
2-b.	31	**37**	36
2-c.	31	36	36
2-d.	28	33	36
2-e.	27	32	36
NM-3.	33	39	40
3-a.	31	37	40
3-b.	33	39	40
3-c.	37	**43**	40
3-d.	26	31	40
3-e.	18	24	40
3-f.	24	30	40
3-g.	26	32	40
NM-4.	22	27	32
4-a.	28	**34**	32
4-b.	25	31	32
4-c.	27	**33**	32
NM-5.	19	25	36
5-a.	18	24	36
5-b.	22	28	36
NM-6.	**53**	**60**	44
6-a.	37	43	44

Table Note:
Numbers in bold indicate an exceedance of the relevant criterion

Noise contour plots for the worst-case meteorological conditions are shown in Figure 14.2.

The predicted operational noise levels in Table 14.13 are higher than those contained in Section 14 of the WICT EIS for some receivers characterised by NM-3, NM-4 and NM-5 due to the revised rail alignment.

Background Creep Results

Estimated "typical" $L_{A90(1hour)}$ levels for comparison with background creep criteria are shown in Table 14.14. These values have been derived from calculated worst-case operating L_{Aeq} levels. An appropriate de-rating has been applied for "typical" operational variations, and changes in meteorological propagation conditions between WICT and receivers.

Table 14.14 Background Creep Prevention - Receiver Noise Levels, Neutral Meteorological Conditions

Receiver	Estimated Typical Received $L_{A90(1\ hour)}$	Background Creep Prevention Criteria
		$L_{A90(1\ hour)}$
NM-1.	**28**	26
1-a.	**30**	26
1-b.	**30**	26
1-c.	**29**	26
NM-2.	26	30
2-a.	28	30
2-b.	26	30
2-c.	26	30
2-d.	23	30
2-e.	22	30
NM-3.	**28**	27
3-a.	26	27
3-b.	**28**	27
3-c.	**32**	27
3-d.	21	27
3-e.	13	27
3-f.	19	27
3-g.	21	27
NM-4.	17	34
4-a.	23	34
4-b.	20	34
4-c.	22	34
NM-5.	14	30
5-a.	13	30
5-b.	17	30
NM-6	**48**	31
6-a.	**32**	31

Table Note:
Numbers in bold indicate an exceedance of the relevant criterion.

The predicted operational noise levels in Table 14.14 are higher than those contained in Section 14 of the WICT EIS for some receivers characterised by NM-3 due to the revised rail alignment.

Sleep Disturbance Results

Short term high level noise events occurring as a result of operations at WICT with potential to cause sleep disturbance during the night period include:

- Conveyor and other start-up sirens; and
- Wagon bunching impact noise.

The predicted L_{Amax} of such events is presented in Table 14.15.

Table 14.15 Sleep Disturbance - Receiver Noise Levels, Neutral Meteorological Conditions

Receiver	Wagon Bunching L_{Amax}	Startup Siren L_{Amax}	Sleep Disturbance Limit
NM-1.	9	41	50
1-a	14	44	50
1-b	13	43	50
1-c	11	41	50
NM-2	11	41	50
2-a	12	44	50
2-b	11	42	50
2-c	13	41	50
2-d	12	38	50
2-e	14	37	50
NM-3	26	44	50
3-a	11	42	50
3-b	28	44	50
3-c	40	47	50
3-d	26	37	50
3-e	26	35	50
3-f	26	35	50
3-g	25	36	50
NM-4	23	32	50
4-a	28	38	50
4-b	27	34	50
4-c	34	37	50
NM-5	9	29	50
5-a	9	30	50
5-b	-	28	50
NM-6	11	50	50
6-a	-	38	50

Table Note:

There is no exceedance of the criterion.

14.7.3 Assessment against Criteria

Planning and Specific (Intrusive) Noise Limiting Criteria

Source ranking within SoundPLAN confirms that the dominant noise sources at the coal terminal are the overland conveyors, stockyard conveyors and outloading conveyors.

Noise emissions are expected to be generally broadband and uniform in character and consequently no adjustments for tonality or impulsivity have been deemed necessary.

Under neutral meteorological conditions, noise levels are predicted to comply with the Planning and Specific (Intrusive) Noise Limiting Criteria at all assessment locations for all time periods, with the exception of Receiver NM6 (Tide Island) where noise levels are predicted to exceed the criteria for all time periods.
Under worst-case meteorological conditions noise levels are predicted to generally comply with Limiting Criteria at most noise sensitive locations.

Receivers 1-a, 1-b, 2-a, 2-b, 3-c, 4-a and 4-b are predicted to be in exceedance of the most stringent of all the Limiting Criteria (ie night-time period under worst-case meteorological conditions) by up to 3dBA. This could generally occur when a steady light breeze blows directly across the WICT site to the receivers and when temperature inversions and atmospheric stability effects are such that noise propagation is optimal.

The predicted 3dBA exceedance of the criteria would be considered marginal and most people would not notice noise originating from the WICT above the existing background levels. It should be recalled that the model predictions assumed that all plant and equipment servicing the coal terminal will be operating simultaneously at maximum capacity. While this represents a worst-case operations scenario, it is an unlikely one. A more “typical” operating scenario is expected to produce equivalent noise levels around 2-3dBA lower than the worst-case modelled.

Receiver NM-6 (Tide Island) is in exceedance of the Design Criteria for day, evening and night periods in both neutral and worst-case meteorological conditions by between 8dBA (neutral, night-time) and 16dBA (worst-case, daytime and evening).

Background Creep Prevention

Noise emissions from the operating coal terminal are expected to be relatively uniform over a representative one hour period. This is a consequence of the high number of sources, such as fans, conveyors, and drives that may operate at a relatively constant load for extended periods of time. The exceptions are mobile equipment sources such as bulldozers, freight trains and plant with short cycle times such as shuttle drives. These items operate in a more varied and transient manner.

From experience in extensive noise monitoring and surveys of existing coal terminal operations, it is anticipated that ‘typical’ received $L_{A90(1hour)}$ noise level emissions would be 2-3dBA lower than ‘typical’ received $L_{Aeq(1hour)}$ noise levels.

It follows that the ‘typical’ received $L_{A90(1hour)}$ noise levels can be assumed to be up to 5dBA lower than those predicted for worst-case ultimate operations.

Potential exceedance of the most critical (lowest) Background Noise Creep Criteria at the receiver locations presented in Table 14.14, may be up to 5dBA at locations in Gladstone and 17dBA at Receiver NM-6 (Tide Island).

When considered over a longer time period, say over the course of a full shift, WICT noise levels are expected to fluctuate even more (compared to one single hour), as operational constraints will result in some, and possibly all, plant and equipment being idle for extended periods. Furthermore, over longer time periods it can be expected that meteorological effects will cause quite significant fluctuations in received WICT noise levels.

The combination of operational changes and varying meteorological influences over a full day or night period may typically result in received noise levels at distant residential locations being more than 20dBA lower than those predicted for a worst-case 1 hour.

It should be noted that whilst the background creep criteria is defined as an $L_{A90(1hour)}$ level, the RBL is determined by the minimum background over a full assessment period (ie day, evening, night). It is unlikely that WICT Project noise will cause a significant increase to existing RBLs at any location except Receiver NM-6 (Tide Island). Any increase in RBLs in only likely to occur under adverse weather conditions.

Sleep Disturbance

The results in Table 14.15 indicate that there are predicted to be no exceedances of the Sleep Disturbance Criteria.

14.8 Operational Noise Assessment – Rail Operations

14.8.1 Modelling Results

The $L_{Aeq(24hour)}$ and L_{Amax} results from WICT rail operations at the 27 receiver locations are shown in Table 14.16.

Table 14.16 Receiver Noise Levels, Rail Operations

Receiver	L_{Aeq} (dBA)	L_{Amax} (dBA)
NM-1.	31	47
1-a.	33	48
1-b.	32	47
1-c.	33	48
NM-2.	34	49
2-a.	32	47
2-b.	30	47
2-c.	29	45
2-d.	30	43
2-e.	30	43
NM-3.	40	55
3-a.	30	45
3-b.	33	46
3-c.	45	59
3-d.	35	47
3-e.	41	55
3-f.	40	55
3-g.	40	54
NM-4.	37	51
4-a.	38	52
4-b.	37	51
4-c.	33	46
NM-5.	59	73
5-a.	59	73
5-b.	53	68
NM-6	32	46
6-a	29	41

Table Note:
There is no exceedance of the criteria.

Noise contour plots for $L_{Aeq(24hour)}$ rail operations are shown in Figure 14.3 and for L_{Amax} in Figure 14.4.

14.8.2 Assessment against Criteria

No $L_{Aeq(24hour)}$ or L_{Amax} exceedances were predicted, although noise levels were higher for receivers in Yarwun.

A preliminary estimation of existing rail traffic $L_{Aeq(24hour)}$ noise levels was conducted for the two most exposed receivers. Existing average daily train numbers were compared with proposed WICT rail traffic, and cumulative noise levels were calculated. The estimated cumulative $L_{Aeq(24hour)}$ is shown in Table 14.17.

Table 14.17 Predicted Cumulative $L_{Aeq(24\ hour)}$ Noise Levels – Rail Operations

Receiver	Existing (Estimated) $L_{Aeq(24\ hour)}$ (dBA)	Modelled (Cumulative) $L_{Aeq(24\ hour)}$ (dBA)	Limit $L_{Aeq(24\ hour)}$ (dBA)
NM-5	60	63	65
5-a.	60	63	65

Although the cumulative $L_{Aeq(24hour)}$ results in Table 14.17 are approaching QR's noise criterion, no exceedance is predicted.

14.9 Mitigation Measures

14.9.1 Construction Mitigation Measures

Noise

Construction noise mitigation measures based on AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*" were detailed in Section 14 of the WICT EIS and are applicable to the revised construction scenarios. No additional noise mitigation measures are recommended.

Vibration

Based on predicted vibration levels and safe working distances, no mitigation measures are required to reduce vibration levels at residences in the communities surrounding the Project.

During the detailed design phase of the Project building condition surveys will occur for any buildings that fall within the safe working distances for the prevention of cosmetic damage.

Further investigations will be undertaken for any structures within and around the safe working distances in order to determine if the "light weight" cosmetic damage criterion (as used for this assessment), is applicable or whether a higher value may be more appropriate.

14.9.2 Operational Mitigation Measures - Terminal

The need for mitigation will depend on the severity of impact on sensitive receivers, and the circumstances of its occurrence.

It is expected that, for the majority of noise sensitive receivers, noise emissions from the proposed WICT will be acceptable. This would need to be confirmed with an investigation of noise levels post-commissioning.

Noise impacts predicted for Receiver NM-6 (Tide Island) will likely require further detailed investigation. An ongoing programme of monitoring and consultation with the property owner is underway and will continue in order to identify practical solutions and/or mitigation measures.

14.9.3 Operational Mitigation Measures - Rail

No exceedances of QR's 65dBA $L_{Aeq(24hour)}$ or 85dBA L_{Amax} criteria have been predicted at any receiver therefore no mitigation measures are required.

14.10 Conclusions

14.10.1 Construction Works

Construction noise was assessed for two alternative "snapshots" during the full construction period. The predicted results indicate that the construction noise criteria are likely to be met for both scenarios at all locations except Receiver NM-6 (Tide Island) for both neutral and worst-case weather conditions.

For both scenarios, it is predicted that the criteria for the night period will be exceeded at Receiver NM-6 (Tide Island) under both neutral and worst-case weather conditions by up to 8dBA. The criteria for Saturday afternoons and evenings are also predicted to be exceeded by 2dBA under worst-case weather conditions for both scenarios. A 2dBA exceedance would be considered marginal as a change in noise level of less than 3dBA is not perceptible to the human ear (ie the predicted noise level (53dBA) would sound the same as the 51dBA criterion).

Noise mitigation strategies would need to be considered and implemented during any evening and night-time work periods.

AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*" sets out numerous practical recommendations to assist in mitigating construction noise emissions. In general, the quietest suitable plant and equipment will be utilised in combination with management measures in order to minimise the noise impacts on the local community.

Construction Vibration

Since the sensitive locations are more than 1km from any pile driving site, vibration from pile driving will be imperceptible, (ie less than 0.1mm/s PPV).

Vibration levels from truck traffic utilising the roads on site will be well below both "cosmetic damage" and "human comfort" criteria. In fact, as most homes are greater than 25m away from the roads, it is expected that any vibration from truck movements would be imperceptible (less than 0.15mm/s PPV).

Based on predicted vibration levels and safe working distances, no mitigation measures are required to reduce vibration levels from pile driving or road traffic at residences in the communities surrounding the Project.

14.10.2 Coal Terminal Operational Noise

Source ranking within SoundPLAN confirms that the dominant WICT noise sources are overland conveyors, stockyard conveyors and outloading conveyors.

Noise levels are predicted to comply with the Ecoaccess criteria under both neutral and worst-case meteorological conditions at the majority of receivers.

For most receivers, it is not expected that mitigation measures will be required, although investigation of noise levels post-commissioning should be carried out as confirmation.

Receiver NM-6 (Tide Island) is predicted to exceed the Design Criteria for the day, evening and night periods in both neutral and worst-case meteorological conditions by between 8dBA (neutral, night-time) and 16dBA (worst-case, daytime and evening).

Noise impacts predicted for Receiver NM-6 (Tide Island) will likely require further detailed investigation. An ongoing programme of monitoring and consultation with the property owner is underway and will continue in order to identify practical solutions and/or mitigation measures.

14.10.3 Rail Operational Noise

All receiver locations are predicted to comply with QR's operational criteria.

15. Terrestrial Flora and Fauna

15.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to terrestrial flora and fauna issues are outlined below.

- The versions of the Regional Ecosystems and Essential Habitat mapping used in WICT EIS have recently been updated. The Supplementary EIS should represent the updated RE and Essential Habitat mapping (ie 2003 RE mapping and Verisoon2.1 Essential Habitat mapping);
- Reference to *Mimosa pigra,* a Class 1 species under the *Land Protection (Pest and Stock Route Management) Regulation 2003*, should be amended within the Supplementary EIS as it was incorrectly reported;
- The EIS should consider further strategies to prevent the movement of weed seed, both from and within the site, as per obligations under Section 45 of the *Land Protection Act 2002*. Strategies should be provided for pest management in either the Coal Terminal EMP or Rail EMP;
- Rehabilitation of land transferred to forest or conservation park should be subject to an agreement with the EPA prior to commencement;
- Identify the relevant approvals under the N*ature Conservation Act 1992* (ie approvals may be required for removal of trees containing nesting fauna and for destruction or salvage of wildlife);
- The CQPA and QR should develop acceptable fauna management measures and contact the EPA prior to the commencement of construction (in sufficient time to allow any necessary approvals to be processed) to ensure activities comply with current legislative requirements; and
- A clear commitment to re-establishment of habitat (nest boxes) for arboreal mammals and relocation of these mammals during clearing is desirable. The measures should be sufficient to maintain viable habitat for the Powerful Owl.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

15.2 Project Changes

The major Project changes that may impact upon the terrestrial flora and fauna components of the area include:

- Proposed rail maintenance and provisioning facilities have been relocated outside the WICT project area;
- The design now incorporates a conveyor system to transport coal from the North Coast Line to the coal terminal. The rail loop which previously linked the coal terminal and the North Coast Line has been relocated to the south west as part of the North Coast Line; and
- The dump station has been relocated to the North Coast Line within the Forest Precinct.

The amendments to the project area have reduced the area directly disturbed by the proposed development and the type of construction activities required. Section 3 provides a detailed description of the changes to the project footprint and works.

It is important to note that the proposed changes to the project area and works are unlikely to significantly alter the findings of the WICT EIS, including potential impacts to matters of National Environmental Significance.

15.3 Existing Environment

15.3.1 Monitoring Sites

As a result of the Project changes a number of the WICT EIS flora and/or fauna monitoring sites now lie outside the project area. The revised project area is illustrated in Figure 15.1.

It is important to note that the monitoring sites are representative of the major habitat types (excluding intertidal wetlands) within the project area and as such the findings of the monitoring activities are still relevant.

15.3.2 Regional Ecosystems

The information below has been amended to comply with the 2003 regional ecosystem (RE) mapping. This updates the maps presented in the WICT EIS which were based on the 2001 RE mapping. The RE mapping (2003) within the vicinity of the WICT project area is illustrated in Figure 15.2. A detailed RE map, on a regional scale is included in Appendix G.

The project area incorporates approximately 850ha of vegetation communities. Within these communities, there are approximately 500ha of mapped REs (refer Figure 15.2). These Res comprise approximately:

- 41ha of Endangered REs;
- 8ha of Of Concern REs; and
- 451ha of Not of Concern REs.

It should be noted that approximately 300ha of the REs are intertidal wetland communities and that the changes to the project footprint effectively reduces the potential loss of REs by 20% (ie 120ha), including the potential for a 50% reduction in the area of Endangered RE to be cleared and an 80% reduction in the area of Of Concern REs to be cleared.

The approximate areas of each RE classification type within the project area are shown in Table 15.1.

Table 15.1 Regional Ecosystem Types within the Project Area

Regional Ecosystems	Community Description	VMA Status	Total within Project Area	
			Ha	%
Wiggins Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	0.03	100
12.11.7	*Eucalyptus crebra* woodland on metamorphics	N	1.09	79.5
12.11.7/ 12.11.12 (75/25)	*Eucalyptus crebra* woodland on metamorphics + Araucarian complex microphyll vine forest on metamorphics	N/O	14.57	100
12.1.2	Saltpan vegetation including grassland and herbland on marine clay plains	N	39.23	7.5
12.1.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries	N	29.08	4.8
	Sub-total		84	

Regional Ecosystems	Community Description	VMA Status	Total within Project Area	
			Ha	%
Hanson Road Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	18.80	78.1
11.3.29/ 12.3.12 (95/5)	*Eucalyptus crebra, E. exserta* and *Melaleuca* spp. woodland on alluvial plains + *Eucalyptus latisinensis* or *E. exserta* and *Melaleuca viridiflora* on alluvial plains	N/O	5.18	6.6
11.3.29	*Eucalyptus crebra, E. exserta* and *Melaleuca* spp. woodland on alluvial plains	N	1.49	26.4
11.5.2	*Eucalyptus crebra and Corymbia* spp. with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	N	15.86	97.3
12.1.2	Saltpan vegetation including grassland and herbland on marine clay plains	N	213.8	40
12.1.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries	N	22.81	6.9
		Sub-total	277.96	
Forest Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	1.81	14.3
12.3.3/ 11.3.29 (70/30)	*Eucalyptus tereticornis* woodland to open forest on alluvial plains + *Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains	E/N	13.27	24.7
11.3.29/ 12.3.3 (90/10)	*Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains + *Eucalyptus tereticornis* woodland to open forest on alluvial plains	N/E	49.63	57.3
12.11.6/ 12.11.14 (95/5)	*Corymbia citriodora and Eucalyptus crebra* open forest on metamorphics + *Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics	N/O	23.66	1.10
12.11.6	*Corymbia citriodora and Eucalyptus crebra* open forest on metamorphics	N	27.9	65.3
		Sub-total	116.27	
Rail Loop Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	5.81	31.5
12.11.14/ 12.3.3 (95/5)	*Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics + *Eucalyptus tereticornis* woodland to open forest on alluvial plains	O/E	2.75	7.4%
12.3.3/ 11.3.29 (70/3)	*Eucalyptus tereticornis* woodland to open forest on alluvial plains + *Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains.	E/N	0.21	0.3
12.11.6/ 12.11.14 (95/5)	*Corymbia citriodora* and *Eucalyptus crebra* open forest on metamorphics + *Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics	N/O	13.35	0.6
		Sub-total	22.12	
		Total Area of REs within Project Area	500.33	

Table Notes:
VMA = *Vegetation Management Act 1999*
O = Of Concern
E = Endangered
N = Not of Concern

The changes to the project area incorporates approximately 30ha of the Mount Stowe State Forest and 10ha of the Calliope Conservation Park (refer Figure 15.3). The vegetation communities within this area are currently mapped as:

- RE 12.11.6/12.11.14 *Corymbia citriodora* and *Eucalyptus crebra* open forest on metamorphics + *Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics. This RE community encompasses an area of approximately 27ha; and
- RE 12.3.3 *Eucalyptus tereticornis* woodland to open forest on alluvial plains. This RE community encompasses an area of approximately 1.9ha.

Works within these areas will be subject to the *Forestry Act 1959* and/or the NC Act.

15.3.3 Vegetation Communities

There were no significant flora species listed under Commonwealth and State legislation identified during the field surveys. In addition, no threatened ecological communities pursuant to the EPBC Act were recorded from the project area.

It is important to note that the vegetation within the project area has been mapped by the EPA and classified in accordance with the *Vegetation Management Act 1999* (VM Act) as outlined in Section 15.2.1 of the WICT EIS.

15.3.4 Declared Pest Plant Species

The WICT EIS discussed the presence of *Mimosa pigra* within Mount Stowe State Forest and Calliope Conservation Park (ie monitoring locations F, G, H and K) and the Rail Loop Precinct (ie monitoring locations J, M and N). *M. pigra* is prescribed as a Class 1 species under the *Land Protection (Pest and Stock Route Management) Regulation 2003* (LP Regulation), and hence considered a targeted action for the State. At present, *M. pigra* is known to exist in one location within Queensland only.

Consultation between the Connell Hatch project team and DNRW determined that the WICT EIS has incorrectly referenced *Mimosa pudica* (common sensitive plant) as *Mimosa pigra*. *M. pudica* is not a declared plant of Queensland.

The amended declared pest flora species list is shown in Table 15.2.

Table 15.2 Declared Pest Flora Present within the Project Area

Scientific Name	Common Name	Status	Located in Sample Site											
			C	E	F	G	H	I	J	K	L	M	N	O
Baccharis halimifolia	Groundsel bush	C2					✓							
Bryophyllum delagoense	Mother of millions	C2					✓		✓	✓			✓	
Cryptostegia grandiflora	Rubber vine	C2	✓		✓	✓	✓			✓				
Lantana spp.	Lantana	C3	✓	✓		✓	✓	✓		✓		✓		
Lantana montevidensis	Creeping lantana	C3	✓	✓	✓			✓		✓	✓	✓		
Opuntia stricta	Prickly pear	C2	✓		✓		✓	✓					✓	
Parthenium hysterophorus	Parthenium weed	C2												✓
Ziziphus mauritiana	Chinese apple	C2											✓	

Table Notes:
C2 = Class 2 Pest Plants (LP Regulation)
C3 = Class 3 Pest Plants (LP Regulation)

15.3.5 Fauna

A total of 238 species were recorded over the monitoring programme as inhabiting and/or frequenting the area. It included 142 avian species, 14 species of amphibians, 39 reptilian species and 44 mammalian species.

It is important to note that the monitoring sites chosen initially were at the time representative of the major habitats types within and surrounding the project area. It is likely that the distribution of the species encountered incorporates a number of habits within the project area.

The changes to the project footprint have effectively reduced the project area. The revised footprint incorporates an area of approximately 1,000ha compared to the original design outlined in the WICT EIS which encompassed an area of approximately 1,300ha. It is important to note that the project areas do not reflect the area of direct disturbance caused by the Project.

Freshwater wetland ecosystems within the project area were mainly associated with the Byellee area and the eastern section of the Rail Loop Precinct. These habitats are unlikely to be directly impacted by the revised Project design. However, it may be noted that the species, including a number of significant and migratory species, recorded from Byellee Wetlands were also observed at other sites within the project area.

The Project changes also limit the works within open forest communities within the Rail Loop Precinct adjoining the Calliope River and Mount Stowe State Forest. The forest communities have a relatively diverse and abundant arboreal assemblage.

Animals of Conservation Significance

Six (6) species that are considered to be significant pursuant to State legislation were identified from the project area. Significant species are considered to be those that are listed as near threatened, rare, vulnerable or endangered under the NC Act.

Of the six (6) species, the Black-necked stork (*Ephippiorhynchus asiaticus*) and Grey goshawk (*Accipiter novaehollandiae*) were recorded from habitats within the Byellee Precinct. The Grey goshawk was also observed overflying Golding Point within the Wiggins Precinct.

The changes to the project area reduce the potential risk of the works directly impacting on these two species. However, suitable habitat does occur within the redefined project area and as such there is the potential for the works to impact species distribution and behaviour.

Essential habitats

The WICT EIS identified four essential habitat areas within or in close proximity to the coal terminal site. This included three essential habitat areas for the Grey-headed flying fox.

The Grey-headed flying fox is listed as vulnerable under the EPBC Act but is recognised by the NC Act as least concern. As the Grey-headed flying fox is listed as of least concern (NC Act) the essential habitats recognised in Version 1 of the essential habitat mapping (ie Wiggins Island, mouth of Flying Fox Creek and Boat Creek) have been amended (Version 2.1, refer Appendix G) with all references to this species removed (ie an essential habitat is an area which is capable to support a species listed as rare, vulnerable and endangered under the NC Act).

In addition to this amendment, Version 2.1 of the essential habitat mapping defines the sub-dominant and dominant Endangered REs within the project area as essential habitat for Koala (*Phascolarctos cinereus*) Southeast Bioregion. The mapping is based on habitat modelling rather than species records (refer Figure 15.3).

The project area is within the northern limits of the South East Queensland Bioregion and as such koalas are listed as vulnerable under the NC Act. No koalas were identified during the survey and from database searches from the area.

In 2006, the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016 (the 'Koala Plan') were implemented. Conservation plans are made under the NCA and prevail over existing planning schemes. The Nature Conservation (Koala) Conservation Plan 2006 is the subordinate legislation component of the Koala Plan made under the NC Act. The Koala Plan directs designation of koala districts and associated objectives:

- Prescribes outcomes for Koala Habitat Areas and criteria against which development in these areas must be assessed;
- Prescribes sequential clearing and koala spotting requirements; and
- Includes additional wildlife permit restrictions for koalas.

It is important to note that the project area is located within District C as described in the Koala Plan. Within this district there is evidence of decline, however koalas are classified as of least concern wildlife under the NC Act due to a generally lower perceived threat to their survival (EPA 2006). This is despite the area being within the Southeast Queensland Bioregion, in which, koalas are listed as vulnerable under the NC Act.

An essential habitat for the Wallum froglet (*Crinia tinnula*) also occurs on Lot 2 on SP147891. As with the Koala habitat modelling has been used to define the essential habitat.

15.4 Potential Coal Terminal Construction Impacts

15.4.1 Terrestrial Flora

The revised terminal footprint, through the relocation of the rail system and addition of the conveyor system, will result in the loss or disturbance of approximately 420ha of fauna habitats (excluding the jetty footprint) which represents a transfer in fauna habitat loss to the coal terminal component of the Project. It should be noted that this change is due to the transfer of obligation within the Hanson Road and Forest Precincts from QR (previously rail loop) to CQPA (conveyor system).

The works will still result in the removal and fragmentation of woodland and open forest communities within the Hanson Road and Forest Precincts. The terminal will also directly impact upon the intertidal wetlands located within the Hanson Road and Wiggins Precincts. A detailed description of the intertidal and freshwater ecosystems within the project area is outlined in Section 16 of the WICT EIS and this report.

Regional Ecosystems

The WICT EIS identified the removal of approximately 14.5ha of RE vegetation communities (excluding intertidal communities) which were to be cleared during construction works associated with the terminal. Project changes have transferred the area of direct disturbance from the rail infrastructure to the coal terminal component of the Project.

Table 15.3 summarises the RE vegetation communities that will be removed during the construction works associated with the coal terminal. Figure 15.4 illustrates the RE communities within the area of direct disturbance.

Table 15.3 Regional Ecosystems to be removed within the Coal Terminal Footprint

Regional Ecosystems	Community Description	VM Act Status	Approximate Disturbance within Project Area	
			ha	%
Wiggins Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	0.03	2.7
12.11.7/ 12.11.12	*Eucalyptus crebra* woodland on metamorphics + Araucarian complex microphyll vine forest on metamorphics	N/O	14.57	100
12.11.7	*Eucalyptus crebra* woodland on metamorphics	N	1.09	80
		Sub-total	15.69	
Hanson Road Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	18.80	78.1
11.3.29/ 12.3.12	*Eucalyptus crebra, E. exserta* and *Melaleuca* spp. woodland on alluvial plains + *Eucalyptus latisinensis* or *E. exserta* and *Melaleuca viridiflora* on alluvial plains	N/O	4.35	5.5
11.3.29	*Eucalyptus crebra, E. exserta* and *Melaleuca* spp. woodland on alluvial plains	N	1.49	26.3
11.5.2	*Eucalyptus crebra and Corymbia* spp. with *E. moluccana* on lower slopes of Cainozoic sand plains/remnant surfaces	N	15.86	50.8
		Sub-total	40.5	
Forest Precinct				
12.3.3/ 11.3.29	*Eucalyptus tereticornis* woodland to open forest on alluvial plains + *Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains.	E/N	2.5	10
12.11.6	*Corymbia citriodora and Eucalyptus crebra* open forest on metamorphics	N	2.9	7
		Sub-total	5.4	
Total Disturbance to REs for Coal Terminal Component of the Project			61.59	

Table Notes:
VM Act = *Vegetation Management Act 1999*
E = Endangered
O = Of Concern
N = Not of Concern

It is likely that the construction activities associated with the coal terminal will require approval to clear approximately 60ha of RE, including approximately 20ha of RE12.3.3 an Endangered RE. This excludes the loss of approximately 300ha of intertidal RE vegetation communities as a result of the activities associated with the terminal construction (refer Section 16).

It is important to note that the overall loss of REs has been reduced as a result of the Project changes. The WICT EIS required the overall removal of approximately 185ha compared to the 120ha required as a result of the Project changes.

Riparian Vegetation

The changes to the Project design reduces the number of watercourses directly impacted by the development and the area of direct disturbance compared to the initial concept design in the WICT EIS. A description of the Project changes is outlined in Section 3.

It is anticipated that approximately 1ha of riparian and instream vegetation along Pyealy Creek will be cleared as a result of the construction activities. The removal of riparian vegetation has the potential to impact on the overall health of the creek and downstream environments.

The calculation is based on the removal of vegetation along watercourses identified on EPA Queensland Wetlands Map Version 1, Wetlands, Gladstone 2006.

15.4.2 Terrestrial Fauna

The proposed WICT (land based terminal component) encompasses an area of approximately 420ha including the Wiggins, Hanson Road and Forest Precincts. However, it is important to note that the overall Project footprint has been effectively reduced as a result of the Project changes.

The area contains a mix of habitats, including pastoral grasslands, open woodlands/forests, intertidal wetlands and vine thicket. Anthropogenic activities within the area have impacted on habitat complexity and wildlife linkages. These activities include clearing for rural and CQPA reclamation activities, construction of a bund wall and access roads, and removal of substrate.

Coal terminal impacts on the adjacent estuarine and marine environments are discussed in Section 16.

Significant Areas

The Project changes increase the footprint associated with the land based terminal component. However, the land based terminal component does not encroach upon any protected areas as defined in the *Nature Conservation (Protected Areas) Regulation 1994* (Calliope Conservation Park) or a State Forest listed under the *Forestry Regulation 1998* (Mount Stowe State Forest).

In addition to the clearing of approximately 60ha of RE, the proposed development will result in the removal of 20ha of essential habitat. The essential habitats within this area are for the koala (Southeast Bioregion), however it is important to note that Calliope and Gladstone LGAs are within District C as defined in the Koala Plan. It is unlikely that the loss of habitat will have a significant impact on this species as no populations were recorded within the area.

The essential habitat located on Lot 2 on SP147891 is based upon habitat modelling. This essential habitat was for the Wallum froglet. Reclamation activities associated with Reclamation Area C may encroach into this area.

Significant Species under the NC Act

The amendments to the Project increases the risk of the terminal construction works impacting on significant species under the NC Act., with the main threat associated with the construction of a conveyor system within the Forest Precinct. The species at risk are discussed below.

However, it is important to note that overall changes to the Project design reduce the risk to the fauna assemblages inhabiting the area.

Powerful Owl
The Powerful owl was encountered inhabiting the open forests within and adjacent to the project area. The distribution and abundance was unclear, however it is thought that there are at least two family groups within the vicinity of the project area.

Vegetation clearing within the project area is the main threat to this species. The loss of hollow-bearing trees may limit species distribution and densities (ie species will need to migrate to other areas due to the absence of suitably aged trees). Changes to habitat structure may also impact on this species (ie open forests to predominantly cleared or grassed areas). However, studies have shown that this species range can include urbanised areas and logged areas (ie nesting in Mount Stowe State Forest and foraging in the lowland woodlands).

Noise and light generation will also potentially alter the distribution and behaviour of this species. This species has been known to abandon nest sites as a result of anthropogenic activity. Construction activities within the project area will potentially have an negative impact on the abundance and distribution of arboreal mammals a common prey of the Powerful owl.

Little Pied Bat

The Little pied bat was identified from the woodland areas of the Forest Precinct. It is likely that the construction activities within these areas will have an impact on species behaviour. The main threat is the loss of suitable habitat, especially hollow-bearing trees. The loss of mature roost trees may impact on species density and distribution within the area. Other impacts will include change to habitat structure (change in understorey) and changes to the areas fire regime.

With the implementation of mitigation measures shown in Sections 15.17 and 23 it is unlikely that this species will be significantly impacted by the construction activities.

Vegetation Clearing

Project design changes transfer the vegetation clearance required for the coal terminal from approximately 14.5ha to 60ha. The majority of the clearing activities will be associated with the construction of the conveyor system linking the North Coast Line and the coal terminal. However, it is important to note that the footprint associated with the conveyor is approximately 30% smaller than that required by the rail infrastructure (ie the WICT EIS required the removal of approximately 125ha of RE from the Forest and Hanson Road Precincts).

The potential impact of vegetation clearing on the fauna assemblages has been described in detail in Sections 15.10.1 and 15.10.2 of the WICT EIS and further discussion is not required.

Exotic/Pest Wildlife Species

During the construction activities there is the potential for the translocation and/or introduction of exotic/pest species.

The nature of the works, habitat structure and locality limited the risk associated with the introduction and proliferation of exotic/pest species. However, the Project changes increase the risk of the translocation and/or introduction of exotic/pest species due to the area of the footprint to be disturbed, structure of the existing environment and the nature of the works. The main areas at risk are the terrestrial habitats within the Forest Precinct.

ASS

There is the potential that the construction activities associated with the coal terminal will disturb ASS. This risk is mainly associated with the intertidal areas of Hanson Road and Wiggins Precincts and dredge spoil material (refer Section 4.3).

The potential for disturbance of ASS is discussed in Section 4.

15.5 Potential Rail Construction Impacts

15.5.1 Protected Areas

The project area for the rail component occurs predominantly within the existing North Coast Line rail corridor. However, some of the works occur within state-controlled land and private property adjoining the rail corridor.

Works within the Calliope Conservation Park and Mount Stowe State Forest will be subject to approval under the *Nature Conservation (Protect Areas Management) Regulation 2006* and the *Forestry Act 1959*. Approximately 27ha of vegetation will be cleared as a result of cutting and filling activities associated with the expansion of the North Coast Line.

Approval will be required prior to construction from the Chief Executive of QPWS to undertake works within this area. If the area is acquired by QR, prior to vegetation clearing, approval will be required under VM Act.

15.5.2 Terrestrial Flora

The impacts of the construction works on the vegetation communities within the project area have been described in detail in the WICT EIS. However, the Project changes have altered the degree of impact associated with the rail construction activities, as described below.

Riparian Vegetation

The Project is likely to directly impact upon a number of watercourses which drain north east from the Calliope Conservation Park and the Mount Stowe State Forest towards the coastal plains of Port Curtis and/or discharge into the Calliope River. However, the changes to the Project design reduces the number of watercourses directly impacted compared to the concept design in the WICT EIS. A description of the project changes is outlined in Section 3.

It is anticipated that during the construction phase, impacts to riparian and instream vegetation associated with these creek systems will be:

- Removal of approximately 1ha of riparian and instream vegetation in Pyealy Creek; and
- Removal of approximately 5ha of riparian and instream vegetation in watercourses within the Forest and Rail Loop Precincts.

Vegetation removal within these watercourses has the potential to impact on the overall health of the creek and potential downstream environments.

The calculations are based on the removal of vegetation along watercourses identified on EPA Queensland Wetlands Map Version 1, Wetlands, Gladstone 2006.

Regional Ecosystems

The WICT EIS identified the removal of approximately 170ha of RE vegetation communities (excluding intertidal communities) which were to be cleared during construction works associated with the rail infrastructure. Project changes have transferred the area likely to be directly disturbed by the rail infrastructure works to the coal terminal component of the Project.

Table 15.4 summarises the RE vegetation that exists within the rail infrastructure project area that is to be removed during construction works. Figure 15.4 illustrates the RE communities within the area of direct disturbance.

Table 15.4 Regional Ecosystems to be removed within the Rail Infrastructure Footprint

Regional Ecosystems	Community Description	VM Act Status	Approximate Disturbance within Project Area	
			ha	%[1]
Forest Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	1.81	7.1
12.3.3/ 11.3.29	*Eucalyptus tereticornis* woodland to open forest on alluvial plains + *Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains.	E/N	5.15	4.8
12.11.6/ 12.11.14	*Corymbia citriodora and Eucalyptus crebra* open forest on metamorphics + *Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics	N/O	23.66	0.05
12.11.6	*Corymbia citriodora and Eucalyptus crebra* open forest on metamorphics	N	3.97	9.2
		Sub-total	34.59	
Rail Loop Precinct				
12.3.3	*Eucalyptus tereticornis* woodland to open forest on alluvial plains	E	5.81	31.5
12.11.14/ 12.3.3	*Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics + *Eucalyptus tereticornis* woodland to open forest on alluvial plains	O/E	2.75	3.7
12.3.3/ 11.3.29	*Eucalyptus tereticornis* woodland to open forest on alluvial plains + *Eucalyptus crebra, E. exserta and Melaleuca* spp. woodland on alluvial plains.	E/N	0.21	0.3
12.11.6/ 12.11.14	*Corymbia citriodora* and *Eucalyptus crebra* open forest on metamorphics + *Eucalyptus crebra* and *E. tereticornis* woodland on metamorphics	N/O	13.35	0.6
		Sub-total	22.12	
Total Disturbance to REs within Rail Infrastructure Component of the Project Area			56.71	

Table Notes:
1 = This represents the percentage loss within the project footprint compared to the total adjoining RE area
VM Act = *Vegetation Management Act 1999*
O = Of Concern
E = Endangered
N = Not of Concern

It is likely that the construction activities associated with the rail infrastructure will require approval to clear approximately 56ha of RE including approximately 10ha of RE12.3.3 an Endangered RE. The changes to the Project design effectively reduces the clearance requirements by 70% compared to the WICT EIS design, in which approximately 170ha of REs would be cleared.

It is also important to note that approximately 30ha of the RE are within the Calliope Conservation Park and Mount Stowe State Forest. Works within this area are subject to approval under the NC Act and the *Forestry Act 1959* and not the VMA.

If approval is acquired from the chief executive to undertake works within the Calliope Conservation Park and Mount Stowe State Forest. In addition, a vegetation clearing approval will be required under the VM Act to clear approximately 26ha.

15.5.3 Terrestrial Fauna

Project changes have altered the area likely to be disturbed by the rail construction activities, with the proposed rail infrastructure encompassing an area of approximately 225ha.

The construction activities associated with the works will include removal of vegetation, reclamation activities, works within watercourses, earthworks and stockpiling of material. The potential impacts on the fauna assemblages inhabiting the area have been described in detail in the WICT EIS.

However, the clearing of vegetation during the construction activities will result in the removal of approximately 10ha of essential habitat for the koalas. No koala populations were recorded from the project area, although the area is classified under the Koala Plan as District C (refer Section 15.3.5). Clearing within Koala Habitat Areas is subject to the Koala Plan, however as the area is within District C there are no statutory requirements.

15.6 Potential Coal Terminal Operational Impacts

It is anticipated that the Project design changes will not alter the operational impacts on the terrestrial flora and fauna assemblages as described in detail in the WICT EIS and as such no further discussion is required.

However, the potential impacts associated with the operation of the conveyor system within the Forest and Hanson Road Precincts were not assessed in the WICT EIS. As with the rail infrastructure the potential impact is associated with changes to species behaviour.

This will include impediment to movement between habitats (ie Calliope River to/from Reid Road) as a result of noise, vibration, light generation and general obstructions. Other impacts would include local distribution patterns (ie sensitive species may retreat deeper into the core habitat or find alternative habitats within the area), smothering of vegetation as a result of dust generation and mortality as a result of utilising artificial structures (ie roosting or nesting).

The conveyor systems may also assist in the proliferation of exotic/pest species within the area. This is due to the likely movement of seeds due to the turbulence around the infrastructure, maintenance activities and also the potential dispersal through other vectors (eg seeds attached to soil). The implementation of a weed management plan pre- and post- construction should assist in mitigating the potential risk.

Ensuring the system facilitates fauna movement (ie elevated structure allowing for movement of larger more mobile species between habitats), is a semi-enclosed structure and has nesting/roosting deterrents should also assist in mitigating the potential impacts.

15.7 Potential Rail Infrastructure Operational Impacts

It is anticipated that the Project design changes will not alter the operational impacts on the terrestrial flora and fauna assemblages as described in detail in the WICT EIS and as such no further discussion is required.

15.8 Clearing Vegetation Approvals

The WICT EIS identified the need to obtain vegetation clearing approval to remove approximately 185ha of RE. This was calculated based on the area of direct disturbance (approximately 900ha) and also the 2001 RE mapping.

The Project changes will require vegetation clearing approval to remove approximately 120ha of RE. This value was based on the area of direct disturbance (approximately 645ha) and also the 2003 RE mapping. The vegetation clearing approvals do not include approximately 300ha of intertidal wetlands within the Hanson Road and Wiggins Precincts. Works within these areas will be subject to the *Fisheries Act 1994* and the Coastal Act (refer Section 16).

Under the *Vegetation Management and Other Legislation Amendment Act 2004* clearing of "Endangered" and "Of Concern" Regional Ecosystems on freehold and leasehold land in rural areas is prohibited without approval. Under the VM Act and IPA, the clearing of native remnant vegetation on freehold land is regarded as "Operational Works" which, if deemed assessable, requires a Development Permit for Operational Works. To obtain a permit, an IDAS application must be submitted to and assessed by DNRW.

The Regional Vegetation Management Code for Southeast Queensland Bioregion will be used for the assessment of development applications for clearing vegetation under the IPA. The Code is prepared in accordance with provisions of the VM Act and are applied in the circumstances where the VM Act allows that an application for assessable clearing be accepted.

As the Project is defined as a significant project (as declared under Section 26 of the *State Development and Public Works Organisation Act 1971*), the clearing of vegetation should meet the performance requirements of Part S in the Regional Vegetation Management Code for Southeast Queensland Bioregion.

Although QR benefits from a number of exemptions under Schedule 9 of the IPA, the organisation is subject to the same provisions as other developers when undertaking Operational Works, involving the removal of protected vegetation, except where vegetation interferes with the operational safety and efficiency of the railway.

It is important to note that the VM Act applies to clearing of vegetation other that vegetation on:

- A forest reserve under the *Nature Conservation Act 1992*; or
- A protected area under the *Nature Conservation Act 1992*, Section 28; or
- An area declared as a state forest or timber reserve under the *Forestry Act 1959*; or
- A forest entitlement area under the *Land Act 1994*.

Construction works associated with the rail infrastructure will require the clearing of vegetation within a protected area as defined in the NC Act and a state forest area as declared in the *Forestry Act 1959*. Therefore approval will need to be sought from the chief executive of QPWS and DNRW to clear vegetation within the Calliope Conservation Park and the Mount Stowe State Forest.

Alternatively QR could acquire the land prior to clearing which will require QR to meet the vegetation clearing requirements pursuant to the VM Act.

In addition, there is the potential to increase the habitat and connectivity of the area as part of offsets requirements for clearing REs and/or essential habitats. The offsets will be finalised in the detailed design phase of the Project and will be in accordance with the DNRW Policy for Vegetation Management Offset.

Prior to obtaining approvals for vegetation clearing a Property Map of Assessable Vegetation (PMAV) may be compiled in accordance with VM Act (ie Property Kit for PMAV) and submitted to the DNRW for accreditation. Alternatively a request for RE modification may be submitted. The aim of the action would be to reduce the area of Endangered RE communities impacted by the development and also identify potential offset areas. Consideration will be given to these issues during the detailed design phase of the Project, prior to submitting the vegetation clearing application.

15.9 Mitigation Measures

A holistic approach to the environmental management of the works will assist in reducing the potential impacts of the development on the terrestrial flora and fauna assemblages inhabiting the project area.

The mitigation measures are provided in Section 23 (Coal Terminal EMP) and Section 24 (Rail EMP).

15.10 Conclusions

The changes to the Project have effectively reduced the area of direct disturbance and degree of fragmentation compared to the WICT EIS design. In addition, the degree of disturbance associated with operational works has also been reduced as a result of the type of works area, location of works in relation to habitats and area of disturbance.

The changes to the Project will result in the transfer of clearing of approximately 120ha of REs (excluding intertidal areas) from QR to CQPA during the construction of the coal terminal and rail infrastructure. This includes approximately 30ha of RE within the Mount Stowe State Forest and Calliope Conservation Park.

While 120ha of REs will be cleared for the Project, this is mitigated by:

- The transfer of 67.5ha of vegetated land owned by QR to the Mount Stowe State Forest. The remaining 52.5ha of this land parcel will be used by QR to mitigate the clearing of bushland associated with the QR Briaba Bank Project; and
- As a potential offset in the proposed rehabilitation of approximately 100ha of degraded areas within the Rail Loop Precinct. The location of potential rehabilitation areas is shown in Figure 15.5.

The main impact to native fauna assemblages is the removal of habitat and an increased edge effect. The changes to the Project have effectively reduced the loss of habitat and degree of likely disturbance associated with the construction and operational works. There is also the potential to offset the impacts through rehabilitation of the Rail Loop Precinct and adjoining area increasing habitat complexity and connectivity between the existing habitats and the Mount Stowe State Forest and Calliope Conservation Area.

The implementation of mitigation and management measures during the construction and operation of the coal terminal and rail infrastructure will ensure that potential impacts to terrestrial flora and fauna within the area are minimised.

16. Aquatic Ecology

16.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to aquatic ecology issues are outlined below.

- The Great Barrier Reef Marine Park and Great Barrier Reef Coast Marine Park boundaries require amending and also references to the role of the Great Barrier Reef Marine Park Authority;
- Clear commitment to protect marine megafauna (eg dugongs, turtles) during dredging operations; and
- Measures to ensure that the works do not have an adverse impact on the health and function of the intertidal wetlands, especially the seagrass communities within the near shore communities of Port Curtis.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

16.2 Project Changes

The Project changes have resulted in a reduction in the area of direct disturbance within the catchment. The most significant changes to the Project are associated with the rail infrastructure and include:

- The rail loop connecting the North Coast Line and the coal terminal has been relocated and a new conveyor system proposed;
- The dump station has been relocated to the North Coast Line within the Forest Precinct;
- The rail maintenance and provisioning facilities will not be established as part of this Project; and
- The footprint does not cross the Calliope River or encroach onto the Byellee wetland area.

The potential impacts on the freshwater, estuarine and marine ecosystems as a result of the Project changes are outlined below. The description of the existing environment, potential impacts and mitigation measures highlighted within the WICT EIS are appropriate for the revised Project except where stated below.

16.3 World Heritage Area

The proposed coal terminal and rail infrastructure are located within and adjacent to the Port of Gladstone, which is one of the largest ports in Queensland and the southern most port adjacent to the Great Barrier Reef Marine Park.

The Port of Gladstone primarily lies within the Great Barrier Reef World Heritage Area (WHA), and extends into the State and Commonwealth Marine Parks, Great Barrier Reef Coast Marine Park and the Great Barrier Reef Marine Park, respectively (refer Figure 16.1).

The proposed marine structures and dredging activities will occur within the WHA, while the majority of the project area encompass terrestrial and intertidal habitats outside the WHA. The Project does not encroach into the State and Commonwealth Marine Parks (refer Figure 16.1)

16.4 Existing Environment

16.4.1 Significant Wetlands

The Directory of Important Wetlands in Australia (DIWA) was initiated to collate and enhance wetland information to provide for better conservation and management of wetlands. Three (3) nationally listed wetlands occur within the Curtis Coast area, The Narrows, Port Curtis and the Colosseum Inlet-Rodds Bay area.

The majority of the coal terminal infrastructure is located within the Port Curtis wetland, with the proposed upgrade of the North Coast Line outside the wetland boundary (refer Figure 16.2).

The CQPA, Queensland Parks and Wildlife Service (QPWS), Queensland Department of Natural Resources and Water (DNRW), Queensland Transport and Gladstone City Council (GCC) are the management and/or planning authorities of this nationally important wetland.

Change in the project footprint now removes the necessity of construction activities within the Calliope River (ie bridging works) and Byellee area. This Project change protects the integrity of the Byellee Wetlands.

In addition, the volume of rail traffic along the Moura Line in the Byellee area will not increase as a result of the changes to the Project. This reduces the risk of environmental harm on the ecological value of the Byellee area (ie indirect impacts as a result of increased traffic movement).

16.4.2 Freshwater Ecosystems

The WICT Project has the potential to impact on a number of watercourses which drain northeast from the Calliope Conservation Park and Mount Stowe State Forest towards the coastal flats of Port Curtis and/or discharge into the Calliope River (refer Figure 9.1).

The expansion of the North Coast Line has the potential to impact on the existing watercourses intersecting the North Coast Line in addition to an unnamed system within the Rail Loop Precinct. The terminal infrastructure (ie conveyor system) intersects Pyealy Creek sub-catchment within the Forest Precinct and also drainage lines of Beales Creek.

As mentioned previously, the Project changes removes the necessity for works within the Byellee Wetlands and therefore the Byellee area will not be directly impacted. This change also results in no impact on the watercourses draining the Byellee area or other wetland ecosystems, such as Ferguson's Dams, within the area.

The EPA wetland mapping (EPA 2006) identified a palustrine wetland along the unnamed creek draining east through the Rail Loop Precinct into the Calliope River (refer Section 9). The wetland is located primarily downstream of the proposed rail infrastructure and as such there is the potential for the works to indirectly impact on the health of the wetland.

It is important to note that the upper reaches of the watercourse have been dammed and the riparian vegetation cleared for agricultural purposes. This activity within the area upstream of the wetland is likely to have an impact on the integrity of the area. Other impacts to the health of the system include cattle grazing along the watercourses and tinning/clearing within the riparian vegetation.

Other wetland environs within the area are mainly associated with artificial impoundments along drainage lines or borrow pits such as the Farm Dam. The Project changes benefit the environmental value of these ecosystems by increasing the buffer between the artificial dams within the eastern section of the Rail Loop Precinct and the proposed works. Other potential improvements include the rehabilitation of lands adjoining the rail infrastructure and/or wetlands to offset clearing activities and/or minimise visual disturbances.

16.4.3 Intertidal Wetlands

The change in the Project footprint ensures that the intertidal wetlands within the Byellee area will not be directly impacted by the development (ie North Coast Line-Moura Line link proposal occurs via the GSDA (Aldoga Precinct)). Figures 16.3 to 16.4 illustrate the intertidal communities within and adjacent the project area.

In addition, the development will not encroach onto the intertidal wetlands of the Calliope River (bridge crossing) or below the limit of tidal influence within the watercourses intersecting the Forest and Rail Loop Precincts. There is the potential for works associated with the terminal to occur below the limit of tidal influence within Pyealy Creek. Works within this area may require the removal of marine plants from the watercourse.

The use of a conveyor structure to transport coal from the dump station to the terminal effectively increases the buffer between the proposed works and the intertidal wetlands of the Calliope River oxbow from 80m to 100m.

The proposed conveyor system reduces the volume of rail traffic and area of operation within the Hanson Road Precinct. This has the benefit of limiting the potential for environmental risk and disturbance during operational works (ie transport of coal from North Coast Line to coal terminal).

Compared with the original rail loop the semi-enclosed conveyor system should also effectively reduce visual disturbances within the Forest and Hanson Road Precincts by reducing, light pollution, noise, vibration and dust generation. The retention of terrestrial communities within these precincts should also assist in limiting the visual disturbances associated with the conveyor system (refer Section 15).

The relocation of dump station results in approximately 20,000m^3 of potential acid sulfate soil (ASS) not being disturbed. However, there is still a risk to the surrounding environment from ASS and contamination as a result of the reclamation activities (ie intertidal wetlands will be filled to a height of approximately 4.5m AHD using a combination of dredge spoil and borrow material). The use of a conveyor system limits the potential risk of ASS and contamination as the area of disturbance has been reduced along with the likely weight associated with the infrastructure.

The conveyor system footprint increases the buffer between the works within the Hanson Road Precinct and the estuarine communities along the Calliope River Anabranch. However, it is important to note that the reclamation activities within the intertidal wetlands of Wiggins and Hanson Road Precincts have not been significantly amended. As such the area of intertidal wetlands which will be directly impacted by the development is consistent with the WICT EIS.

Other benefits associated with the Project changes include the relocation of the rail maintenance and provisioning facilities. The works associated with these facilities have the potential to impact on downstream environments through changes to water quality and environmental flows (refer Section 9 WICT EIS). The revised Project still has the potential to impact on the downstream environments during the rail operational works, however the risk has been reduced through the removal of the facility and will be further mitigated through the incorporation of appropriate mitigation measures during the construction and operational phases.

16.5 Potential Coal Terminal Construction Impacts

The potential construction impacts associated with the proposed coal terminal are detailed in the WICT EIS. However, the amendments to the Project design have altered the potential impacts to the existing environment as a result of the construction activities associated with the terminal.

It is important to note that the main impacts are associated with reclamation and dredging activities which have been described in detail in the WICT EIS. The construction of a conveyor system will also have the potential to impact on the health of the aquatic ecosystems but to a lesser degree than those associated with reclamation activities.

16.5.1 Reclamation Activities

Existing Approvals

CQPA has reclamation approval for the site of the proposed stockyard and conveyor system. Approval for the reclamation of intertidal areas near Wiggins Island was granted under the *Harbours Act 1955* on the 3 October 1991 and published in the Queensland Government Gazette on the 5 October 1991 (refer Appendix C3 of the WICT EIS). The approval, which remains in force for a period of 20 years from the 5 October 1991 (until the 5 October 2011), allows the reclamation of the Areas A, B and C (refer Figure 3.8 for location of reclamation areas) to a minimum level of 3.7m Australia Height Datum (AHD) 5.968m Lowest Astronomical Tide (LAT), so as to render it fit for port land and industrial purposes.

The total area of approved reclamation under current approvals is outlined in Table 16.1.

Table 16.1 Existing Reclamation Approvals

Reclamation Area	Approximate Area (ha)
Reclamation Area A	56.8
Reclamation Area B	193
Reclamation Area C	140
Total Reclamation Area	389.8

Reclamation Area C also incorporates approximately 18ha of terrestrial vegetation (RE12.3.3) and as such the works within this area will be subject to the VM Act and not the Coastal Act.

The Project changes require additional reclamation within the Wiggins and Hanson Road Precincts outside of the existing Reclamation Areas B and C boundaries. It is important to note that Reclamation Area A is now not required, while some areas of Reclamation Areas B and C will no longer be required (refer Figure 3.8).

In 2004, CQPA obtained an approval under the *Fisheries Act 1994* to remove 73ha of marine plants from Reclamation Areas A and B. Table 16.2 summarises the approval details.

Table 16.2 Summary of Existing Marine Plant Approval

Location (refer Figure 16.5)	Marine Plant Type	Approximate Area (ha)
Reclamation Area A	Mangroves	17
	Seagrass	22
Reclamation Area B	Mangroves	34
	Saltmarsh	
	Saltcouch	

Marine approval was sought in 2006 for the removal of 3ha of marine plants within Reclamation Area C for the purposes of undertaking geotechnical investigations for the concept design and WICT EIS.

The Project design requires the following amendments to the existing approvals and other areas requiring marine plant approval (refer Figure 16.5):

- Marine plant approval within Reclamation Area A will be relinquished, along with the reclamation approval for Area A;
- Marine plant approval to remove approximately 1ha of seagrass for jetty construction. The maximum marine plant disturbance within this area will be limited to 7ha;
- Marine plant approval will be required to remove an additional 6ha of marine plants adjoining Reclamation Area B, including the Calliope River berth;
- Reclamation Area C – marine plant approval will be required to remove an additional 44ha of marine plants;
- Additional reclamation adjacent to Reclamation Area C – marine plant approval will be required to remove an additional 1ha of marine plants; and
- Beales Creek area – marine plant approval will be required to remove 8ha of marine plants.

The Project changes have resulted in the following changes to the reclamation and removal of marine plant approvals identified in the WICT EIS:

- Reclamation approval within the Byellee wetland area is not required; and
- Approval to remove marine plants from the Byellee wetland area, including the Calliope River rail bridge footings is not required.

The Project design changes will result in the physical disturbance of approximately 100ha in comparison to the 108ha originally identified in the WICT EIS. The disturbance of the marine plants is associated with the construction of the coal terminal and additional areas will require marine plant approval prior to construction.

Intertidal Areas

The Project changes will not alter the area to be reclaimed with approximately 300ha of intertidal habitats to be infilled. This will involve the construction of bund walls and infilling using material from borrow and dredged material from the harbour. This will result in a permanent loss of intertidal habitat, the majority of which is comprised of saltmarsh and saltpan communities.

Watercourses

The majority of the works associated with the terminal are below the limit of tidal influence and are subject to approval under the *Fisheries Act 1994* and Coastal Act. However, the alterations to the project footprint includes the construction of a conveyor system.

The construction activities associated with the conveyor and associated infrastructure will result in the removal of approximately 1ha of vegetation aligning Pyealy Creek. Clearing of vegetation and other works within a defined watercourse under the *Water Act 2000* will need to comply with the DNRW Guideline – Activities in a watercourse, lake or spring carried out by an entity (ie compliance with guideline allows exemptions under the Act).

If works involve the temporary impoundment of a watercourse, it will be necessary to obtain approval under the *Water Act 2000*. These approvals will need to be obtained once the design of the Project has been finalised and prior to undertaking construction activities.

Vegetation clearing within the catchment areas of the watercourses also increases the risk of the works impacting on the environmental value of the existing watercourses and downstream environments. The replacement of the rail loop to the terminal with a conveyor system reduces the overall area of vegetation which will be removed as a direct result of the proposed development.

Flora

A staged works programme is proposed for the WICT and berth area in which approximately 100ha of intertidal vegetation will be physically removed with the majority of the intertidal wetlands infilled to a height of approximately 4.5-11m AHD using a combination of dredge spoil and borrow material. As such the changes to the Project design will only slightly reduce the area of marine plants which will be disturbed as a result of the works (ie approximately 8ha).

Vegetation clearing and/or infilling activities will result in the loss and/or disturbance of marine plants inhabiting:

- Reclamation Area B and adjoining areas;
- Reclamation Area C and adjoining Beales Creek; and
- Below the tidal influence of Pyealy Creek.

The construction of the coal terminal and conveyor system will also result in the loss of approximately 60ha of RE ecosystems (refer Section 15). It is important to note that the Project changes have effectively reduced the project area and hence the area of RE vegetation to be cleared. This has the benefit of increasing the buffering capacity of the existing environment which will reduce the impacts associated with the construction and operation of the conveyor system (ie vegetation communities can have a natural buffering capacity).

The replacement of the rail loop to the coal terminal with a conveyor system also has the benefit of increasing the buffer zone between the development and the intertidal wetlands of the Calliope River oxbow from 80m to 100m.

Fauna

The reclamation activities will permanently remove and impact an area of intertidal habitat approximately 300ha in size. The potential impact on fauna assemblages inhabiting the aquatic ecosystems within and adjoining the project area have been described in detail in the WICT EIS.

The replacement of the rail loop to the terminal with a conveyor system has the benefit of increasing the buffer zone between the development and the intertidal wetlands of the Calliope River. However, as mentioned above the reclamation activities will effectively remove approximately 300ha of intertidal wetlands.

Changes to the Project footprint, reduces the area of vegetation which will be cleared, which is likely to reduce the potential impacts on the fauna assemblages inhabiting the downstream environments. This is due in part to the buffering capacity of the vegetation (eg filtering contaminants and reducing visual disturbances) and the interrelationship between the terrestrial and aquatic ecosystems.

Mitigation measures will be implemented to reduce and offset the potential impacts through a variety of different methods and techniques (refer Section 23).

16.6 Potential Rail Construction Impacts

The Project design changes have effectively reduced the rail footprint, including the removal of the Calliope River bridge and works within the Byellee Wetland and intertidal wetlands of the Hanson Road Precinct. In addition, the Project design does not include the construction of a rail maintenance and provisioning facilities within the WICT project footprint.

The Project changes have effectively reduced the direct impacts associated with construction activities on the aquatic, estuarine and marine ecosystems. This includes no filling activities within the Byellee Wetlands, removal of marine plants or constructions activities within the intertidal wetlands within the project area.

It is important to note there is still the potential for the proposed rail works to indirectly impact on downstream environments. However, these impacts are described in detail in the WICT EIS and as such no further discussion is required.

16.6.1 Flora

The construction activities associated with the rail infrastructure are unlikely to have a direct impact on the intertidal wetlands and the near shore environs of Port Curtis. The amendments to the Project ensure that the rail construction activities will not occur within intertidal wetlands.

The development may impact on macrophyte communities within the freshwater ecosystems such as the ephemeral watercourses and palustrine wetlands identified within the area. It is likely that the impacts will be limited due to the harsh environments for macrophyte communities within the ephemeral watercourses (ie erratic flows and limited pooling). The location of works in relation to artificial and palustrine wetlands will also negate potential impacts on macrophyte communities with impacts localised.

The works have the potential to indirectly impact on the health of these communities (ie increase sedimentation within the catchments due to the destabilisation of substrate).

16.6.2 Fauna

The associated impacts on fauna assemblages inhabiting the aquatic, estuarine and marine ecosystems will be associated with indirect impacts on downstream environs. This is due to the location of the works in relation to these ecosystems (ie the proposed rail works do not encroach on to the Byellee Wetlands and intertidal wetlands of Hanson Road Precinct). In addition, the majority of the works are within ephemeral systems which have erratic flow patterns limiting habitat value.

A number of significant wetland bird species were identified from the project area, including the Black-necked stork listed as rare under the NC Act. Suitable habitat was mainly associated with Byellee Wetlands and intertidal wetlands of Hanson Road Precinct and as such the works are unlikely to have an impact on these species.

Visual disturbances and noise, dust and light generated during the construction activities have the potential to impact on fauna behaviour, including migration/movement and feeding patterns. The amendments to the Project design are such that the construction activities associated with the rail infrastructure are unlikely to directly impact on fauna assemblages inhabiting the aquatic ecosystems. This is due to the location of the works in relation to these ecosystems (ie increase buffer between works and wetlands).

16.6.3 ASS

The construction activities associated with the rail infrastructure are unlikely to disturb ASS. Section 4 addresses the potential impacts associated with ASS.

16.6.4 Watercourses

The impacts associated with the construction of the rail infrastructure have been described in detail in the WICT EIS. However, it is important to note that the area of direct disturbance has been amended.

The construction activities will include the clearing of riparian vegetation along the watercourses intercepting the rail infrastructure, with approximately 5ha of riparian vegetation to be cleared.

In addition to the clearing of vegetation, the works will further impact on the geomorphology of the watercourses as the Project changes include a larger area directly impacted by cutting and infilling activities. Other works such as the construction culverts and/or bridges, channelisation and the impoundment and/or diversion of watercourses will also impact the geomorphology of the watercourses.

16.6.5 Approval Requirements

Filling Activities within Intertidal Areas

The Project design included in the WICT EIS required approval under the Coastal Act and the *Fisheries Act 1994* to undertake works within the Byellee Wetlands (ie filling associated with rail embankments). The amendments to the Project result in the rail infrastructure not encroaching onto intertidal wetland communities.

As such the reclamation and marine plant removal approvals for Operational Works within the intertidal wetlands of Byellee will not be required. In addition, marine plant approval will not be required for bridging works for the Calliope River and Pyealy Creek crossings.

Watercourses

The amendments to the project area result in Operational Works associated with the rail infrastructure being upstream of the limit of tidal influence and hence it is unlikely that approval under the *Fisheries Act 1994* is required (ie remove or damage marine plants).

However, riparian vegetation along Calliope River, Pyealy Creek and other watercourses within the project area will be disturbed through direct removal or construction works. Clearing of vegetation and other works within a defined watercourse under the *Water Act 2000* will need to comply with the DNRW Guideline – Activities in a watercourse, lake or spring carried out by an entity.

If works involve the temporary impoundment of a watercourse, it will be necessary to obtain approval under the *Water Act 2000*. These approvals will need to be obtained once the design of the Project has been finalised and prior to undertaking construction activities.

16.7 Potential Terminal Operational Impacts

The impacts associated with the operation of the coal terminal have been described in detail in the WICT EIS and remain essentially unchanged.

However, the Project amendments include the incorporation of an extended conveyor system between the North Coast Line and the stockyard as coal terminal infrastructure. The impacts associated with this new infrastructure were not assessed as part of the WICT EIS and therefore a description of the potential operational impacts are outlined below.

16.7.1 Conveyor System

The operation of the conveyor system may potentially impact on the behaviour of species inhabiting the area and/or health of the aquatic environments. The impacts associated with the conveyor system are unlikely to be as significant as the original concept design contained in the WICT EIS (ie rail infrastructure).

Operational impacts associated with the conveyor system are similar to the impacts described in the WICT EIS for the rail operational works. This includes the generation of dust, risk of chemical spills and/or contamination and waste, light and noise generation. However, the Project design changes have effectively reduced the area of disturbance, operational activity and type of works and reduce the potential environmental risk of works impacting the health of adjoining habitats.

Lighting, noise and vibration associated with the operation of the conveyor may impact on the behaviour of wetland and shorebirds species which are known to inhabit the area. In addition, there is the potential that the operational activities may impact on the behaviour of intertidal species inhabiting the intertidal wetlands adjacent to the conveyor system (ie generation of light may act as an artificial attractant to fish and other estuarine species). It is important to note that the conveyor system will be a semi-enclosed system which should assist in reducing light and noise pollution and also the generation of dust.

It is important to note that the reclamation activities will reduce the area of suitable habitat within close proximity to the conveyor system. The location of the conveyor system and the retention of vegetation along the Calliope River and within the Hanson Road Precinct should mitigate impacts by increasing the buffer capacity of the area (ie reducing visual disturbances and acting as a sound sink).

There is also the potential to impact on the health of the aquatic environments through the generation of dust and other contaminants. The location of the conveyor system and the introduction of other mitigation measures such as those associated with water quality (refer Section 9 of the EIS) should reduce the potential risk of contamination (ie design measures to capture overland runoff).

16.8 Potential Rail Operational Impacts

The amendments to the Project design will not impact on the existing volume of rail traffic utilising the Moura Line (refer Section 6). An increase in the volume of rail traffic along the North Coast Line up to the Calliope River crossing is anticipated. However, the rail infrastructure is now situated away from sensitive receptors such as the intertidal wetlands of the Calliope River, Hanson Road Precinct and the Byellee area.

In addition, direct impacts associated with operational activities on the aquatic, estuarine and marine ecosystems have been effectively reduced as a result of the proposed changes to the Project design. This includes the removal of a bridge crossing on the Calliope River and works within the wetland environments of Byellee and intertidal wetlands of the Hanson Road Precinct. Also the Project changes do not include the construction of the rail maintenance and provisioning facilities.

It is important to note there is still the potential for the works to indirectly impact on downstream environs as the rail infrastructure intersects of a number of ephemeral watercourses, including Pyealy Creek, which flow into the Calliope River. The potential impacts associated with the rail operation have been described in detail in the WICT EIS and as such no further discussion is required.

16.9 Mitigation Measures

The implementation of an appropriate environmental management plan for the proposed works will assist in reducing the potential impacts of the development on the aquatic ecosystems within the project area.

The mitigation measures have been described in detail in the WICT EIS. However due to the changes to the Project design and through the consultation process, the following additional mitigation measures will be implemented.

16.9.1 Coal Terminal

Design

The following mitigation measures will be implemented during the detailed design phase of the Project to minimise the impact on the aquatic environments within the area:

- The minimisation of the clearing of marine plants and reclamation through innovative design techniques which will ensure minimal no negative impacts on master plan objectives and function;
- Coal terminal lighting design will ensure that the visual impact on adjoining habitats is minimised (eg directional lighting, low pressure sodium bulbs, shrouding etc);
- Where possible the conveyor system should be an enclosed system and an elevated structure;
- The depth and width of dredge channels are designed so as to reduce future dredging
- Additional loss of marine plants will be mitigated by:
  - Rehabilitation of mangrove and saltmarsh communities within the Port Curtis region. Suitable areas are to be identified in consultation with DPIF officers;
  - Funding towards ongoing monitoring of Port Curtis estuarine and marine environments, including seagrass and mangrove communities;
- Preparation of a detailed Dredge Management Plan (refer Section 11 and Appendix D);
- Reclamation approval for Area A and the accompanying marine plant approval (39ha of marine plants) will be rescinded;
- Submit reclamation application under the Coastal Act to reclaim areas outside current approvals (approximately 20ha);
- Submit marine plant application for the removal and/or disturbance of marine plants within the project area (approximately 100ha); and
- Where practical, high noise construction activities will be planned to commence outside the bird migration period (October to May).

Construction

The mitigation measures outlined in the WICT EIS will be implemented during the construction phase of the Project to minimise the impact on the aquatic environments. However, the following mitigation measures will be implemented to ensure that the works conform to a sufficient level of environmental protection and/or comply with the comments obtained during the consultation process.

A Dredge Environmental Management Plan (DEMP) will be prepared and implemented during the design phase (refer Section 11 and Appendix D). The DEMP will outline measures to ensure that the aquatic environment is not adversely impacted during dredging activities, including:

- An exclusion/safety zone will be created around the perimeter of the dredging activities. Dredging will not be carried out while dugongs, turtles or other marine species of conservation significance are within 150m or while migratory birds are within 25m of the dredge activities. Activities will be placed on hold for the period of time it takes the animal to leave the safety zone;
- Where possible, dredging operations shall be undertaken in such a way as to limit introduction of toxic organisms or new species in the marine environment;
- Subject to equipment availability, a large dredge may be employed to enable the completion of the dredging program in the shortest possible timeframe;
- Where trailer suction dredging is carried out, turtle excluding devices are to be fitted to the drag heads of the dredger; and
- Where trailer suction dredging is carried out, during times when the drag head is not in contact with the seabed, and pumps are in operation, pump speed shall be reduced and drag head water jets must be activated to minimise the risk of turtle capture.

Operational

The mitigation measures outlined in the WICT EIS will be implemented during the operational phase of the Project to minimise the impact on the aquatic environments.

16.9.2 Rail Infrastructure

Design

The mitigation measures outlined in the WICT EIS will be implemented during the detailed design phase of the Project to minimise the impact on the aquatic environments within the area.

It is important to note that the Project changes include the removal of the rail maintenance and provisioning facilities from the project works and works within the Byellee area which has reduced the area of direct disturbance. As a result the changes to the Project and comments obtained during the consultation process the following mitigation measures will be implemented:

- Marine plant approval will no longer be required for the works (ie the rail infrastructure will not encroach upon intertidal wetlands within Port Curtis);
- Consultation with EPA and QPWS concerning works within the Calliope Conservation Park and Mount Stowe State Forest; and
- Investigate opportunities to improve the fauna habitat value adjacent to the Rail Loop Precinct.

Construction

The mitigation measures outlined in the WICT EIS will be implemented during the construction phase of the Project to minimise the impact on the aquatic environments.

It is important to note that the changes to the Project design have resulted in works no longer encroaching on intertidal wetlands and as such no marine plant approval will be required for the rail works.

Operational

The mitigation measures outlined in the WICT EIS will be implemented during the operational phase of the Project to minimise the impact on the aquatic environments.

16.10 Conclusions

The Project is located within the Calliope River catchment, which is important to the function and health of Port Curtis (ie environmental flows from the Calliope River are an important source of nutrients and triggers for biota). The Project is also within and in close proximity to the Great Barrier Reef World Heritage Area.

Overall the area of direct disturbance has been effectively reduced as a result of the Project changes. However, the dredging and reclamation activities described in the WICT EIS have only been slightly altered. The reclamation activities will require the infilling of approximately 300ha. The majority of this area is saltpan, however the area contains approximately 100ha of marine plants. CQPA has already received approval to remove approximately 76ha of marine plants from Reclamation Areas A, B and C. On balance the Project requires additional marine plant approval for the removal of approximately 24ha of mangroves and saltmarsh communities.

The replacement of the WICT EIS rail loop with a conveyor system will have a reduced impact on the existing environment. This includes a reduction in the project area, reduction in rail traffic in the Hanson Road Precinct and Byellee area, the reduced potential impact from the conveyor system and maximising the buffer capacity of the retained vegetation.

The Project changes result in rail infrastructure not encroaching on the intertidal wetlands of the Calliope River and Port Curtis. In addition, the works will not encroach upon the freshwater wetlands of the Byellee area or the artificial wetlands of Rail Loop Precinct. However, the upgrade of the North Coast Line, is likely to further impact upon the existing watercourses and potentially downstream environments. The relocation of the rail maintenance and provisioning facilities should also reduce the risk of indirect environmental impacts on the health of downstream environments.

The implementation of mitigation and management measures during the construction and operation of the coal terminal and rail infrastructure will assist in minimising potential impacts to the aquatic environments within Port Curtis.

17. Cultural Heritage

There are no changes to the cultural heritage section resulting from the changes to the Project footprint. The WICT EIS (November 2006) contains details relating to cultural heritage issues.

The Traditional Owner groups will be consulted on the Project changes during the finalisation of the Cultural Heritage Management Plan.

18. Social

18.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to social issues are outlined below.

- Accommodation/housing:
  - To provide an Accommodation Management Strategy for the construction/operational workforces
  - To address the health of workers within provided accommodation
  - To address the transport needs of temporary workers to and from the work site
  - To further investigate short-term accommodation availability and the indirect impact on housing affordability
- Training and employment:
  - To develop a skills/employment working party to address training and employment of local employees, including participation from people from disadvantaged or diverse backgrounds
  - To clarify benefit for local business eg materials being pre-assembled
- Consultation:
  - To develop a Community Consultation Management Plan to identify areas of concern of the community, resolve potential conflict and develop mitigation or monitoring strategies
  - To incorporate the outcome of consultation and the input of this consultation into the EIS
- Moura and Northern rail lines:
  - To address the potential increase in rail traffic and subsequent noise levels
  - To provide an independent assessment from a qualified property valuation specialist relating to the impact of an increase in train movements
- Social facilities and services:
  - Support was expressed for a whole of government response to address additional social facilities and services needs arising from major projects
  - The limitation of the Gladstone City and Calliope Shire statistics used in the SIA and
  - To identify the usage of the project area for commercial and recreational fishing
  - To further explore, identify and address social infrastructure and the impact on community services
- Mitigation and monitoring:
  - To commit to collaborating with Government and other project developers to resource strategies to mitigate the negative impacts on social services
  - To provide additional details on actions relating to the proposed mitigation measures
  - The impacts and mitigation/monitoring strategies being generic/regional
  - To further assess potential social impacts to address housing, education, police facilities and resources and to ensure mitigation and monitoring strategies are included in the SIA to address these impacts including an explanation of who is to undertake the monitoring, how it is to be undertaken and who will fund the monitoring
- Cumulative impacts
  - The WICT Project's relationship to other industrial projects within the region
  - The potential overlap of construction periods for various stages of different projects
- Community values and the impact of the project on these values
- To address social impacts and mitigation strategies related to the acquisition of land

These comments are addressed in the sections below.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

18.2 Project Changes

A description of the Project changes are discussed in Section 3, including the revised rail links. The approximate workforce numbers for the construction and operation of the Project have also been revised (refer Section 3.2.8).

In comparison to the workforce numbers of other projects, the peak construction workforce of 500 people during Stage 1 of the WICT Project remains considerably smaller in comparison to the Rio Tinto Yarwun Alumina Refinery (RTYAR) expansion and GPN projects which are expected to have construction workforces in the order of 2,000 and 2,600 people respectively. However, the increased duration of the peak workforces for the WICT Project may result in an increased risk of projects potentially overlapping.

It should be understood that the timing of construction for projects can depend on many factors, including timing of project approvals, project funding, international market fluctuations and seeking favourable market conditions. On this basis it could be expected that timeframes may be further revised. Hence it will be important for projected workforce numbers and the timing of different projects to be continually monitored. The proposed Accommodation Working Group (refer Section 18.3.2) will provide the opportunity for these factors to be reviewed regularly and to consider the repercussions on housing and the local community as required beyond this EIS process.

18.3 Accommodation and Housing

18.3.1 Overview

As stated in the WICT EIS , it is expected that the Project's accommodation requirements can be met by the existing available accommodation supply together with the implementation of an Accommodation Management Strategy and the coordination of peak construction periods between different projects. Coordination between projects will be facilitated by the proposed Accommodation Working Group (refer Section 18.3.2) and regular consultation with the Department of Employment and Training and relevant industry organisations (refer Section 18.4.1).

Current indications are that Stage 1 of the WICT Project will utilise a substantial proportion of the existing construction workforce from the RGTCT expansion project or from other projects in between construction peaks to reduce the need to import new staff. CQPA are liaising with other project proponents, and more regularly with GPN which is at a similar stage to the WICT Project, to determine the timing of other projects in the Gladstone area.

At this point of time, it is expected that the peak construction period for Stage 1 of the WICT Project (October 2009 to June 2011) will primarily be after the RTYAR expansion project construction period (the project is expected to conclude February 2010) and GPN Stage 1 Project is expected to have a peak construction workforce of 2,600 in April 2009 (URS 2007). It is assumed that there will be a suitably skilled existing workforce from other projects, which will have already secured accommodation in the area (eg Gladstone City and Calliope Shire LGAs).

Notwithstanding this, CQPA and QR recognise that the existing local supply for housing is unlikely to be able to cope with the increased demand from other construction projects in the area if anticipated timeframes change and other projects occur at the same time as the WICT Project. Therefore, there is an identified need for:

1. Regular monitoring of timeframes of approved projects to keep abreast of any changes in timeframes which may create an overlap of projects, particularly peak workforce numbers;
2. Maintaining regular liaison with other project managers to coordinate construction and minimise/avoid potential overlap; and

3. To consider collaboratively both temporary and permanent forms of additional accommodation for the construction and operational workforces if required due to overlapping projects.

An Accommodation Management Strategy (AMS) will ensure the needs of the construction and operational workforces are met and also address the needs and/or concerns of the local community and key agencies with an interest in housing provision. The key vehicle to initiate the development of the AMS and to ensure housing needs are addressed is the establishment of an Accommodation Working Group. This working group will be particularly important as workforce numbers and timings of projects become more definitive and it will provide the mechanism to continually revise housing availability and affordability and to respond as required.

The strategy to develop the working group and develop an AMS is discussed in Sections 18.3.2 and 18.3.3 respectively and the option to develop a workers village is discussed in Section 18.3.4. The issues relating to the current housing availability and affordability are discussed in Section 18.3.5.

18.3.2 Establishment of an Accommodation Working Group

To develop and implement an AMS, it is recommended that an Accommodation Working Group be established.

As State level coordination is required and there will be a substantial benefit in including proponents from other key projects yet to be constructed in Gladstone, it is suggested that the working group be established at the State level. A facilitator will also be required to assist in the set-up of the working group, to establish a Terms of Reference, a funding mechanism as well as to nominate a chairperson.

The inclusion of proponents from other projects on the working group will enable the sharing of information, to formally keep abreast of timing issues and to achieve a coordinated outcome in the provision of accommodation in the study area.

The working group will enable the AMS to be developed collaboratively with direct input from Local Government and State agencies and with agreed commitment from the project proponents.

The working group will enable a collaborative approach to accommodation provision in the study area and will provide a mechanism for the development of joint partnerships. Ongoing working group meetings will also enable the actions from the AMS to be monitored and for any high-level issues to be discussed.

The potential strategies could be incorporated within the AMS are discussed below.

18.3.3 Accommodation Management Strategy

As previously mentioned, the AMS will be established by the proposed working group with direct input from key agencies and the proponents of approved projects in Gladstone. Due to the need for broad input, details of who will actually prepare the AMS and funding of the development of the AMS will be determined as part of the proceedings of the working group.

Key components and mitigation measures to be incorporated within the AMS may include:

- Regular review of the current housing situation to determine any change;
- Initiating strategies and potential joint partnerships for the construction of a mix of new dwellings;
- Provision of a “workforce village” style accommodation targeted at construction workers;

- Forming alliances with regional builders and/or other projects/developers;
- Providing assistance to workers in securing short-term and permanent housing, predominantly within the proposed workforce village for construction workers
- Discouraging the construction workforce from using rental properties as a main source of temporary accommodation;
- Stimulating the private sector to generate the construction of new accommodation by providing incentives to encourage potential developers and investors to become involved in the development of new accommodation (eg the workforce village);
- Promoting regional accommodation as an attractive and cheaper option (eg within the Fitzroy Shire) and providing feasible transport options for those construction workers to and from their place of temporary residence;
- Approaching State housing agencies to increase the public housing supply in the region to support low income households;
- Subsidising fly-in fly-out facilities provided to construction workers with families who do not plan on living full-time within the region;
- Monitoring housing availability and affordability in response to demand associated with the timing of major projects in the Gladstone area; and
- Developing a monitoring programme to measure the performance of the AMS against key social planning principles established by the working group.

The AMS will need to be a dynamic document that can be adapted and updated as required to meet the changing needs of the local community and the construction workforce. A monitoring programme also needs to incorporate regular consultation with the community and stakeholders to address concerns related to the impact of the workforce on the community dynamics within the region. A key vehicle for this monitoring will be the proposed working group to enable a collaborative approach to address any issues that may arise.

The AMS should be packaged as a strategy that will provide benefits to the community during and post-construction. In this regard, the community are more likely to take ownership of the new facilities within their community and may feel more inclination to use these facilities post-construction.

CQPA and QR will continue to liaise and work with the Accommodation Working Group when required and to contribute to the implementation of the AMS as part of a collaborative approach to address the housing situation and mitigate any potential housing shortages which ultimately reduces housing affordability.

18.3.4 Housing Availability and Affordability

Housing availability and affordability was addressed within the WICT EIS in Section 18.2.3. The WICT EIS identified the potential factors that cause an increase in housing costs and the potential impacts on housing availability with the monitoring of housing availability and affordability recommended.

However, it is recognised that further strategies may be required to mitigate the impacts on housing availability and affordability, particularly with changes in the peak workforce numbers for a longer duration and the higher risk of potential project overlaps (as discussed in Section 18.2). Whilst current indicators suggest current housing availability for short-term accommodation may be limited and housing costs are increasing, it is difficult to be definitive on the potential impact of the WICT Project with other influences from factors including general market forces, interest rates and the timing of the construction of other projects. Subsequently, the Accommodation Working Group and the proposed AMS will provide the vehicle to continually monitor the current situation and to address these issues with a collaborative and whole of government response.

It is acknowledged that Gladstone City Council in their submission to the WICT EIS has indicated that the availability of short-term accommodation is limited to accommodate the construction workforce. The key issues identified in the submission relating to housing include:

- Occupancy rates of rooms are generally being booked for up to 3 months in advance (eg during festivals and the Comalco shutdown during July 2006);
- A survey of caravan parks undertaken in February 2006 by Council to establish availability indicated that only 50 sites were available in the region, with no caravans located on these sites;
- The majority of real estate agents in Gladstone City have reported vacancy rates of between 0 to 1%, which has been the case for the past 9 to 12 months;
- Council's Community Advisory Service (CAS) has reported a 25 to 40% increase in rental prices over the past 12 months; and
- There has been a 300% increase in tenancy advice (general enquiries through to direct assistance) due to the increase in rents.

These are issues that will be able to be discussed as part of the Accommodation Working Group and be addressed as part of the AMS.

It is anticipated that the construction of a workforce village to primarily accommodate construction workers together with the implementation of other strategies in the AMS will reduce pressure on existing housing stock, which will assist to mitigate the potential impacts from increased housing costs.

Displacement of the local community is likely to be avoided as a result of the AMS and the holding of regular meetings of the Accommodation Working Group to monitor implementation of the AMS and to address any potential issues as they arise.

To further reduce the impact of the WICT Project on housing availability and affordability, a local workforce will be used where possible or the workforce will be trained to enable the development of the skills required. As outlined within the workforce strategy, it is assumed that the local workforce will already have suitable accommodation and will not increase the demand for housing within the area.

The DoC and the GCC suggested in their submissions that a social monitoring program should be implemented, partnering with local agencies to monitor the extent of stress on the housing market. The proposed Accommodation Working Group will provide this opportunity together with the implementation of the AMS.

CQPA and QR will continue to liaise and work with the relevant State and Local Government agencies and other project proponents in the region as part of the Accommodation Working Group to address:

- Housing needs and other related social issues;
- To continue to monitor social conditions; and
- To respond to change by developing strategies that may are required to mitigate the community and social construction impacts of the projects.

18.4 Training and Employment

18.4.1 Skills Shortages

CQPA and QR will undertake regular consultation with the Department of Employment and Training, local Councils and construction groups, such as the local chambers of commerce and Gladstone Engineering Alliance, to advise on potential future skills strategies that are relevant to the construction and operation of the WICT project.

18.5 Community Values and Social Services

18.5.1 Community Values

The WICT EIS identified the community values of the region and the impacts that the WICT Project may have on community values. Section 18.1.4 and Appendix P2 of the WICT EIS outlined the community services and facilities within the study area and Section 18.2 described the objectives and practical measures for protecting and enhancing social values.

Furthermore, Section 18.2.3 of the WICT EIS identified the anticipated impacts and benefits of the proposed development, highlighting the impacts on directly affected properties and nearby residential areas, demographic, social, cultural and economic profiles, land use and lifestyle, community services and recreational facilities, local labour market, housing, and community values and aspirations.

The community values were addressed in WICT EIS (page 18–49 and page 18–50), with reference to the GCC and CSC community surveys and the findings from the retail survey and business survey, all of which have incorporated direct community consultation. The potential impacts and benefits of the WICT Project to these community values were identified on page 18–50 of the WICT EIS. Furthermore both the Gladstone Plan and the Calliope Shire Planning Scheme which have recently been endorsed by Council, again required comprehensive public consultation to plan for the future development of both the Gladstone and Calliope Local Government Areas.

It is believed that general community values have been adequately addressed in the WICT EIS to meet the requirements of the TOR.

18.5.2 Social Services

Summary of Findings from the WICT EIS

Appendix P2 of the WICT EIS identified the social infrastructure in the Gladstone City and Calliope Shire jurisdictions, utilising data that was primarily collected from the Community Services Directory 2006 for Gladstone City and Calliope Shire Councils (http://comdir.dz1.calliope.qld.gov.au/), departmental websites, and recent studies initiated by Gladstone City Council.

The WICT EIS found that Gladstone contains a wide range of services and facilities that cater for both the local and surrounding communities. Enrolment numbers of the educational facilities within the region found that many schools within the region were not operating at capacity (CW 2006). This was also found to be the case within the GPN Study (URS 2007).

A number of the existing formal recreational facilities within the region also have capacity for new members (refer Appendix P of the WICT EIS). The ROSS Planning Study (June 2006) prepared on behalf of GCC concluded that there currently appears to be an adequate supply of sporting land and an undersupply of functional recreation parkland against the standard industry benchmarks. The calculations did not include specialised facilities associated with shooting ranges, motor sport, the racecourse, showground and golf course as these generally are not publicly accessible areas. Whilst the study has identified land requirements to accommodate projected growth to 2026, it was further noted that the demands for recreation land could be adequately met through the upgrade, enhancement and development of existing open space.

There is capacity for the construction workforce to be able to use the facilities currently available and as identified in the WICT EIS may provide the impetus to upgrade some facilities with increased patronage. However, as part of the design of the workers village it is recommended that some form of recreational facilities be provided on-site to service the needs of the workers and increase the flexibility for the reuse of the facility eg for tourism and community groups.

The shopping and retail facilities within Gladstone were described within the WICT EIS based on the findings from the Gladstone Retail Study (May 2005) that was undertaken by Economics Associates Pty Ltd and GHD Pty Ltd. The main finding of this study was that the majority of respondents (82%) are satisfied with Gladstone's suburban shopping centres, but were less satisfied with the City Centre shops and services, with retail leakage to Brisbane and Rockhampton for clothing, apparel and homewares. Once again, it was identified in the WICT EIS that increased demand for retail facilities and services will provide the impetus for a greater range of retail services and facilities in the longer term.

Impact of Skill Shortages on Social Services

The GCC submission has highlighted the current shortage of doctors and the need for additional health, police, educational and support services which are required to support the social services available to the community. Whilst this is identified as an immediate need at the present time and the proposed industrial projects will exacerbate the problem with an increase in population, attracting the skills required to support these service should be addressed by State Government.

It should be noted that there is a general shortage nationally of some key occupations which are essential to the functioning of a community, such as doctors and teachers, particularly in regional areas. This is an issue that requires a whole of government response.

It is noted that the Department of Education, Science and Training (DEST) has developed a National Skills Shortages Strategy. This strategy, together with the other work undertaken by DEST, should be used to address this issue.

Furthermore, should it be identified that further social services or community infrastructure would be required as a result of the project construction timeframes conflicting, the Accommodation Working Group may provide an avenue for this to be addressed through a sub-committee. Increased population and housing needs that may be identified through the AMS may flow onto other social service needs.

CQPA and QR will work with the government agencies to develop strategies to address the social services requirements. As suggested, this may be in the form of a sub-committee of the Accommodation Working Group to specifically address social service requirements once potential population increases and characteristics are more clearly identified in relation to actual construction timeframes. This approach will enable a whole of government input to social services provision in the study area. The collaboration of Government and project proponents to address social facilities and services will also address the requirements in the submissions from the Department of Communities and the Department of Local Government and Planning.

In response to the State Development Centre submission, the community will be kept informed of the WICT Project and the potential implications through the Community Consultation Management Plan (refer to Section 18.13.1).

18.6 Cumulative Impacts

Cumulative impacts on housing demand may result from a number of projects occurring at the same time as the WICT Project. Other projects may include:

- Gladstone Pacific Nickel Project (GPN);
- Fisherman's Landing Expansion;
- Rio Tinto Yarwun Alumina Refinery expansion; and
- Australian Nitrogen plant.

The actual cumulative impacts of major industrial projects will be dependent on the timing of construction. Construction timing may vary between projects due to the timing of project approvals, project funding, international market fluctuations and favourable market conditions for construction contracting. It was identified in the WICT EIS (based on current knowledge) that the expected peak workforces are unlikely to conflict.

The cumulative effects of a number of projects occurring within the region at the same time will be mitigated by the implementation of the strategies outlined in the Accommodation Management Strategy which will both be prepared with the direct input from Local and State Government agencies, industry providers and other key agencies. The strategy will incorporate mechanisms to review project timings and the current situation.

The Accommodation Work Group will provide the mechanism to monitor the implementation of the AMS, and will provide the opportunity for project proponents and Local and State Government agencies to discuss issues as they arise and to determine a collaborative approach to resolving any issues that may arise.

To address the cumulative impacts of this project and other future projects, CQPA and QR will work with other industrial proponents and the key agencies through the work groups, which will enable a whole of government approach to the mitigation of cumulative impacts should this become an issue with conflicting construction timeframes.

18.7 Gladstone City and Calliope Shire Statistics

The data that was used to highlight the social trends within the Gladstone City and Calliope Shires was derived from the 2001 Census (the most recent data available from the Australian Bureau of Statistics at that time). It is recommended the 2006 Census data (available late 2007) be analysed as part of the preparation of the AMS and Workforce Strategy.

18.8 Outcomes of Community Consultation

General consultation was undertaken using methods such as agency briefings, distribution of community newsletters and an EcoFest display. Section 18.2.2 "Community and Agency Consultation Overview" within the WICT EIS provides an overview of the consultation undertaken.

Section 1 of the Supplementary EIS provides a summary of the consultation undertaken for the WICT EIS and how the Project design has altered to respond to this consultation.

Relevant information from the consultation has been passed onto the project team and addressed as part of the social impact assessment as required.

18.9 Property Values

The rail maintenance and provisioning facilities are now proposed to be located at the Euroa Yard within the GSDA. No additional rail movements beyond the current capacity are proposed for the Moura Line as a result of the WICT Project. Therefore residents in the Seaview Heights area will not be impacted by the revised proposal.

18.10 Mitigation Measures

A collaborative and strategic partnering approach will achieve the best outcomes for social planning. The mitigation measures outlined in the WICT EIS are appropriate, and will be formalised into actions as part of the AMS. In addition to this, further mitigation measures have been considered in response to the submissions received from consultation.

18.10.1 Community Consultation Management Plan

Community awareness of detailed design, environmental management and construction timing is recognised as being important to community resilience and to minimise perceived impacts, particularly during construction.

The preparation of a Community Consultation Management Plan (CCMP) has been recommended by the Department of Communities. Officers from the Department of Communities (Fitzroy/Central West Queensland Region) have offered to provide advice on developing appropriate community consultation strategies to foster a more active role for the impacted communities and interested stakeholders. General consultation was undertaken as part of the WICT EIS. However, it is acknowledged that further consultation is expected as the Project proceeds.

The purpose of the CCMP would be to:

- Provide relevant information to notify interested stakeholders of the Project
- Keep the general community informed of construction timeframes
- Identify any concerns interested stakeholders may have with the Project and associated rail infrastructure
- Provide ongoing focused and detailed consultation to identify and address concerns and resolve any potential conflicts
- Provide the Accommodation Working Group and Training and Employment Working Group with a summary of key issues relevant to housing, training and employment for discussion and action through the AMS and Workforce Strategy

The following details the strategies that could be implemented within the CCMP:

- Preparation and distribution of newsletters and fact sheets to residential areas in proximity to the Project (ie Clinton and nearby rural residential properties):
  - Prior to construction
  - During construction
  - Post-construction
  - Operation
- Ongoing consultation with directly affected residents and key stakeholders:
  - One-on-one consultation with residents to discuss whether there are any concerns related to noise, dust, visual amenity and any other issues that may arise.
  - Consultation throughout the construction and operational phases of the project to address any issues that the residents and the temporary workforce may have.

Other measures to specifically address issues of concern such as noise and vibration, dust, traffic and access, and visual amenity have been addressed in other sections of the WICT EIS.

18.10.2 Other Mitigation Measures

The mitigation measures outlined in the WICT EIS are considered appropriate, however, agency submissions have indicated that these measures need to be further detailed in terms of what actions are to be undertaken and how each measure is to be implemented. The mitigation measures required for the social impacts are dependent upon the onset and timing of other industrial projects in the area.

From this perspective, the Accommodation Working Group will provide the mechanism to review and refine the mitigation measures with more detail should the construction timeframes of different projects overlap.

The aim of the mitigation measures are to:

- Reduce demand on current housing and rental markets from construction workers by providing accommodation if required;
- Being able to monitor housing availability and affordability through the Accommodation Working Group and the AMS;
- The project proponent being prepared to negotiate with local agencies on the development of a workforce village with appropriate infrastructure that can be used post-construction should projects conflict and housing to accommodate construction workers is required;
- Consult with relevant agencies and groups to address skill shortages; and
- Formally coordinate with other developments in the area to share infrastructure if practicable.

18.11 Conclusion

This section has addressed the State and Local Government agencies and community submissions on the WICT EIS relating to a number of social issues.

An Accommodation Working Group has been proposed to address the key issues relating to housing availability and affordability through the preparation of an Accommodation Management Strategy. Workforce skills shortages will be addressed by CQPA and QR undertaking regular consultation with the Department of Employment and Training, and construction groups to advise on potential future skills shortages that are relevant to the construction and operation of the WICT Project.

The working group is proposed to provide a whole of government response to the key issues currently facing the study area, which potentially will be exacerbated with the construction of a large number of projects in the area. The industrial proponents (including CQPA and QR) are proposed to be participants in the working group and the proponents will be able to keep the working group informed of anticipated project construction timeframes.

More detailed mitigation measures have been suggested within this Supplementary EIS in response to the submissions, together with the vehicle to implement and monitor these measures through the proposed working group. Furthermore, preparation of the AMS will provide the opportunity to review the current situation if required and to further refine the suggested mitigation measures within this WICT EIS. The working group is particularly important to monitor and implement the mitigation strategies identified and will have the flexibility to adapt to change as required beyond the EIS process.

CQPA and QR will also prepare and implement a Community Consultation Management Plan for the Project.

19. Health and Safety

19.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to health and safety issues are outlined below.

- Dust nuisance and potential health problems facing employees of CQPA and the general community;
- OH&S procedures and recommendations for future practices; and
- Impacts of the facility on residents, particularly by approaching the WICT via the Moura Line.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

19.2 Project Changes

This section has been prepared to address the potential impacts of the proposed WICT on health and safety issues. Subsequent amendments to the engineering design options have resulted in the following changes to the Project:

- Relocation of the rollingstock maintenance yard and provisioning facilities to the Gladstone State Development Area (GSDA) at Aldoga;
- Construction of a new rail link line from the Moura Short Line to connect to the western end of the yard; and
- Removal of the requirement for additional coal trains to travel through the city of Gladstone as they will utilise a new rail line within the GSDA.

Under the previously proposed arrangement, Moura and Surat traffic would enter the WICT precinct from the south west via the Moura branch line. The new design will have Moura/Surat traffic arriving via a new link line running from the existing Moura Line to the existing North Coast Line (NCL) near Mt Larcom. This new link line runs through rural areas to the west of the Bruce Highway and will be fully contained in the GSDA. From the northern end of the new Moura Link Moura/Surat rail traffic will follow the same path as Blackwater traffic (parallel to the NCL) and all trains will enter WICT from the same direction. This option also addresses many of the issues raised during the consultation period in relation to noise, dust and road/train crossing issues.

19.3 Project Operational Workforce

CQPA has an Occupational Health and Safety system in place for the operational workforces employed on the Project. Staff is monitored on a regular basis and in addition it is recommended that all persons on site wear appropriate Personal Protective Equipment (PPE) including ear protection and dust masks when conditions warrant their use. Appropriate mitigation measures will be employed to increase general site safety relating to dust, occupational noise, hazardous chemicals and materials exposure.

Before implementation by the Contractor, CQPA and/or QR will review a construction Safety Management Plan to minimise construction workplace accidents. A detailed safety operational plan will be enacted at both the terminal and supporting rail infrastructure facilities.

19.4 Conclusion

The implementation of the CQPA Occupational Health and Safety System has the potential to minimise risks to an acceptable level.

20. Economics

The modelling clearly identifies significant economic impacts during the construction and operation of the WICT with benefits accruing at the regional, state and national levels. There are no substantial changes to the economic section of the WICT EIS through the changing of the Project footprint. The WICT EIS (November 2006) contains details on economic related issues.

21. Hazard and Risk

21.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to hazard and risk issues are outlined below.

- Risk issues and risk treatment involving fire;
- Risk issues involving medical emergencies;
- DGSM Act regarding the establishment and documentation of Emergency Plans and Procedures prior to commencement of operations; and
- DGSM Act regarding the development, implementation and documentation of a Safety Management System prior to commencement of operations.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

21.2 Project Changes

The EIS discusses the potential for hazards and risks associated with the WICT and associated infrastructure. References were made to potential impacts of emergency situations, current emergency management and response strategies and plans. This section has been prepared to address submissions received during the WICT EIS consultation period relating to potential hazard and risk issues, particularly fire and medical emergencies, for the proposed WICT and associated port and rail infrastructure.

21.3 Hazards and Risks associated with Port Operations

The potential impacts and mitigation measures of emergency situations involving fire and medical emergencies was outlined in Section 21 of the WICT EIS. CQPA Emergency Procedures outline the Port's overall strategy to respond to emergencies, for both land based and shipping operations, and provide adequate response procedures in the event of fire, spill or a medical emergency occurring. Assistance will be sought from the Queensland Ambulance Service and Queensland Fire and Rescue Service, Gladstone, where appropriate.

21.4 Hazards and Risks associated with Rail Operations

The potential hazards associated with the WICT and associated infrastructure was presented in Section 21 of the WICT EIS. Hazards or risks relating to fire and/or medical emergencies are addressed in QR's emergency procedures that include an Emergency Preparedness, Response and Recovery System Standard. This document establishes the framework for responding to emergencies, including natural disasters.

Additional information was requested through the WICT EIS consultation period. In particular, a risk anaylsis was required for a number of additional factors such as traffic management, site sanitation and ship movements of hazardous waste. These additional analyses are located in Table 21.1.

21.5 Emergency Plans and Procedures

CQPA has a number of emergency procedures, which combined with State, Federal and National plans give a comprehensive coverage of potential emergencies. An integrated risk management plan is being documented by CQPA for their entire port operation, including the WICT. This plan will provide an overall strategy for the extension of existing plans and procedures to incorporate the WICT. The CQPA Emergency Plans and Procedures will be established prior to commencement of operations.

Safety plans prepared for construction and operation of rail and port facilities will be provided to the Department of Emergency Services and other agencies prior to the commencement of construction for the WICT.

21.6 Safety Management System

QR has a comprehensive risk management system and access to Emergency Services at local and state level. Additional procedures will be developed and incorporated if required into the existing system to cover the new rail infrastructure and will be implemented prior to commencement of operations.

Table 21.1 Risk Assessment (General - Rail and Port Operations)

Risk Identification And Analysis				Risk Rating						Risk Rating (after implementation)					
Risk Issue	Causes	Impacts or Consequences	Planned Controls	Control Effectiveness	Likelihood Rating	Consequence Rating	Risk Rating		Priority	Risk Treatments	Likelihood Rating	Consequence Rating	Risk Rating		Priority
Hydrocarbon and chemical spillage - offshore	Ship movements of hazardous materials, collisions, striking, grounding, impacts, leakage during transfer and construction and site operational activities of CQPA	Water quality and aquatic flora and fauna within Port Curtis and the Calliope River Negative community relations Cost of cleanup Reduced public amenity	Containment measures on ships, wharf structures and transfer equipment Spill kits Training and education Compliance with Australian Standards CEMP and operation management plan Small volumes of hazardous materials	90%	Possible	Significant	Moderate	13	Medium Term	Review existing CQPA policy and emergency response procedures and recommend appropriate action Compliance with Australian Standards	Possible	Moderate	Moderate	8	Medium Term
Site sanitation during construction - illness	Leaks and spills Inadequate facilities and/or capacity Poor maintenance and or waste management practices	Illness Disease vectors	Spill kits Training and education Compliance with Australian Standards CEMP	90%	Possible	Major	High	18	Short Term	Review existing site policy and recommend appropriate action Compliance with Australian Standards	Unlikely	Major	Moderate	14	Short Term
Traffic management – light and heavy vehicle traffic	Additional vehicles required for construction	Dust production Damage to vehicles Pollution Noise Speed Spillage of material Increased motor vehicle accidents	CTMP	75%	Possible	Major	High	18	Medium Term	Water carts Sweepers Vehicle inspections – mufflers, covered loads, wheel washers, rumble grid, road worthy compliance Speed zones Traffic controllers	Possible	Significant	Moderate	13	Medium Term

22. *Visual Amenity and Landscape Character*

22.1 Summary of Comments

A summary of the comments received during the WICT EIS consultation process relevant to visual amenity and landscape character issues are outlined below.

- The viewshed of the existing houses on the east bank of the Calliope River and the suburb of Clinton and Seaview Heights will now include the rail maintenance yard and loop. It is acknowledged in the EIS that the landscape/visual character of the rail maintenance precinct will change from the current open space and natural character to major transport infrastructure, but no specific reference is made to the properties that will be affected by this change or the affect that this may have on their property values or quality of life.
- The visual amenity impact assessment does not provide an adequate analysis of the extent and significance of changes in skyline on current views from sensitive locations. While statements are made regarding the change in character, there are no visual representations of the alterations to existing views or labelled the locations of infrastructure on photos of existing views.
- Vegetation buffers need to be considered in the Rail Maintenance Precinct in its current location. Reference is made in the list of mitigation measures in Section 22.2.2 to minimising clearing and minimising light overspill, but no reference is made to vegetation buffers for road and rail infrastructure.

A more detailed summary of the comments provided during the WICT EIS consultation process is included in Appendix A. The Supplementary EIS response and/or report reference location are also included in Appendix A.

22.2 Project Changes

As detailed within the project description in Section 3, a number of Project layout changes have occurred which have changed the proposed infrastructures interaction with the visual amenity and landscape character of the area. The sections below detail the changes to the Project that have changed the potential visual impact of the Project.

22.3 Byellee Wetland Area

There are now no proposed works within the Byellee wetland area due to the Project changes (refer Section 3). Therefore the Project will have no visual impact on the Byellee wetland area.

22.4 Rail Loop Precinct

The description of environmental values outlined in the WICT EIS are unchanged for the Project.

The proposed rail loop will have a substantially reduced impact on the visual amenity and character of this precinct compared to the rail infrastructure proposed in the EIS. The Project will change the rural character of the landscape to that of major transport infrastructure. However, the residence within this precinct which is most effected is to be acquired and the residents will relocate.

The rail loop will sit on a fill embankment approximately 6.3m tall with the tallest part of the train, the locomotive, adding approximately 4.3m height. This will give a total height of approximately 10.6m above the existing ground level.

The existing vegetation and intervening topography is likely to shield the view of the rail loop from the residential areas on the eastern side of the Calliope River.

Visual representations of the Project are shown in Photos 22.1 and 22.2, respectively. Photo 21.1 is a view of the proposed rail loop as viewed from Julius Crescent, Clinton. Photo 22.2 shows the view of the proposed rail loop as viewed from Boundary Road, Kirkwood.

The following measures are recommended to mitigate the visual impacts of the proposed rail infrastructure:

- Minimise the area of existing vegetation to be cleared by minimising the footprint of the development at the design phase and at construction by confining the clearance of vegetation to that necessary to carry out construction;
- Provide screening vegetation around the rail loop particularly on the eastern and southern sides of the tracks (refer Figure 3.6). Environmental bunds are not considered necessary to achieve visual screening. Table 22.1 provides plant species suitable for screening which are endemic to the area; and
- Minimise light spillage to areas outside the areas that need to be lit using suitable fittings and shields.

Table 22.1 Plant Species Suitable for Screening Rail Loop

Botanical Name	Common Name	Form	Approximate height at 10 years
Acacia maidenii	Maiden's wattle	Tree	10m
Acacia salicina	Sally wattle	Tree	14m
Casuarina cunninghamiana	River oak	Tree	15m
Corymbia intermedia	Pink bloodwood	Tree	15m
Cupaniopsis anacardioides	Tuckeroo	Tree	10m
Eucalyptus acmenoides	White mahogany	Tree	15m
Eucalyptus populnea	Poplar box	Tree	15m
Eucalyptus tereticornis	Forest red gum	Tree	20m
Ficus virens	White fig	Tree	12m
Flindersia australis	Crow's ash	Tree	10m
Lomandra longifolia	Long-leaved matrush	Tufting herb	1.5m
Lophostemon suaveolens	Swamp box	Tree	12m
Melaleuca fluviatilis	Teatree	Tree	15m

22.5 Conveyor Link between North Coast Line and Coal Stockyard

The description of environmental values outlined in the WICT EIS are unchanged for the Project.

Potential visual impacts are likely to be significantly reduced as a conveyor system now provides the coal transport link between the North Coast Line and the coal stockyard, compared to the rail loop to Golding Point proposed in the EIS. This will substantially reduce the width of the corridor required (between 40 and 70m narrower corridor is required for the conveyor as opposed to the rail loop). The quantity of fill material for the Project within the Hanson Road Precinct has been reduced which has also reduced the visual profile and footprint of works within this area.

Increased vegetated buffering is also proposed in the southern Hanson Road and Forest Precincts between the Project footprint and Calliope River and Anabranch.

22.6 Conclusion

The Project will be visible from a wide range of viewing locations within Gladstone due to the nature and scale of the proposed development. The proposed coal terminal and associated rail infrastructure will have a visual impact on the existing environment.

However, the proposed port and rail infrastructure are not new elements in the Gladstone landscape and are consistent with existing infrastructure and the port function of the area. The charges to the proposed layout has moved significantly the rail loop away from the residential areas and thereby reduced the visual impact.

Existing remnant vegetation, landscape plantings and local topographic features will mitigate to some extent the visual impact of the proposed Project.

23. Coal Terminal EMP

23.1 Introduction

This draft EMP has been prepared in order to propose environmental protection commitments to protect the environmental values potentially affected by the proposed coal terminal works within the WICT project footprint. This EMP has been further refined based on submissions received during the EIS consultation period. The EMP will be further expanded following the Coordinator-General's decision on the Project and during the detailed design phase of the Project.

The EMP identifies and describes the environmental values and potential impacts that may be caused by the coal terminal works and defines critical environmental values which are to be protected through the consent conditions of the EA. Commitments are proposed and identified including environmental protection objectives, standards, measurable indicators and control strategies (ie to demonstrate how the objectives will be achieved).

The EMP will be refined and expanded further during the detailed design phase of the project and through consultation with the regulators.

23.1.1 Basis for the Plan

An important requirement of a Project of this nature is the preparation of an EMP to ensure the environmental safeguards proposed as a result of the Project planning and environmental assessments are enacted in an appropriate and timely fashion.

The potential exists for the degradation of the site and surrounding natural values. This would be likely to occur during the construction and operational stages of this Project and has been identified during the course of the environmental studies performed for this Project.

Planning and design measures are therefore necessary to ensure that all reasonable measures are taken to protect the environmental values, which may be impacted during construction and operational activities.

23.1.2 Aim of the Plan

The aim or purpose of this EMP is to detail the actions and procedures to be carried out during the implementation phase of the project in order to mitigate adverse and enhance beneficial environmental and social impacts. The environmental studies and consultation conducted as part of the EIS have identified the potential construction and operational impacts of proceeding with the project.

A range of mitigation measures have been identified from the EIS environmental studies to mitigate and manage these potential impacts and need to be implemented during the construction and operational stages of the project.

The EMP addresses the proposed mitigation measures, records environmental commitments and establishes the framework to ensure they are implemented during each stage of the project. In effect, the EMP becomes the key reference document in that it converts the undertakings and recommendations of the environmental studies into a set of actions and commitments to be followed by the designers, constructors and future operators of the proposed Project.

The EMP will also serve as the benchmark for measuring the effectiveness of environmental protection and management. This can be achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing to ensure the necessary mitigation measures are met. The EMP also makes provision, as appropriate, for unforseen events by outlining corrective actions which may be implemented in these situations.

23.1.3 Format of the EMP

The EMP is structured as follows:

- Relevant statutory obligations and regulatory framework within which the Project will be required to progress (Section 23.2);
- Management structure and general project responsibilities for staff involved in the project (Section 23.3);
- Environmental management objectives for particular environmental aspects (Section 23.4); and
- Subsequent stages of the environmental management process during the detailed design, construction and operational stages of the project (Section 23.5).

To increase the useability of the EMP, it has been prepared as a stand alone document.

23.1.4 CQPA Environmental Management Approach

CQPA is committed to operating in a manner that allows for sustainable development with minimal environmental harm to the Port and its surrounding areas.

CQPA has implemented an Integrated Environment Management System (IEMS) to guide environmental management operations. The IEMS has been approved by the Environmental Protection Agency and defines environmental risks posed by CQPA operations, document control measures and monitoring requirements and designates responsibilities to personnel at all levels throughout the organisation.

CQPA currently have ISO 14001 certification for their IEMS.

23.2 Statutory Obligations

23.2.1 National Strategies and International Conventions

The following national policies provide the guiding principles for the design, construction and operation of the proposed coal terminal:

- National Ecologically Sustainable Development (ESD) Strategy 1992;
- National Greenhouse Response Strategy 1992; and
- Framework Convention on Climate Change 1994.

Other international conventions and agreements relevant to the coal terminal include:

- CAMBA – Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their environment;
- JAMBA – Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their environment; and
- Ramsar Convention on Wetlands – The Convention on wetlands, signed in Ramsar, Iran, 1971, is an inter-governmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

In addition to the conventions and agreements above, a further two conventions are identified as being indirectly relevant to the coal terminal. These are:

- CMS or Bonn Convention – The Convention on the Conservation of Migratory Species of Wild Animals aim is to conserve terrestrial, marine and avian migratory species throughout their range.

  The convention is aimed at restricting harvesting, conserving habitats and controlling other adverse factors. The species covered include marine mammals, sea turtles and sea birds.

- Convention on Biological Diversity – is a comprehensive, binding agreement covering the use and conservation of biodiversity.

23.2.2 Regulatory Process

The following legislation is considered relevant to the project:

- *Aboriginal and Torres Strait Island Heritage Protection Act 1986*;
- *Aboriginal Cultural Heritage Act 2003*;
- *Acquisition of Land Act 1967*;
- *Animal Care and Protection Act 2001*;
- *Civil Aviation Act 1988*;
- *Coastal Protection and Management Act 1995*;
- *Dangerous Goods Safety Management Act 2001*;
- *Environmental Protection Act 1994*;
- *Environment Protection and Biodiversity Conservation Act 1999*;
- *Fisheries Act 1994*;
- *Health Regulations under the Health Act*.
- *Integrated Planning Act 1997*;
- *Lands Act 1994*;
- *Nature Conservation (Wildlife) Regulation 1994*;
- *Plant Protection (Red Imported Fire Ant) Quarantine Notice 2001*;
- *Queensland Heritage Act 1992*;
- *Soil Conservation Act 1986*;
- *Transport Infrastructure Act 1994*;
- *Transport of Dangerous Goods by Road Act*;
- *Vegetation Management Act 1999*;
- *Water Act 2000; and*
- *Workplace Health and Safety Act 1995*.

A summary of the likely approvals required for the proposed coal terminal are provided in Table 23.1.

Table 23.1 Summary of Likely Approvals Required for Coal Terminal

Legislation	Administering Authority	Trigger	Project Response
Environment Protection and Biodiversity Conservation Act 1999	Department of Environment and Water Resources Commonwealth Environment Minister	Impact on matter of NES: Section 12 and 15A (World Heritage); Section 18 and 18A (Listed threatened species and communities); and Section 20 and 20A (Listed migratory species).	Commonwealth Environment Minister declared the project a controlled action
Native Title Act 1993	Any Department of Local Government making a decision which may impact on Native Title.	Any action on Crown Land (including ocean) over which a registered native title claim exists. Following Federal Court decision on *Lardil Peoples and Ors v QLD* it is unlikely that a claim to native title over the ocean will preclude commercial activity in the claim area.	Onshore works will be carried out within the existing terminal boundary which is freehold land. Native title therefore is not applicable. Offshore works most likely not affected by native title due to *Lardil* decision but further investigation and legal advice needed. Reclamation works will be partially undertaken on land not identified as being SPL, which may have native title implications. If native title applies, notification of proposed activity to Native Title Claimants will be required.
State Development and Public Works Organisation Act 1971	Coordinator-General	Initial Advice Statement prepared by the Proponents, identified the level of investment necessary for the project, employment opportunities provided by the project, potential impact on the environment, potential effects on relevant infrastructure and the significance of the project to the region and State	Coordinator-General declared the project a significant project
State Development and Public Works Organisation Act 1971	Coordinator-General	Part of the reclamation and conveyor between the dump station and coal terminal traverses the GSDA, therefore the GSDA Development Scheme applies to works within the GSDA.	MCU application needs to be lodged with Department of Infrastructure

Legislation	Administering Authority	Trigger	Project Response
Integrated Planning Act 1997	Gladstone City Council Calliope Shire Council Queensland Transport	Development which requires approval under the Gladstone/calliope Planning Schemes and land use designations.	For works undertaken within the boundaries of the SPL the IPA does not apply. Approval under IPA may be required for reclamation works on land not identified as being SPL.
Dangerous Goods Safety Management Act 2001	DES	Large dangerous goods location established	Notify the Chief Executive (DES). Emergency Plans and Procedures to be prepared
Aboriginal Cultural Heritage Act 2003	DNRW	Duty of care to take all reasonable and practicable measures not to harm Aboriginal cultural heritage	Aboriginal cultural heritage investigation and Cultural Heritage Management Plan required under s87 if EIS proposed under the *State Development and public Works Organisation Act 1972.*
Coastal Protection and Management Act 1995	EPA	The removal of quarry material from State coastal land below the high water mark in a coastal management district. Operational work that is undertaking tidal works; or works (including land reclamation under tidal water) within a coastal management district.	Development Permit for Operational Work to be obtained
Environmental Protection Act 1994	EPA	Construction ERAs • ERA 7: Storing chemicals (other than crude oil, natural gas and petroleum products) • ERA 20(c): Extracting rock or other material • ERA 22: Screening, washing, crushing, grinding, milling, sizing or separating material extracted from the earth • ERA 62: Concrete batching Other ERAs as required during construction • ERA 28: Motor vehicle Workshop	Development Permits and Registration Certificates to be obtained

Legislation	Administering Authority	Trigger	Project Response
Environmental Protection Act 1994	EPA	Operational ERAs • ERA 11: Crude oil or petroleum product storing in tanks or containers having a combined total storage capacity of: 500,000L or more • ERA 7: Storing chemicals (other than crude oil, natural gas and petroleum products) • ERA 15 (a): Operating a sewage treatment plant to have a peak design capacity to treat sewage of 100 or more equivalent persons but less than 1,500 equivalent persons • ERA 23(a): Abrasive blasting, commercially cleaning equipment or structures using a stream of abrasives • ERA 62: Concrete batching Other ERAs as required during construction • ERA 71: Operating a port (other than an airport) under the Transport Infrastructure Act 1994	Development Permits and Registration Certificates to be obtained
		• ERA 74: Commercially loading, unloading or stockpiling materials or goods, in association with an activity mentioned in ERA 71	
		• ERA 28: Motor Vehicle Workshop	
Explosives Act 1999	DNRW	Possession, storage and use of explosives	Blasting required for dredging and/or fill material. Authority required for possession (s34), storage (s44) and use (s53) of explosives
Fisheries Act 1994 and *Integrated Planning Act 1997*	DPIF	Work in areas causing removal, destruction or damage to marine plants	Development Permit for Operational Work to be obtained
		The construction or raising of a waterway barrier	Development Permit to be obtained

Legislation	Administering Authority	Trigger	Project Response
Nature Conservation Act 1992	EPA	Taking, using, keeping or interfering with a protected animal or plant (Section 88 and 89).	Licence/Permit to be obtained if removal of or interference with protected plants or animals is proposed.
Vegetation Management Act 1999 and *Integrated Planning Act 1997*	DNRW	Removal of Regional Ecosystems as defined by the EPA under the Act	Development Permit to be obtained
Transport Infrastructure Act 1994	CQPA Department of Transport	Any reclamation works which encroach on land not identified as being SPL, will have land use and land tenure implications. If CQPA has title over the encroached area, then CQPA will be required to modify the Gladstone Land Use Plan to reflect the change in land use arising from the encroachment. Section 285 requires CQPA to consult with the public and local government prior to it amending the plan. In order to take effect, the amended plan must be approved by the Minister for Transport, followed by gazette notification (s286).	
		If CQPA does not hold title over the encroached area, it must acquire the land first before it can be approved as SPL. If CQPA is unable to do so, it may need to approach and convince Government that the land is needed for strategic port purposes and to acquire the land on its behalf.	

Legislation	Administering Authority	Trigger	Project Response
Transport Infrastructure Act 1994 and Integrated Planning Act 1997	DMR	Undertaking operational works on land contiguous to a State-controlled road (Schedule 2 Table 3 *Integrated Planning Regulations* 1997), Includes work that is: • Associated with access to State-controlled road; • Involves filling or excavation; or • Results in redirection or intensification of site stormwater through a pipe with diameter greater than 625 cm2. Operational work on SPL does not trigger a referral to DMR. Works that constitute a Material Change of Use on SPL triggers the development assessment process (Schedule 2, table 2 *Integrated Planning Regulations 1997*).	For operational works on SPL, development application is not required. For works on land other than SPL, development application to be submitted to DMR for approval.
Transport Infrastructure Act 1994 and Integrated Planning Act 1997	CQPA	Development below high water mark and within the limits of a Port under the *Transport Infrastructure Act 1994.*	Operational impacts on marine navigation associated with the movement of vessels within Port Limits. Approval from CQPA primarily due to navigational issues (Schedule 2 *Integrated Planning Regulated 1998).*
Transport Operations (Road Use Management) Regulation 1995	Department of Transport DMR/Department of Transport	Transportation by road of vehicles of a size or weight which exceed the legal limit (s11A). Carrying dangerous goods as defined under the Australian Code for the transportation of dangerous goods by road or rail, or prescribed by Regulations (s154).	Approval to be obtained if applicable.
Transport Operations (Road Use Management/Dangerous Goods) Regulations 1998	DMR/Department of Transport	Transport of empty drums that previously held materials classed as Dangerous Goods (Part 18).	Approval to be obtained if applicable.
Transport Planning and Co-ordination Act 1994	DMR/Department of Transport		

Legislation	Administering Authority	Trigger	Project Response
Dangerous Goods Safety Management Regulation 2001	Department of Emergency Services	Storage of goods/materials in quantities exceeding the levels outlined in the Regulation.	If facility is a Large Dangerous Goods Location then notification only to Dept of Emergency Services is required. If facility is a Major Hazard Facility then it will be necessary to notify Dept of Emergency Services and make application under IPA for a Development Approval.
Civil Aviation Act 1988 and Regulations	Civil Aviation Safety Authority and Gladstone-Calliope Aerodrome Board	Object that penetrates the obstacle limitation surface of Gladstone Aerodrome	Obtain approval if required
		Lighting within 6km radius of the aerodrome	Obtain approval if required
Water Act 2000 and Integrated Planning Act 1997	DNRW	Taking water from a watercourse, lake, spring or underground water (s237). Taking, getting, removing or otherwise interfering with quarry material in or from a watercourse or lake (s280). These activities are assessable development under Schedule 8 of IPA.	Development permit for operational works required if taking water from a watercourse, lake, spring or underground water is proposed. Development permit required if taking, getting, removing or interfering with quarry material from a watercourse or lake is proposed.

Legislation	Administering Authority	Trigger	Project Response
Integrated Planning Amendment Regulation (No.3) 2002 and State Planning Policy 2/02 (Acid Sulphate Soils)	DNRW	Development assessable where the surface of the land is at or below 5m AHD or the development involves filling the development site with 1000m^3 or more of material. Assessing acid sulphate soil matters under IPA does not apply to SPL (IPA Guide 11). For SPL, development is only assessable if there is a Material Change of Use made assessable under a planning scheme or there is a reconfiguration of a lot.	All works undertaken within boundaries of SPL do not require consent. This issue will be referred to DNRM as an Advice Agency for a Development Permit for Operational Works for reclamation works on land outside of SPL. Acid Sulphate Soil management needs to be addressed as part of environmental due diligence under the *Environmental Protection Act 1994*

Table Notes:
DES = Department of Emergency Services
DPIF = Department of Primary Industries and Fisheries
EPA = Environmental Protection Agency
NES = National Environmental Significance
ERA = Environmentally Relevant Activity
CLR = Contaminated Land Register
EMR = Environmental Management Register
DNRW = Department of Natural Resources and Water
DMR = Department of Main Roads

Some of the other key legislative requirements for the coal terminal are summarised in the table below. Other approvals for the coal terminal are to be identified during the detailed design phase of the Project.

Table 23.2 Other Key Legislative Requirements

Legislation	Administering Authority	Trigger	Project Response	Responsibility (Project Phase)
Animal Care and Protection Act 2001	DPIF	Encounter animals in the course of works/activities	Must not be cruel to an animal (eg cause pain, abuse, confine or transport inappropriately)	Construction Contractor (Construction)
			Fauna Relocation Plan to be implemented	Construction Contractor (Construction)
Environmental Protection (Waste Management) Regulation 2000	EPA	Various triggers relating to waste tracking	Waste management to comply with relevant provisions (refer Section 3.9.3 for further details)	Construction Contractor (Construction)
Land Protection (Pest and Stock Route Management) Act 2002	DNRW	Pests (ie animals or plants) must be controlled	EMP to be implemented during construction and maintenance	Construction Contractor (Construction) Operator (Operation)

Table Notes:
DNRW = Department of Natural Resources and Water
DPIF = Department of Primary Industries and Fisheries
EPA = Environmental Protection Agency

23.2.3 Monitoring and Auditing Standards and Guidelines

The following standards apply to monitoring and auditing of performance:

Water and Wastewater

- Water Quality Sampling Manual, Third Edition, 1999 – For use in Testing for Compliance with the *Environmental Protection Act 1994*. Third Edition (Department of Environment Heritage 1999);
- Standard Methods of the Examination of Water and Wastewater – American Public Health Association (APHA)/Australian Waste Water Association (AWWA); AND
- AS 2031 Selection of Containers and Preservation of Water Samples for Chemical and Microbiological Analysis.

Soils

- Australian and New Zealand Environment and Conservation Council (ANZECC)/National Health and Medical Research Council (NHMRC) – Guidelines for the Assessment and Management of Contaminated Sites;
- Queensland Government Chemical Laboratory – Guidelines for Soil Sampling;
- Queensland Acid Sulfate Soil Investigation Team (QASSIT) "Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998"; and
- "Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland" (Department of Environment 1998).

Air Quality

- AS 3580 Methods of Sampling and Analysis of Ambient Air.

Noise and Vibration

- E1 Environmental Guideline "Noise from Construction, Maintenance and Demolition Sites" (EPA 1989);
- Noise Measurement Manual, Third Edition, 2000;
- AS 1055.1 and AS 1055.2 Acoustics – Description and Management of Environmental Noise;
- AS 2187 Explosives – Storage Transport and Use (Explosives Code);
- AS 2436 Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- AS 2659.1 Guide to the Use of Sound Measuring Equipment; and
- AS 2659 Sound Level Meters.

Dangerous Goods

- AS 1216 Classification, Hazard Identification and Information Systems for Dangerous Goods;
- AS 1678 Emergency Procedure Guides – Transport;
- AS 1940 Storage and Handling of Flammable and Combustible Liquids;
- AS 2508 Safe Storage and Handling Information Cards for Hazardous Materials;
- AS 2809 Road Tank Vehicles for Dangerous Goods; and
- AS 2931 Selection and Use of Emergency Procedure Guides for Transport of Dangerous Goods.

23.2.4 Best Practice

For the purposes of the EMP the term "best practice" refers to the environmental management of an activity which achieves an ongoing minimisation of environmental harm of the activities through cost effective and practical measures currently used nationally and internationally for the activity.

23.3 Project Management

The project delivery method for the coal terminal is being considered by the CQPA. For the purposes of this EMP the following roles have been used:

- Detailed Design Consultant;
- Environmental Consultant;
- Construction Contractor;
- Superintendent; and
- Operator (CQPA).

23.4 Environmental Management Strategies

23.4.1 Structure

The structure of the environmental management strategies that follow are to assist in separate consideration of the relevant environmental issues. It is intended that this format is user-friendly and is amenable to review and amend when necessary. Where appropriate, management strategies for individual sections of the Project have been identified. The contents of a typical strategy are described below:

- Commitment or Objective;
- Mitigation Measures (design, construction and operation where relevant); and
- Monitoring (if required).

23.4.2 Topography, Geology and Soils

Objectives

- To manage ground disturbance activities during pre-construction, construction and operational activities to minimise environmental impacts and maximise the potential for successful land rehabilitation following construction;
- To ensure any acid sulfate soils (ASS) that may be disturbed during pre-construction, construction and operational activities are identified and managed to minimise potential impacts to surrounding land and nearby water bodies;
- Manage the storage, transport and handling of hazardous materials during site construction and operational activities to protect human health and the environment;
- Provide guidance on environmental, health and safety aspects associated with construction and operation of the Project;
- Manage the health and environmental risks from contaminated land;
- Manage the way contaminated spoil is removed and disposed to ensure the risk is not relocated to another site;
- Minimise the potential and risk for hazardous events;
- Minimise soil erosion;
- Minimise loss of fertile topsoil material; and
- Aim to improve soil and geotechnical stability.

Mitigation Measures

Design

To minimise potential impacts discussed above the following mitigation measures will be applied in design:

- During the detailed design process the fill embankments will be assessed in terms of both settlement and stability;

- The design process will require the input of a comprehensive level of information on the subsurface profile, the strength and reactivity properties of the various materials and groundwater information;
- Further detailed geotechnical investigations may be required to obtain information relating to stability assessments, foundation design parameter requirements and potential settlement of fill embankments and foundations; and
- If soil is to be removed from, or temporarily stored on, Lot 2 on SP147891 (a portion of Reclamation Area C) then the consideration of the need for further assessment of the contamination status of this land parcel during the design phase and prior to commencement of construction will be required. Special soil handling and management measures for this land parcel may need to be incorporated in a Construction Soil Handling and Management Plan.

Construction

To minimise potential impacts during construction, the following mitigation measures will be applied:

- A DPIF Approval Risk Management Plan (ARMP) will be prepared to minimise the risk of spreading Fire Ants. It will cover the procedures to be followed when:
  - Planning for works in Fire Ant Restricted Areas,
  - Treating high risk items; and
  - Moving High Risk items between sites in Restricted Areas or to sites out of Restricted Areas.
- Movement certification procedures for high risk items will also be addressed. A Fire Ant Management Plan will be implemented prior to the commencement of any construction work;
- Bulk earthworks for excavation at both Golding Point and Borrow Hill 1 as well as the filling associated with the embankments for Hanson Road will be carried out in a controlled manner. Works will be undertaken in accordance with a materials handling schedule and the requirements of an erosion and sediment control plan;
- Drainage and overland water flow will be carefully controlled so as to not impact on the stability of the rail embankments. Vegetation will be established as soon as practicable to prevent slope face degradation;
- Careful construction practices will be used in the vicinity of any settlement monitoring devices to avoid damaging the equipment;
- An ASS Management Plan will be required which outlines affected areas, ASS management practices and the required liming rates, location and operation of treatment areas;
- Collection and removal of illegally disposed waste items located in the Borrow Hill 1 area to an appropriately licensed landfill prior to commencement of excavation works associated with Borrow Hill 1; and
- The development prior to commencement of construction and implementation of a Soil Handling and Management Plan which covers:
  - ASS;
  - Fire Ants;
  - Erosion and Sediment Control;
  - The movement of actual or potentially contaminated soil (from the existing rail corridor or any properties listed on the EMR including the application for an EPA Waste Disposal Permit (required for removal of soil from a land parcel which is listed on the EMR);
  - Topsoil management; and
  - Dredge spoil placement/disposal.

Operation

To minimise potential impacts during operation, the following mitigation measures will be applied:

- Dredge spoil placement plan to guide dredge spoil placement during maintenance and operation;
- An adequate level of maintenance on surface and subsurface drains will be required; and
- Vegetation on embankment slopes should be maintained to prevent face degradation.

23.4.3 Transport and Traffic

Objectives

- To minimise the impact on existing traffic and infrastructure associated with the transport of plant, equipment and materials during pre-construction, construction and operations. Manage interactions between port activities and other infrastructure; and
- Access from public roads to construction sites must be managed in accordance with all State regulatory requirements, including warning signage and transport control staff at critical intersections.

Mitigation Measures

The following mitigation measures will be implemented:

Design

- Prepare a Traffic Management Plan in accordance with DMR requirements; and
- CQPA will enter into an infrastructure agreement with DMR with respect to the impact on the DMR road network.

Construction

- Implementation of a Traffic Management Plan.

23.4.4 Water Quality

Objectives

- To ensure that water quality entering creeks and waterways downstream during and post construction meet with approved statutory guidelines;
- Where the water quality of existing water bodies does not comply with the guidelines, water quality objectives should be consistent ambient historic and seasonal fluctuations;
- No sustained or significant increase in pollutant levels in receiving waterways;
- No visible evidence of contaminants leaving the site through stormwater runoff;
- No litter leaving the site during construction or operational phases;
- Maximise use of mitigation measures such as Water Sensitive Urban Design (WSUD) devices between construction and operational phases of the project; and
- Water quality during construction should be within any limits set by environmental authorities.

Mitigation Measures

Design

The following mitigation measures will be implemented during the design phase:

- All dredging and spoil disposal (initial and maintenance dredging) will be undertaken in accordance with the relevant guidelines. This should take into account the presence of approximately 40% clay fractions and design accordingly. The mitigation measures for dredging will be included within a Dredge Management Plan (refer Appendix D);
- Areas of riparian vegetation and flow-dependent ecosystems be left undisturbed wherever possible;
- Existing degraded areas should be clearly mapped and identified as areas to avoid or appropriate measures should be implemented to minimise further degradation. These measures include:
  - Minimising the work footprint within the riparian zone and watercourses;
  - Minimising land clearing within the project area; and
  - Silt fencing or other erosion and sediment control measures;
- The Dredge Management Plan will be finalised during the detailed design phase. This Plan will be implemented during the construction stage to minimise potential impacts on the World Heritage Area and marine species. The plan will incorporate measures so that dewatering discharge will not:
  - Enter poorly defined watercourses, as water may leave the channel, flooding adjoining land and vegetation;
  - Compromise the Environmental Values of any surface water or groundwater;
  - Enter watercourses or drainage lines not designated for dewatering; and
  - Discharge at levels above discharge guidelines;
- Decant water will be continuously monitored for compliance with the required guidelines before being discharged through one or two locations along the Anabranch and Calliope River (discharge from the WICT reclamation ponds) and Port Curtis (discharge from the RGTCT reclamation pond). As there is a high fraction of clays (approximately 40%) in the dredge material, the water will have a high turbidity reading. Settling out these diatomaceous particles prior to discharge will require deep, extensive ponds and rigorous monitoring of the discharge water. If the water does not comply with the required guidelines for discharge, other forms of solids reduction such as flocculation may be required. Careful planning will be undertaken during the detailed design phase to refine the dewatering strategy;
- Consider the needs to dose acidic discharge water with alkalis such as lime to raise pH;
- Finalisation of the Acid Sulfate Soils Management Plan during detailed design;
- Preparation of a Stormwater Management Plan to identify drainage lines, water quality improvement devices and their location;
- Preparation of a Waste Management Plan; and
- Potential coastal management impacts will be mitigated by the preparation of a Coastal Management Plan that considers the Coastal Management Overlay Codes, under the Gladstone IPA Plan.

Construction

The following mitigation measures will be implemented during construction:

- Implementation the Dredge Management Plan;
- Consultation with EPA will be undertaken to finalise the trigger values for suspended solids and/or turbidity within water column. Discharge trigger values for dredging will be determined during a validation study to be conducted within the first week of dredging. This study will allow the determination of the relationship between turbidity and the receiving environment. CQPA and the dredging contractor will then apply the discharge trigger values. The receiving environment trigger values will be as recommended by McArthur *et al* (1994) with the 95th percentile ambient conditions regarded as appropriate threshold for the receiving habitat of Port Curtis;
- Prior to offsite discharge, water quality must meet the conditions of the licensing agreement;
- To reduce the amounts of sediment carried in stormwater runoff during construction, the following measures will be implemented:
  - Minimise the use of environmentally persistent herbicides and fertilisers;
  - Maximise the areas of vegetation within the project area. Wetland communities and riparian zones are natural buffer zones removing sediment and other pollutants;
  - Stockpile materials and soils away from natural drainage areas;
  - Implement mechanisms to slow and/or prevent overland runoff. Such mechanisms include the planting of vegetation and/or the installation of artificial structures (ie geofabric and bunds);
  - Areas of erosion and/or dispersive soils to be isolated and remediated to prevent further degradation;
  - Where possible undertake significant earthworks during the dry season and install temporary bunding or sediment traps;
  - To minimise erosion of bunds by stormwater runoff, measures such as re-establishing vegetation and rock revetments will be employed, where necessary;
  - Where practical, monitor discharges on a weekly basis from all discharge points;
  - Minimising works within watercourses and riparian zones; and
  - To minimise sedimentation and scouring of the watercourse, design culverts and bridge abutments to conform to the watercourse morphology;
- To minimise the impact of a hydrocarbon or chemical spill, the following measures will be implemented:
  - As part of the Standard Operating Procedure all employees will be educated in the response to a spill or leak;
  - Chemical spill kits will be located within all vehicles carrying chemicals and near chemical storage areas;
  - Chemical storage areas and wash down facilities are to be located away from existing drainage lines and have appropriate bunding and waste water collection mechanisms;
  - Chemical and hydrocarbon wastewater must be disposed to a liquid waste disposal facility or company, or treated to an acceptable level for discharge to the sewer with the permission of the responsible authority; and
  - Waste storage facilities and spoil placement areas are to be located away from existing drainage lines and have appropriate bunding and drainage mechanisms;
- An Acid Sulfate Soils Management Plan will be implemented to minimise impacts from ASS;
- A Stormwater Management Plan will be implemented; and
- Implementation of the Coastal Management Overlay Codes, under the Gladstone IPA Plan, to minimise coastal management impacts.

Operational

The following mitigation measures will be implemented during operation:

- Maintenance dredging spoil will be disposed at an approved disposal site and will be managed under the existing port Dredge Management Plan;
- Recycle onsite water where the water quality is suitable for reuse for dust control, wash-down water, or irrigation of vegetation;
- Discharges under circumstances such as high rainfall will comply with discharge quality guidelines outlined in Table 23.3;
- Spills and wastewater will be managed under the Waste Management Plan and hazardous substances Australian Standard AS 1940B1993;
- The redirection of flows under Hanson Road will incorporate a larger culvert that will need to be regularly cleared of sediment build up; and
- Abrasive blasting over water will be managed to comply with the *EPA Over-water abrasive blasting in marine and other aquatic environments Environmental Operation Guidelines* (EPA 2004).

Monitoring and Reporting

Water discharged from the project area to the receiving environment will be continuously monitored for compliance with the appropriate guidelines. Water will be discharged from the dewatering discharge locations along the Anabranch during construction and from the stormwater and settlement pond during operation. The monitoring will include:

- Dredge dewatering discharge flow rate, continuously metered;
- During dewatering discharge weekly monitoring of suspended solids, pH, litter and oil and grease;
- Physical parameters post treatment at operation settling pond overflow (eg pH and turbidity) on commencement, and thereafter at a weekly interval during periods of discharge;
- Site specific chemical and biological parameters using a NATA accredited laboratory on commencement, and thereafter at a monthly interval;
- If flocculation is to be used for treatment, monitoring of the dosing and residual floc will be undertaken;
- Impacts on vegetation, wetlands and water resources by carrying out investigations immediately prior to commencement, post commissioning and thereafter at regular intervals; and
- Records and results of the monitoring programme should be retained for a period suitable for inspection or reporting on request by government agencies.

23.4.5 Groundwater

Objectives

- Ensure there is no adverse impact on the existing levels and quality of shallow and regional groundwater aquifers during pre-construction, construction and operational activities;
- Develop and implement management controls for hazardous goods on site to protect groundwater, including a spill response programme, on site equipment and training; and
- Manage the potential for impacts resulting from the migration of contaminated groundwater.

Mitigation Measures

Design

A regular water level and water quality monitoring programme will be implemented and continued until commencement of construction. Routine monitoring of water levels will be undertaken to obtain baseline groundwater quality and groundwater level data. This data will be used to determine the natural variability in the groundwater system. As a minimum, the groundwater quality analyses will include electrical; conductivity, TDS, pH, major cations, major anions and the various components of alkalinity. Analysis for nutrients, volatile compounds or hydrocarbons is not warranted unless site specific data suggest otherwise.

Baseline monitoring data will be used to establish trigger levels of key parameters which can be used as a quantitative method of determining whether unexpected impacts are occurring during construction, or if variations in parameters are simply a result of natural variability. Typically, trigger values are applied to electrical conductivity, pH and water levels, however other parameters may be used if necessary. For electrical conductivity and groundwater levels, trigger values of two standard deviations greater or less than the maximum or minimum observed values are acceptable. In terms of pH, lower and upper trigger values of 6.0 and 9.5, respectively are appropriate.

Construction

During construction water level monitoring will be continued. Deviations from seasonal baseline water levels will be assessed and if necessary mitigation options formulated.

Some level of impact may be considered acceptable, particularly in relation to drawdown, however, inflows of acid groundwater to WICT excavations during construction is undesirable. Options to manage the collection of groundwater inflow include:

- Measurement of water volumes collected at sumps;
- Periodic measurement of electrical conductivity and pH;
- Reporting of analytical results;
- Treatment of the water by the addition of lime, if necessary, prior to disposal; and
- Cut off of excavations to limit infiltration.

23.4.6 Air Quality

Objectives

- To manage impacts to air quality during pre-construction, construction and operations due to emissions from vehicles, plant and equipment;
- To minimise the generation of dust and associated impacts during construction and operational activities such as vehicle travel on unsealed roads, earthworks, coal transport and stockpiling;
- Minimise potential for nuisance impacts as a result of dust emissions;
- Minimise emissions of pollutants from construction vehicles and machinery;
- Minimise potential odour impacts;
- Minimise greenhouse gas emissions (GHG) due to construction and operation of the Project; and
- Provide opportunities for minimising GHG emissions.

Mitigation Measures

Design

The proposed coal terminal will employ a range of best practice measures for controlling dust emissions.

- Maintaining an appropriate level of moisture for each coal type from rail receival through to ship loading;
- Wet down of stockpile surfaces. The final stockyard design will incorporate in excess of 100 water cannons each with a radius of throw of approximately 75m. The water cannons will wet down the surface of the stockpiles to form a surface crust that inhibits the wind erosion of dust;
- Mist curtain. In high winds water cannons become ineffective at dust suppression. A secondary suppression system will be used in these conditions that utilises a mist curtain. The mist curtain enhances deposition of dust by impaction of the dust particles;
- Extendable dust shroud for stacking. The extendable dust shroud will minimise dust emissions from stacking by reducing the effective drop height of the coal to the stockpile and by reducing the potential for fine coal particles to be entrained in the wind during stacking;
- All coal will be placed into its final location in the stockyard by the travelling gantry stackers and does not require dozers for this operation, therefore eliminating a potentially significant source of dust emissions;
- Reclaiming system designed to minimise bulldozing;
- Enclosure of all transfer points; and
- Where possible partial enclosure of elevated conveyors.

Construction

Dust control measures that will be implemented during construction will include:

- Development of a dust management plan prior to construction commencing;
- Applying water on all exposed areas by water cart as required to minimise dust emissions, particularly from wheel-generated dust;
- Minimising significant dust-generating activities during high wind speeds where practicable and unwatered;
- Restricting vehicle speeds on unsealed haul roads to reduce dust generation;
- Avoiding spillages and ensuring prompt cleanup of any that occur;
- Covering haul vehicles moving outside the construction site;
- Stockpiled material should be treated appropriately to prevent wind erosion from the prevailing easterly wind direction;
- Regular cleaning of machinery and vehicle tyres will prevent track-out of dust to public roads;
- Minimising licensed burning or incineration on site;
- Ensuring that roads are appropriately surfaced as soon as possible after the commencement of site activities;
- Routing roads away from sensitive areas wherever possible;
- Revegetating disturbed areas as soon as possible;
- Vehicles and equipment are to be appropriately maintained to minimise air emissions; and
- Visual monitoring of dust. Dust deposition gauges will be installed at nearby residences if required.

Operations

Dust emissions from the coal terminal will be minimised by the diligent application and maintenance of the design features.

In addition to the above, maintaining an appropriate level of moisture within the coal is the most important process in minimising dust emission from the transported or stockpiled coal.

Depending on the properties of the coal, each coal has an optimum moisture level above which coal dust can be effectively minimised. Monitoring the moisture content of coal at rail receival is an important process. This is to ensure the moisture level for each coal type is appropriate on arrival. If the moisture level is found to be below the optimum level, then calibrated water sprays can be used to raise the moisture content.

Handling of coal with moisture content at or above the optimum moisture level will minimise dust lift-off from operations including conveying, stacking, reclaiming, transfer points and ship loading.

During adverse meteorological conditions (such as high wind speeds) the use of misting sprays on the gantry stackers and reclaimers will also reduce dust emissions.

Reducing the spillage from conveyors is important for reducing dust emissions. This can be achieved with effective enclosures at transfer points, washing of the conveyor belts and utilising conveyor belt cleaning systems. Ground areas in the immediate vicinity of transfer points and other areas subject to spillage should be sealed where practical to facilitate rapid cleanup and removal of potential sources of dust emissions.

Dust emissions from exposed stockpile surfaces are reduced when the moisture level is maintained at the optimum moisture content. The large surface area of the stockpiles is continually subject to evaporation when exposed to hot, dry, windy conditions. Continual moisture replenishment is therefore required during such conditions and this will be applied through the regular use of the stockpile spray system.

Dust lift-off from the stockpiles is greatest during strong wind speeds. Recent studies have shown dust lift-off from static unbroken stockpile surfaces can be reduced by the application of a veneer solution to the stockpile surface (Planner (2004a), Planner (2004b) and Planner (2005)). This procedure is currently under investigation at other coal terminals in Australia.

The operation of a mobile spray tanker to apply water at regular intervals to areas where the stockpile sprayers cannot reach, empty stockpile areas and ground areas subject to coal spillage is another effective method of minimising dust lift-off. In a similar manner, use of a mobile road sweeper/cleaner is very effective in minimising dust emission from roads and other sealed areas.

23.4.7 Waste

Objectives

- To minimise waste generation and ensure appropriate handling and disposal of domestic and industrial wastes generated during pre-construction, construction and maintenance activities; and
- All waste streams will have regard to the Environment Protection (Waste Management) Policy 2000 principles, especially the waste management hierarchy of waste avoidance, reuse, recycling, treatment and disposal.

Mitigation Measures

Construction

Where possible, the quantity of wastes generated and removed from site will be reduced, with wastes to be segregated and recycled. Onsite reuse of wastes including soil, green waste and concrete is to be undertaken, with wastes associated with materials packaging returned to suppliers wherever possible. Remaining wastes during the construction phase will be recycled or disposed at Council's landfill where recycling is not feasible. Regulated waste will be removed by a regulated waste contractor.

Waste collection practices will be designed to prevent the site from becoming contaminated by oil or chemical spills during construction. New opportunities to reduce, reuse or recycle waste that may become available throughout the construction period will be incorporated into the waste management strategy.

Appropriate disposal permits for the disposal of contaminated soil from site will be obtained in accordance with Section 424 of the EP Act. Disposal permits enable appropriate and legal disposal and tracking of contaminated soil or materials.

Operational

Wastes generated during the operation of the coal terminal will be minimised where possible. Onsite reuse of wastes will be undertaken where feasible, and will include wastes such as green waste, pond sediment, concrete, bitumen and timber. Where suitable, wastes will be recycled or treated onsite with non-recyclable items sent to Council's landfill.

Abrasive blasting has been identified as a potential ERA relevant to the coal terminal, and will require approval in the form of a development permit granted under IPA and a Registration Certificate granted under the EP Act. Waste generated from abrasive blasting will be managed in accordance with the approval conditions.

Sewage from the proposed coal terminal will be treated onsite and effluent used for landscape irrigation.

23.4.8 Noise and Vibration

Objectives

- Construction noise and vibration impacts to be reduced as far as practicable through the implementation of appropriate management procedures, including use of low noise equipment and management of construction hours;
- Operational noise levels to be maintained by appropriate mitigation measures, including appropriate infrastructure design and noise mitigation measures;
- To minimise the impacts of noise and vibration associated with pre-construction, construction and operational activities on local residents, sensitive places and sensitive marine fauna;
- Design and implement a public complaint system to deal with construction noise and other impacts from construction and operational traffic movements; and
- Design and implementation of mitigation measures to achieve compliance with the Project noise and vibration goals, where feasible and reasonable.

Mitigation Measures

The following mitigation measures will be implemented:

Construction

Noise

- The quietest suitable plant and equipment will be utilised where possible;
- Where appropriate implement the requirements of AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*";
- Quietest plant and equipment that can economically undertake the work will be selected, wherever possible;
- Regular maintenance of equipment to keep it in good working order;
- Noise measurements of plant and equipment to maintain/check noise emissions;
- Mobile plant and other diesel powered equipment to be fitted with residential class mufflers;
- Minimise the usage of truck exhaust brakes onsite;
- Where possible, use silenced air compressors onsite;
- Construction work to occur within the daytime period wherever possible;
- Where practicable, avoid the coincidence of plant and equipment working simultaneously close together;
- Operators of construction equipment are to be made aware of the potential noise issues and of techniques to minimise noise emissions through a continuous process of operator education;
- Reversing alarms within construction areas cannot be avoided for safety reasons. Consideration should therefore be given to sourcing so-called "quiet" white-noise alarms whose annoying character diminishes quickly with distance and self-adjusting alarms which adjust emission levels relative to the local background noise level;
- Large rocks are to be placed in dump trucks not dropped;
- Horn signals should be kept at a low volume, where feasible without compromising public and employee safety;
- Implement, as part of the broader community involvement plan, a well-planned, focussed community awareness programme in order to improve the understanding of the noise and vibration issues and to assist in allaying potential fears and concerns, particularly where vibration is the perceived concern. This programme may include, for example:
  - Active community consultation and the maintenance of positive relations with residents. Representative groups of the community could be invited to attend a short, concentrated Noise and Vibration Briefing prior to the works approaching their community;
  - Ensure measures are undertaken to reduce the noise and vibration impact at neighbouring properties;
  - Where construction noise levels exceed the recommended criteria or in the event of complaints, an investigation of construction noise will be required; and
  - Provision of a complaints phone number;
- Construction site personnel are to be made aware of all community attitudes and complaints;
- Residents are to be made aware of the times and duration that they will likely be affected. Making residents aware of likely future occurrence of noise significantly reduces annoyance and allows people to make arrangements accordingly.

Vibration

Based on predicted vibration levels and safe working distances, no mitigation measures are required to reduce vibration levels at residences in the communities surrounding the Project.

During the detailed design phase of the Project building condition surveys will occur for any buildings that fall within the safe working distances for the prevention of cosmetic damage.

Further investigations will be undertaken for any structures within and around the safe working distances in order to determine if the “light weight” cosmetic damage criterion (as used for this assessment), is applicable or whether a higher value may be more appropriate.

Blasting

These predicted airblast overpressure and ground vibration levels are well below the nominated criteria for this Project.

Vibration monitoring will be undertaken for site-specific activities and in any situations where there is some doubt regarding the suitability of the plant or where there is believed to be a risk of exceeding the applicable vibration criteria.

Underwater Impacts

- In the event that the operator of the pile driver identifies marine mammals within the Impact Zone, piling should be halted until the marine mammal has departed; and
- Adopt a soft start to piling activities.

Monitoring

Monitoring is an important component in mitigation, in that it enables control to be maintained over the noise levels. Where necessary, the actual levels of noise created can be demonstrated to interested parties. It also enables the noise created by a piling operation to be ranked against other local sources of noise.

Fixed distance noise monitoring may be used to keep a record of peak noise levels and to provide an appropriate response, if these are excessive. Ideally, monitoring should include “real time” feedback of the level.

Operational

The need for mitigation will depend on the severity of impact on sensitive receivers, and the circumstances of its occurrence.

- Investigation of noise levels post-commissioning will be carried out as confirmation; and
- Noise impacts predicted for location 1-d (Tide Island) will likely require further detailed investigation, including baseline noise monitoring. Potential mitigation measures to be investigated may include, but not be limited to:
  - Enclosure of jetty, wharf and shiploading conveyors;
  - Acoustic treatment of the dwelling on Tide Island; and
  - Consultation and negotiation with affected residents.

23.4.9 Terrestrial Flora and Fauna

Objectives

- To minimise the potential for impacts to terrestrial flora and fauna species and vegetation communities, particularly those of state and/or national listed significance, during pre-construction, construction, and operational activities;
- Minimise clearance of terrestrial vegetation and habitat;
- Rehabilitate disturbed areas and maintain to avoid colonisation by weeds;
- Implement fauna and habitat management measures that prevent injury to terrestrial fauna;
- Minimise impacts to terrestrial fauna during pre-construction and construction;

- Implement infrastructure design measures that minimise impacts to terrestrial fauna and habitats; and
- Implement a rehabilitation plan for the revegetation and reinstatement of terrestrial habitat.

Mitigation Measures

Design Phase

The following mitigation measures will be implemented during the detailed design phase of the Project to minimise the impact on the fauna assemblage within the area:

- Consultation with DNRW to identify potential offset requirements in accordance the DNRW Policy for Vegetation Management Offset.
- Coal terminal lighting design to minimise visual impact on adjoining habitats (eg directional lighting, low pressure sodium bulbs, shrouding etc);
- Conveyor system to be semi-enclosed structure and be designed to limit vibration, noise, light and dust pollution;
- Conveyor system design should facilitate fauna movement especially within the Forest Precinct (ie movement is no impeded by the conveyor system);
- Design of structures or implement design measures to minimise risk to fauna (ie prevent bird nesting and/or roosting);
- Minimise clearing of marine plants and reclamation through innovative design techniques;
- Maximise retention of existing habitats and wildlife corridors especially within the Forest Precincts (ie limit footprint of conveyor system and associated infrastructure and where possible use existing haul roads);
- Maximise retention of existing riparian vegetation along the Calliope River and other watercourses;
- Prepare a Vegetation Rehabilitation and Management Plan (VRMP); and
- Maximise use of local native species in landscape design.

The works may be located near sites of the Red Imported Fire Ant (Fire Ant). Therefore controls on the movement of materials that may be of risk of transporting Fire Ant are required. The management actions detailed below reflect the “Red Imported Fire Ant Procedure” of Roads and Drainage Provider Unit. The Red Imported Fire Ant Management Plan shall be implemented prior to the commencement of any construction work (refer Table 23.3).

Table 23.3 Red Imported Fire Ant Management Plan

Investigation Threshold	Strategy	Management Action
Inspection of site for Fire Ants not undertaken prior to commencement and monthly thereafter.	To inspect the site for the presence of fire ants prior to the start of works and at monthly intervals during the works period.	Prior to commencement of works, a Department of Primary Industries and Fisheries (DPIF) approved person shall carry out an inspection of the site. This inspection will identify whether the site is visually free or visually infested with Fire Ants. The inspection of the site shall be repeated every 28 days. The approved inspector will complete the Site Inspection Form (Issued by the DPIF).
Importation to the site of materials capable of transporting fire ants without inspection and clearance.	To only source restricted items (soil, plants etc) which are free of Fire Ants.	All incoming restricted items (soil, plants etc) must be visually inspected by an DPIF authorised person prior to entry into the site and shall only be sourced from providers outside the restricted area or with a DPIF Approved Risk Management Plan, and be accompanied by a written assurance that the material is Fire Ant free.

Investigation Threshold	Strategy	Management Action
No records of imported materials from the restricted area.	To maintain records of any imported materials from the restricted area.	All incoming restricted items must be recorded detailing the nature, quantity and source of materials imported to the site. All records to be held onsite by the Construction Contractor.
Importation to the site of materials capable of transporting fire ants without inspection and clearance.	To minimise the risk of Fire Ants being transported to the site by equipment and machinery.	All equipment and machinery to be visually free of loose soil or other material capable of containing Fire Ants prior to entry on to site.
Materials being exported from the site without inspection and clearance.	Movement of materials from the site shall not increase the risk of spread of Fire Ants.	Materials shall only leave the site within 28 days of a site inspection, which finds no visible evidence of Fire Ants.
Visual evidence of Fire Ants onsite.	Visual evidence or suspicion of Fire Ants to be reported.	In the event that Fire Ants are detected or reasonable suspicion is held that Fire Ants are present on the site, the Superintendent shall be immediately notified. The area under suspicion shall be barricaded and works in that area shall cease. The Construction Contractor should notify the DPIF.
	Additional management measures to be implemented on detection of Fire Ants.	In the event of Fire Ants being detected onsite, additional management measure shall be implemented which are in accordance with Attachment 4 of the Red Imported Fire Ant Risk Management Plan.

Construction Phase

Prior to the commencement of construction works, the following mitigation measures will be implemented:

- Designate rehabilitation zones and no go areas prior to clearing;
- All vegetation within the project area classified as an Endangered and Of Concern REs shall be clearly marked and contractors are to be briefed on clearing requirements and restrictions to prevent over clearing of these sensitive areas;
- Collection of seed from local native flora for propagation and use in rehabilitation works, particularly in REs mapped as Endangered and Of Concern by the EPA;
- Site offices, stockpiling and plant and equipment storage are to be located where possible on existing cleared lands or heavily disturbed areas; and
- Prepare a Weed and Pest Management Plan (WPMP) that includes details of vehicle and pedestrian wash down bays and vehicle signage and training.

A Fauna Management Plan which includes, but not be limited to, the following will be prepared and implemented during the construction phase of the terminal operation:

- Staff will be informed that all native wildlife is protected and shall not be intentionally harmed as a result of works or workers actions;
- Staff will be educated (on site induction) in relation to the risks of fauna deaths and how to manage animals which are injured or displaced, other measures include:
  - Outline procedures to be undertaken if an animal (healthy or injured) is encountered during construction;
  - Any injured fauna must be safely bundled and taken to the nearest vet or reported to the EPA where further instructions will be given;

- Recognised fauna spotter/catcher to inspect the sites prior to construction for any habitat trees and be present during construction for all vegetation and potential habitat removal, other measures include:
  – Relocation of wildlife to similar habitats adjoining the project area;
  – Trees containing hollows to be marked prior to construction;
  – Where applicable hollow bearing trees within the project area shall be retained and used in rehabilitation programs and/or offset areas (eg habitat in form of artificial hollows and/or woody debris);
  – Where necessary hollow-bearing trees are tapped prior to demolishing;
  – Where applicable a ratio of 1:1 for replacement of any hollows knocked down or damaged during clearing shall be employed;
  – In areas where natural hollows are scarce, artificial nest boxes and/or hollows sourced from cleared areas are to be introduced;
  – Identify and mark nesting areas and provide a buffer zone around nesting species
  – Identify and clearly mark feeder trees and glider flyways. These trees should be retained along with surrounding habitat ie hollow bearing trees wherever possible;
- Procedures to check culverts, trenches and other excavations for fauna species (ie checked each morning and after periods of inactivity to ensure fauna are not trapped or likely to be harmed by construction activities);
- Site works, such as trenches and excavations, will be designed to ensure fauna are not trapped or likely to be impacted by construction activities (eg install trench ramps at 15 degree slope every 30m or place branches or suitable material for fauna to climb and escape from trenches);
- Contact details for recognised fauna spotter/catchers, qualified animal carers and vets within the area; and
- Management requirements (ie organisational control and roles, review, reporting and corrective actions).

The following measures will be implemented during the construction phase to mitigate impacts on flora and fauna assemblages within and adjacent to the project area:

- Removal and/or disturbance of REs and marine plants will be carried out in accordance with approval conditions;
- Clearing of remnant vegetation will be restricted to the minimum required to enable the safe construction, operation and maintenance of the conveyor system and associated infrastructure;
- Limits of clearing will be clearly marked (eg flagging tape, barricade webbing or similar high visibility marking);
- All vegetation earmarked for retention will be protected and clearly defined/marked;
- Where possible, avoid loss of significant canopy vegetation and works that will lead to enhanced proliferation of weed species;
- Where possible, disturbance of REs, mangrove communities, riparian vegetation, wetland and saltpan vegetation will be minimised to retain their ecological value and buffering abilities;
- Minimal disturbance to riparian and instream vegetation to prevent bank erosion and excess sedimentation in local waterways;
- Intertidal batters to be stabilised as soon as possible and grade to allow recolonisation by marine plants;
- Implement the VRMP;
- Disturbed areas including riparian zones, wetlands, significant species, steep slopes and mapped Regional Ecosystems to be revegetated and rehabilitated with suitable native species after construction activities have been completed (in accordance with VRMP);
- Suitable native flora species to be used in rehabilitation works;
- Monitor the success of the rehabilitation strategies;

- Maintenance works are to be carried out within designated area(s) and/or offsite;
- Maintenance contractors are to remain on designated tracks and not disturb surrounding vegetation;
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible;
- Heavy machinery and equipment is stored in designated pre-cleared area(s) only;
- Restrict fauna access to waste storage facilities;
- Appropriate signage in prominent positions to reduce speed within the project area to promote awareness and provide safety for fauna crossing or inhabiting the area;
- Adhere to a WPMP particularly regarding the prevention of pest and potential pest species proliferating in the project corridor, especially those listed under the LP Act;
- The introduction of weeds or other introduced vegetation are to be minimised onto the construction site as per WPMP requirements;
- Machinery and heavy equipment is inspected prior to entering site as per the WPMP;
- Ensure any imported soil is uncontaminated (abiotic and biotic);
- An Environmental Officer is onsite to address potential issues as required;
- Ensure dust suppression mechanisms are in place;
- Prepare and implement Bushfire Management Plan;
- Implement ASS Management Plan;
- Comply with the conditions of the reclamation approval (Permit No. 04SADB0287);
- Removal and/or disturbance to marine plants is carried out in accordance with approval conditions;
- Mangrove communities adjoining the terminal will be protected and managed (ie implement a monitoring programme); and
- Environmental awareness programme to include species inhabiting the area and potential risks.

Operational Phase

The following mitigation measures will be implemented during the operational phase:

- Maintenance works are to be carried out within designated area(s) and/or offsite. This should be an area that has been disturbed and/or cleared within the project corridor;
- Maintenance contractors are to remain on designated tracks and not disturb surrounding vegetation;
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible;
- Heavy machinery and equipment is stored in designated area(s) only;
- Machinery and heavy equipment is inspected prior to entering site as per WPMP requirements;
- All native fauna is protected and shall not be intentionally impacted as a result of the works or worker actions;
- CQPA to investigate the opportunities to be part of regional migratory bird monitoring to confirm the importance of different habitat types within the Port Curtis region;
- Prepare and implement a Vegetation and Pest Management Plan; and
- Encourage community involvement in environmental monitoring programmes.

23.4.10 Aquatic Ecology

Objectives

- Minimise impacts to aquatic flora and fauna resulting from modification of water flows, levels or quality;
- Undertake pro-active measures to improve aquatic habitat quality if disturbed by construction and operational activities;

- Avoid disturbance to marine plants;
- Prevent the pollution and sedimentation of stormwater runoff discharged from site to minimise impacts to aquatic flora and fauna;
- Implement fauna and habitat management measures that prevent injury to aquatic fauna;
- Minimise impacts to aquatic fauna during pre-construction and construction;
- Implement infrastructure design measures that minimise impacts to aquatic fauna and habitats; and
- Manage ASS affected material to prevent impacts to aquatic flora and fauna within the receiving waterways.

Mitigation Measures

The following mitigation measures will be implemented to minimise the potential impact on the aquatic environments within the area:

Design

- Minimise clearing of marine plants and reclamation through innovative design techniques while ensuring no negative impact on master plan objectives and function;
- Coal terminal lighting design to minimise visual impact on adjoining habitats (eg directional lighting, low pressure sodium bulbs, shrouding etc);
- The depth and width of dredge channels should be designed so as to reduce future dredging;
- Additional loss of marine plants is to be mitigated by:
  - Rehabilitation of mangrove and saltmarsh communities within the Port Curtis region. Suitable areas are to be identified in consultation with DPIF officers; and
  - Ongoing monitoring of Port Curtis estuarine and marine environments including seagrass and mangrove communities.
- Reclamation Approval for Area A and the accompanying marine plant approval (39ha of marine plants) will be dissolved;
- Submit marine plant application for the removal and/or disturbance of marine plants within the project area; and
- Where practical, high noise construction activities will be planned to commence outside the bird migration period (October to May).

A draft Dredge Environmental Management Plan (DEMP) has been prepared (refer Appendix D) and will be implemented during the design phase. The draft DEMP outlines measures to ensure that the aquatic environment is not adversely impacted during dredging activities, including:

- An exclusion/safety zone will be created around the perimeter of the dredging activities. Dredging will not be carried out while dugongs, turtles or tother marine species of conservation significance are within 150m or while migratory birds are within 25m of the dredge activities. Activities will be placed on hold for the period of time it takes the animal to leave the safety zone
- Where possible, dredging operations shall be undertaken utilising the same equipment used by Port of Gladstone to limit introduction of toxic organisms or new species in the marine environment.
- Subject to equipment availability, a large dredge may be employed to enable the completion of the dredging program in the shortest possible timeframe.
- Where trailer suction dredging is carried out, turtle excluding devices are to be fitted to the drag heads of the dredger.
- Where trailer suction dredging is carried out, during times when the drag head is not in contact with the seabed, and pumps are in operation, pump speed shall be reduced and drag head water jets must be activated to minimise the risk of turtle capture.

Construction

- Areas around construction works must be maintained and/or restored to their natural state;
- No clearing and/or reclamation of Wiggins and Mud Islands;
- A buffer zone should be constructed around retained mangroves and riparian plants with protection and/or establishment of native shrubs, trees and other vegetation along disturbed areas to prevent destabilising banks, trap sediment and filter other pollutants;
- Limit the operation of heavy equipment within intertidal wetlands and riparian to established tracks;
- Where possible vegetation should not be removed within 30m of a wetland, waterway or estuary;
- Where possible protect and rehabilitate intertidal wetlands including mangroves, saltmarsh and saline grasslands;
- Maintain adjacent high tide banks with their cover of salt-tolerant vegetation;
- Implement a weed control strategy during and after construction;
- Implement procedures that will ensure the avoidance of material spills and ensure prompt clean up;
- A dredge vessel will be utilised in order that the dredge programme is completed within the shortest possible timeframe, thereby minimising the available window for potential impacts to occur;
- A water quality monitoring programme will be implemented to ensure that turbidity levels do not have the potential to impact on aquatic flora and fauna, particularly seagrass beds;
- Validation sampling should be undertaken during the dredging programme to confirm the continued non contamination of the sediments;
- Avoid temporary spoil sites and use spoil as a resource where possible;
- A staged dredging programme should be implemented which may potentially allow recovery of the marine and/or estuarine environments;
- A safety zone will be created around the perimeter of the dredging activities. Dredging will not be carried out while dugongs, turtles or tother marine species of conservation significance are within 150m or while migratory birds are within 25m of the dredge activities. Activities will be placed on hold for the period of time it takes the animal to leave the safety zone;
- Consultation with EPA to establish trigger values for suspended solids and/or turbidity within water column. Discharge trigger value for dredging will be determined during a validation study to be conducted within the first week of dredging. This study will allow the determination of the relationship between turbidity and the receiving environment. CQPA and dredging contractor will then apply discharge trigger value. The receiving environment trigger value will be as recommended by McArthur *et al* (1994) with the 95th percentile ambient conditions regarded as an appropriate threshold for the receiving habitat of Port Curtis;
- Bund walls will be designed and constructed in accordance with relevant standards. This should limit the movement of contaminants and risk of erosion/breaching;
- Sediment containment structures must be appropriately maintained and where containment screens are used, joints should be over-lapping and be appropriately secured;
- Sediment containment screens should be made of puncture and tear resistant material, hessian is not recommended. Selection should consider fire retardancy, burst strength and ultra-violet resistance. Shade cloth will not prevent the escape of fine dust and should not be used for temporary enclosures if work generates silica, lead or other toxic dusts;

- Over-water abrasive blasting will be carried out in accordance with the EPA QPWS Environmental Operations for Over-water abrasive blasting in marine and other aquatic environments. Environmental factors such as wind conditions should be considered prior to blasting operations commencing. Where wind conditions affect the ability to contain over-spray, work must cease;
- A waste management plan should be prepared and implemented. This programme should specifically address the clean-up and appropriate disposal method of abrasive blast waste products immediately after completion of blasting operations. Dust collectors, abrasive vacuum systems and recycling unit may be used in the management plan;
- Spray painting must be carried out in an approved spray paint booth where practicable;
- No filling, draining or alteration of the waterways, excluding that necessary for the development;
- Construction vehicles and machinery must remain within construction footprint and where practical stick to designated tracks and roadways;
- Install erosion and sediment control measures, prior to construction;
- Retain and treat overland runoff and stormwater from the site prior to discharging;
- Comply with the conditions of the reclamation approval (Permit No. 04SADB0287);
- Implement a revegetation/rehabilitation plan for the area. Rehabilitating riparian buffers is key to restoring natural stream functions and aquatic habitats;
- Prepare and implement a Weed and Pest Management Plan; and
- Implement mechanisms to minimise the risk of entanglement and mortality of migratory species (eg shorebirds, dugongs and turtles).

Operational

- Monitor the success of the revegetation/rehabilitation plan;
- Establish spoil disposal arrangements for maintenance dredging for new and ongoing dredging that minimise long-term impacts. Maintenance dredge material should be monitored to ensure that the sediments continue to be classified as non-contaminated;
- Where possible access tracks will be constructed clear of waterways;
- A fire management plan will be developed to address the risk and management of operational activities in relation to fire risks;
- Encourage community participation in compiling information on significant species within Port Curtis;
- Prepare and implement a Weed and Pest Management Plan; and
- Regular monitoring of the health of the intertidal wetlands including the seagrass and mangrove communities.

23.4.11 Cultural Heritage

Objectives

- Ensure all indigenous and non-indigenous cultural heritage artefacts and sites of significance are identified, protected and managed in accordance with all relevant statutory requirements during pre-construction, construction and maintenance activities; and
- Prevent the loss of, or damage to, items of Indigenous and non-Indigenous cultural heritage as a result of construction works.

Mitigation Measures

To minimise the impact from construction on the existing Indigenous and Non-indigenous environment, the following management measures will be implemented:

- Ongoing consultation with Traditional Owner representatives;
- Finalise the draft CHMP (refer WICT EIS Appendix O) and obtain approval from DNRW;

- Project works to be undertaken in accordance with the ACH Act;
- Implement the CHMP, which will include requirements for monitoring construction, specifically excavation activities within the proposed project area;
- Construction staff to attend cultural heritage inductions run by Traditional Owner group representatives prior to commencement of works, to promote an understanding of the potential indigenous heritage existing within the development; and
- Construction staff will be made aware of the importance of the ACH Act and the Duty of Care.

The Operational EMP for the coal terminal will include the requirement to comply with the ACH Act.

23.4.12 Social

Objectives

- Minimise the impacts of construction activities on the existing structure and values of nearby local communities;
- Wherever possible, enhance the development of community well being and amenity, including the provision of commercial and employment opportunities;
- Develop and implement a comprehensive Community Liaison programme, including regular meetings with community representatives and a project construction awareness program;
- Provide clear communication to community members of the project objectives, project definition and scope of the assessment to allow community members to consider the potential issues, benefits and impacts;
- Obtain community input to identifying local values and knowledge to be considered in the impact assessment investigations and development of the design; and
- Provide inclusive and regular opportunities for community members to participate in consultation.

Mitigation Measures

The following mitigation measures will be implemented:

- Preparation and distribution of newsletters and fact sheets to residential areas in proximity to the project (ie Clinton and nearby rural residential properties) prior to the various phases of construction;
- Maintain liaison with other projects expected to be developed in the Gladstone region to coordinate construction and minimise/avoid potential overlap;
- Preassemble construction materials offsite, where possible, away from the Gladstone area to reduce the number of workers required at the site;
- Ensure efficient timing and management of the construction phase of the project and where possible, coordinate with other projects being undertaken in the Gladstone area;
- Encourage single workers to share accommodation to decrease the overall demand for dwelling units;
- Specifically target the employment of local and regional professionals, technical, skilled and semi-skilled workers;
- Share resources and promote on-going employment opportunities through the movement of construction workers from other major projects as they reach completion;
- An Accommodation Strategy for the Project will be developed in consultation with Local and State Government agencies. The Strategy will consider:
  - Monitoring of housing availability in response to demand associated with the timing of WICT and other projects;
  - Measures to provide assistance to workers in securing short-term and permanent housing;

  - Opportunities for the project proponents to provide direct intervention in housing supply in the region through State housing agencies;
  - Encouraging partnerships with developers, the local building industry and community to develop more housing; and
  - Developing a monitoring programme to measure performance against the key social planning principles;
- Other options for housing assistance will be considered as part of the Accommodation Strategy in consultation with State housing agencies; and
- Commence discussions with State agencies to initiate a whole of government response to meet additional social facilities and services needs arising from the major projects currently planned for the region.

23.4.13 Health and Safety

Objectives

- Establish a Workplace Safety Ethic and Programme;
- Ensure a prompt and appropriate response is made to unplanned incidents where life and property are threatened during the construction phase;
- Provide a safe work site during the construction phase, achieve sustained reductions in the number of accidents during the operation phase and maintain a safe and secure site environment;
- Ensure that satisfactory safety provisions are implemented during construction and for the operational phase of the Project; and
- Identify potential hazards and risks and apply appropriate impact treatment and/or prevention mitigation measures.

Mitigation Measures

The following mitigation measures will be implemented to minimise potential health and safety impacts:

Design

- Consideration should be given to potential mosquito breeding in the design stage. Queensland Health (2002) has published Guidelines to minimise mosquito and biting midge problems in new development areas. This document provides advice on how to prevent or minimise the impact of mosquitoes and other biting insects in new development areas;
- Constructed wetlands, water impoundments, grass swales and open earth drains can all be designed so as to minimise mosquito breeding. The Australian Mosquito Control Manual (Mosquito Control Association of Australia 2002) has helpful advice on mosquito control. This manual can be purchased through the Association's website.

Construction

- Construction and installation of water storages should be carried out in accordance with Part 8, Mosquito Prevention and Destruction of the *Health Regulation 1996*. Where a risk assessment process has identified that there is a significant risk of mosquito borne disease, holding tanks for recycled water should be designed so as to prevent entry of mosquitoes; and
- Implementation of mosquito management practices.

Operation

- Regular maintenance of all structures associated with storage or treatment of recycled water is necessary to minimise mosquito breeding. For example, if mosquitoes are present in an open water storage, water plants should be cleared away from the edge of the storage to reduce habitat for larvae. In particular, recent research suggests that dense mats of surface vegetation or fallen decaying material can encourage mosquito breeding (Dale *et al* 2001);
- When recycled water is used for irrigation, surface ponding should be prevented by appropriate irrigation scheduling;
- Open recycled water storages should be monitored regularly to identify presence of mosquito larvae;
- If a potential health risk from mosquito breeding has been identified, biological control using natural predators, such as aquatic invertebrates or native fish known to prey upon mosquito larvae, may be considered; and
- Ensuring mosquito management practices are being employed.

23.4.14 Visual Amenity and Landscape Character

Objectives

- Implement revegetation measures to promote the use of native Australian vegetation species;
- Protect and enhance the visual amenity of the site and surrounding areas;
- Design and implement a landscape programme that integrates the development into the existing character of the site through the use of local native species; and
- Minimise visual impacts of Project.

Mitigation Measures

The following mitigation measures will be implemented:

- Investigate the feasibility of planting trees with a mature height of 20-30m within the landscape buffer (note that due to salt and wind pruning this height may not be achievable);
- Minimise the area of existing vegetation to be cleared by minimising the footprint of the individual elements of the development at the design phase and at construction by confining the clearance of vegetation to that necessary to carry out construction;
- Where possible construct infrastructure particularly buildings in materials with a visually neutral colour (eg mist green); and
- Minimise light spillage to areas outside the areas that need to be lit by using suitable fittings and shields.

23.5 Environmental Management Process

23.5.1 Preamble

CQPA's environmental management processes are generally detailed in their IEMS.

This EMP has been prepared as a Preliminary EMP and will be finalised prior to the detailed design tender phase of the project.

Construction

The Construction Contractor will be responsible for the creation of an EMP (Construction). This document should provide the Construction Contractor's proposed methods of mitigating any environmental impacts, which may be incurred as a result of their construction activities.

The checklist below provides the methodology, which should be followed by the Construction Contractor to create an EMP (Construction).

1. Identify the relevant works;
2. Identify which environmental aspects are required to be addressed in the EMP (Construction);
3. Refer to the relevant sections ie 'Construction' of the various Environmental Management Strategies (provided in the EMP), which address the environmental aspects (as identified in step 2) which are required to be included in the EMP (Construction);
4. Create the EMP (Construction) in accordance with the requirements of the Environmental Management Strategies (as identified in step 3). Section 23.5.2 provides guidance on the format and content of the EMP; and
5. Submit the EMP (Construction) to the Superintendent, who will then submit the EMP to the CQPA Representative for approval.

Operation

Operational activities will be undertaken in accordance with CQPA's Operational EMP and IEMS.

23.5.2 Content of an EMP

The Construction and Operational EMPs should address the requirements of the relevant environmental management strategies outlined in the EMP in separate sections. The EMPs should provide information under several different headings (which complement those in the environmental management strategies) as outlined below:

- Overview of Impacts and Existing Situation – The anticipated construction and/or operational impacts of the Project as determined in the EIS and final EMP should be detailed;
- Objectives – This section should provide the management objectives or environmental commitments to be achieved, as included in the 'objectives' section of the relevant environmental management strategy;
- Non Compliance – This section should provide information on the corrective actions to be implemented. The level or extent of corrective actions implemented should reflect the seriousness of the event. The various indicators which should trigger the implementation of corrective actions are provided in the 'corrective actions' section of the relevant environmental management strategy.
- Mitigation Measures – This section should provide details of the actions to be performed onsite. These actions should be developed from the requirements provided in the 'mitigation measures' section of the relevant environmental management strategy;
- Monitoring - This section should provide information on the monitoring activities to be performed. The actions included in this section may be sourced from the 'Monitoring' section of the relevant environmental management strategy;
- Reporting - This section should provide information on the reporting which will be performed by the Construction Contractor. The details included in this section may be able to be sourced from the 'Reporting' section of the relevant environmental management strategy; and
- Corrective Actions – This section should outline the action, or the commitment for action, to be implemented when a specified mitigation measures is not met or legislative requirements have been exceeded.

23.5.3 Submission of an EMP (Construction)

The Construction Contractor shall submit an EMP (Construction) to the CQPA for approval prior to construction commencing.

The Construction Contractor will have overall responsibility for the full and complete implementation of the EMP (Construction).

23.5.4 Auditing

The Construction Contractor will include in the reporting section of the EMP (Construction) the requirement to submit weekly checklist audit reports to the CQPA.

The Superintendent should audit the Construction Contractor's implementation of their EMP (Construction).

Actions to be undertaken by the Superintendent during the audit are likely to include:

- Check monitoring programme and reporting procedures;
- Undertake investigations where necessary;
- Review performance standards and criteria against results;
- Prepare audit reports over time (with respect to agreed schedule) and submit to the CQPA; and
- Procedures for non compliance and exceedance/investigation/intervention of indicators identification.

24. Rail EMP

24.1 Introduction

This draft EMP has been prepared in order to propose environmental protection commitments to protect the environmental values potentially affected by the proposed rail works within the WICT project footprint. This EMP has been further refined based on submissions received during the EIS consultation period.

The EMP identifies and describes the environmental values and potential impacts that may be caused by the rail works and defines critical environmental values which are to be protected through the consent conditions of the EA. Commitments are proposed and identified including environmental protection objectives, standards, measurable indicators and control strategies (ie to demonstrate how the objectives will be achieved).

The EMP will be refined and expanded further as required during the detailed design phase of the project and through consultation with the regulations.

24.1.1 Basis for the Plan

An important requirement of a Project of this nature is the preparation of an EMP to ensure the environmental safeguards proposed as a result of the Project planning and environmental assessments are enacted in an appropriate and timely fashion.

The potential exists for the degradation of the site and surrounding natural values. This would be likely to occur during the construction and operational stages of this Project and has been identified during the course of the environmental studies performed for this Project.

Planning and design measures are therefore necessary to ensure that all reasonable measures are taken to protect the environmental values, which may be impacted during construction and operational activities.

24.1.2 Aim of the Plan

The aim or purpose of this EMP is to detail the actions and procedures to be carried out during the implementation phase of the project in order to mitigate adverse and enhance beneficial environmental and social impacts. The environmental studies and consultation conducted as part of the EIS have identified the potential construction and operational impacts of proceeding with the project.

A range of mitigation measures have been identified from the EIS environmental studies to mitigate and manage these potential impacts and need to be implemented during the construction and operational stages of the project.

The EMP addresses the proposed mitigation measures, records environmental commitments and establishes the framework to ensure they are implemented during each stage of the project. In effect, the EMP becomes the key reference document in that it converts the undertakings and recommendations of the environmental studies into a set of actions and commitments to be followed by the designers, constructors and QR.

The EMP will also serve as the benchmark for measuring the effectiveness of environmental protection and management. This can be achieved by specifying the monitoring, reporting and auditing requirements, with nominated responsibilities and timing to ensure the necessary mitigation measures are met. The EMP also makes provision, as appropriate, for unforseen events by outlining corrective actions which may be implemented in these situations.

24.1.3 *Format of the EMP*

The EMP is structured as follows:

- Relevant statutory obligations and regulatory framework within which the Project will be required to progress (Section 24.2);
- Management structure and general project responsibilities for staff involved in the project (Section 24.3);
- Environmental management objectives for particular environmental aspects (Section 24.4); and
- Subsequent stages of the environmental management process during the detailed design, construction and operational stages of the project (Section 24.5).

To increase the useability of the EMP, it has been prepared as a stand-alone document.

24.1.4 *QR Environmental Management Approach*

QR is committed to the effective management of its environmental risks both during its construction and operational activities.

QR is taking a proactive approach to meeting its environmental obligations and continually improving environmental performance through an Environmental Management System (EMS) that is consistent with ISO14001 and AS3806 Compliance Programmes. QR's EMS sits under the Governance and Management System Framework which applies risk principles to various disciplines in QR. Under this framework, QR Board approved policies are supported by management systems, which detail how the policy goals are to be achieved in QR. This gives effect to the QR Board Governance Charter including the Director's responsibility for, as well as the organisational role in, managing the interaction between economic efficiency, social obligations and environmental responsibility.

QR's EMS is designed to provide the framework for ensuring that the associated Policy is implemented, achieved, reviewed and maintained. The EMS includes standards and specifications which are mandatory and associated documents which are guidelines to assist with implementation.

QR formally issued its EMS in August 1999 recognising that the system would need to be refined over time with the benefit of experience, input from the Business Groups and changing internal and external environments. QR's EMS is currently being substantially revised to both align and integrate within QR's recently revised Governance and Management System Framework and to reflect risks identified in QR's Environmental Risk Report.

24.2 Statutory Obligations

24.2.1 *National Strategies and International Conventions*

The following national policies provide the guiding principles for the design, construction and operation of the proposed rail infrastructure:

- National Ecologically Sustainable Development (ESD) Strategy 1992;
- National Greenhouse Response Strategy 1992; and
- Framework Convention on Climate Change 1994.

Other international conventions and agreements relevant to the rail infrastructure include:

- CAMBA – Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their environment;

- JAMBA – Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their environment; and
- Ramsar Convention on Wetlands – The Convention on wetlands, signed in Ramsar, Iran, 1971, is an inter-governmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

In addition to the conventions and agreements above, a further two conventions are identified as being indirectly relevant to the coal terminal. These are:

- CMS or Bonn Convention – The Convention on the Conservation of Migratory Species of Wild Animals aim is to conserve terrestrial, marine and avian migratory species throughout their range.

  The convention is aimed at restricting harvesting, conserving habitats and controlling other adverse factors. The species covered include marine mammals, sea turtles and sea birds.

- Convention on Biological Diversity – is a comprehensive, binding agreement covering the use and conservation of biodiversity.

24.2.2 Regulatory Process

The following legislation is considered relevant to the project:

- *Aboriginal and Torres Strait Island Heritage Protection Act 1986*;
- *Aboriginal Cultural Heritage Act 2003*;
- *Acquisition of Land Act 1967*;
- *Animal Care and Protection Act 2001*;
- *Coastal Protection and Management Act 1995*;
- *Dangerous Goods Safety Management Act 2001*;
- *Environmental Protection Act 1994*;
- *Environment Protection and Biodiversity Conservation Act 1999*;
- *Fisheries Act 1994*;
- *Health Regulations under the Health Act*.
- *Integrated Planning Act 1997*;
- *Lands Act 1994*;
- *Nature Conservation (Wildlife) Regulation 1994*;
- *Plant Protection (Red Imported Fire Ant) Quarantine Notice 2001*;
- *Queensland Heritage Act 1992*;
- *Soil Conservation Act 1986*;
- *Transport Infrastructure Act 1994*;
- *Transport Planning and Coordination Act 1994;*
- *Transport of Dangerous Goods by Road Act*;
- *Vegetation Management Act 1999*;
- *Water Act 2000; and*
- *Workplace Health and Safety Act 1995*.

A summary of the likely approvals required for the proposed coal terminal are provided in Table 24.1

Table 24.1 Summary of Likely Approvals for Rail Infrastructure

Legislation	Administering Authority	Trigger	Project Response
Environment Protection and Biodiversity Conservation Act 1999	Department of Environment and Water Resources Commonwealth Environment Minister	Impacts upon matter of National Environmental Significance (NES): Section 12 and 15A (World Heritage); Section 18 and 18A (Listed threatened species and communities); and Section 20 and 20A (Listed migratory species).	Commonwealth Environment Minister declared the project a controlled action
Native Title Act 1993	Any Department or Local Government making a decision which may impact on Native Title.	Any action on Crown Land (including ocean) over which a registered native title claim exists. Following Federal Court decision of *Lardil Peoples and Ors vs QLD* it is unlikely that a claim to native title over the ocean will preclude commercial activity in the claim area.	Onshore works will be carried out within the existing terminal boundaries which are freehold land. Native title therefore is not applicable. Offshore works most likely not affected by native title due to Lardil decision but further investigation and legal advice needed. Reclamation works will be partially undertaken on land not identified as being SPL, which may have native title applies, notification of proposed activity to Native Title Claimants will be required.
State Development and Public Works Organisation Act 1971	Coordinator-General	Initial Advice Statement prepared by the Proponents, identified the level of investment necessary for the project, employment opportunities provided by the project, potential impact on the environment, potential effects on relevant infrastructure and the significance of the project to the region and State	Coordinator-General declared the project a significant project
Integrated Planning Act 1997	Calliope Shire Council	Development which requires approval under the Calliope Planning Scheme	MCU approval required from Calliope Shire

Legislation	Administering Authority	Trigger	Project Response
Dangerous Goods Safety Management Regulation 2001	DES	Storage of goods/materials in quantities exceeding the levels outlined in the Regulation.	If facility is a Large Dangerous Goods Location then notification only to Dept of Emergency Services is required. If facility is a Major Hazard Facility then it will be necessary to notify Dept of Emergency Services and make application under IPA for a Development Approval.
Aboriginal Cultural Heritage Act 2003	DNRW	Duty of care to take all reasonable and practicable measures not to harm Aboriginal cultural heritage	Aboriginal cultural heritage investigation and Cultural Heritage Management Plan required under s87 if EIS proposed under the *State Development and Public Works Organisation Act 1972*.
Environmental Protection Act 1994	EPA	Likely indication of ERAs applicable: • ERA 20: Extracting rock or other material • ERA 22: Screening, washing, crushing, grinding, milling, sizing or separating material extracted from the earth • ERA 62: Concrete batching – producing concrete or a concrete product by mixing cement, sand, rock, aggregate or other similar materials in works (including mobile works) having a design production capacity of more than 100 tonnes per day.	Development Permits and Registration Certificates to be obtained
		• ERA 83: Regulated waste transport - Transporting regulated waste commercially or in quantities greater than 250kg in a load.	
Explosives Act 1999	DNRW	Possession, storage and use of explosives	Authority required for possession (s34), storage (s44) and use (s53) of explosives

Legislation	Administering Authority	Trigger	Project Response
Nature Conservation Act 1992	EPA	Taking, using, keeping or interfering with a protected animal or plant (Section 88 and 89). Activities within a Protected Area Calliope Conservation Park Mount Stowe State Forest	Licence/Permit to be obtained if removal of or interference with protected plants or animals is proposed. Approved under the NC Act from the administering authority to undertake proposed works (ie clearing of vegetation) Obtain approval under Section 63 of the *Nature Conservation (Protected Areas Management) Regulation 2006* and Section 27 of the *Forestry Regulation 1988*.
Vegetation Management Act 1999 and *Integrated Planning Act 1997*	DNRW	Removal of Regional Ecosystems as defined by the EPA under the Act	Development Permit to be obtained
Water Act 2000 and Integrated Planning Act 1997	DNRW	Taking water from a watercourse, lake, spring or underground water (s237). Taking, getting, removing, or otherwise interfering with quarry material in or from a watercourse or lake (s280). These activities are assessable development under Schedule 8of IPA.	Development Permit for operational works required if taking water from a watercourse, lake, spring or underground water is proposed. Development Permit required if taking, getting, removed or otherwise interfering with a quarry material form a watercourse or lake is proposed.
Transport Operations (Road Use Management) Regulation 1995	Department of Transport DMR/Department of Transport	Transportation by road of vehicles of a size or weight which exceed the legal limit (s11A). Carrying dangerous goods as defined under the Australian Code for the transportation of dangerous goods by road or rail, or prescribed by Regulations (s154).	Approval to be obtained if applicable.
Transport Infrastructure (Dangerous Goods by Rail) Regulation 2002	DMR/Department of Transport		Approval to be obtained if applicable.

Legislation	Administering Authority	Trigger	Project Response
Transport Operations (Road Use Management/Dangerous Goods) Regulation 1998	DMR/Department of Transport	Transport of empty drums that previously held materials classed as Dangerous Goods (Part 18).	Approval to be obtained if applicable
Civil Aviation Act 1988 and Regulations	Civil Aviation Safety Authority and Gladstone-Calliope Aerodrome Board	Object that penetrates the obstacle limitation surface.	Obtain approval if required
		Lighting within 6km radius of the aerodrome	

Table Notes:
DES = Department of Emergency Services
DPIF = Department of Primary Industries and Fisheries
EPA = Environmental Protection Agency
DNRW = Department of Natural Resources and Water
ERA = Environmentally Relevant Activity
CLR = Contaminated Land Register
EMR = Environmental Management Register

Some of the other key legislative requirements for the rail infrastructure are summarised in the table below. Other approvals for the rail infrastructure are to be identified during the detailed design phase of the Project.

Table 24.2 Other Key Legislative Requirements

Legislation	Administering Authority	Trigger	Project Response	Responsibility (Project Phase)
Animal Care and Protection Act 2001	DPIF	Encounter animals in the course of works/activities	Must not be cruel to an animal (eg cause pain, abuse, confine or transport inappropriately)	Construction Contractor (Construction)
			Fauna Relocation Plan to be implemented	Construction Contractor (Construction)
Environmental Protection (Waste Management) Regulation 2000	EPA	Various triggers relating to waste tracking	Waste management to comply with relevant provisions (refer Section 3.9.3 for further details)	Construction Contractor (Construction)
Land Protection (Pest and Stock Route Management) Act 2002	DNRW	Pests (ie animals or plants) must be controlled	EMP to be implemented during construction and maintenance	Construction Contractor (Construction) Operator (Operation)

Table Notes:
DNRW = Department of Natural Resources and Water
DPIF = Department of Primary Industries and Fisheries
EPA = Environmental Protection Agency

24.2.3 Monitoring and Auditing Standards and Guidelines

The following standards apply to monitoring and auditing of performance:

Water and Wastewater

- Water Quality Sampling Manual: for use in Testing for Compliance with the *Environmental Protection Act 1994*. Third Edition (EPA 1994);
- Standard Methods of the Examination of Water and Wastewater – American Public Health Association (APHA)/Australian Waste Water Association (AWWA); and
- AS 2031 Selection of Containers and Preservation of Water Samples for Chemical and Microbiological Analysis.

Soils

- Australian and New Zealand Environment and Conservation Council (ANZECC)/National Health and Medical Research Council (NHMRC) – Guidelines for the Assessment and Management of Contaminated Sites;
- Queensland Government Chemical Laboratory – Guidelines for Soil Sampling;
- Queensland Acid Sulfate Soil Investigation Team (QASSIT) "Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998"; and
- Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (Department of Environment 1998).

Air Quality

- AS 3580 Methods of Sampling and Analysis of Ambient Air.

Noise and Vibration

- QR Code of Practice for Railway Noise Management;
- Environmental Guideline. Noise from Construction, Renovation, Maintenance and Demolition Sites (DEC 1989);
- Noise Measurement Manual, Third Edition, 2000;
- AS 1055.1 and AS 1055.2 Acoustics – Description and Management of Environmental Noise;
- AS 2187 Explosives – Storage Transport and Use (Explosives Code);
- AS 2436 Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- AS 2659.1 Guide to the Use of Sound Measuring Equipment; and
- AS 2659 Sound Level Meters.

Dangerous Goods

- AS 1216 Classification, Hazard Identification and Information Systems for Dangerous Goods;
- AS 1678 Emergency Procedure Guides – Transport;
- AS 1940 Storage and Handling of Flammable and Combustible Liquids;
- AS 2508 Safe Storage and Handling Information Cards for Hazardous Materials;
- AS 2809 Road Tank Vehicles for Dangerous Goods; and
- AS 2931 Selection and Use of Emergency Procedure Guides for Transport of Dangerous Goods.

24.2.4 Best Practice

For the purposes of the EMP the term "best practice" refers to the environmental management of an activity (which achieves) an ongoing minimisation of environmental harm of the activities through cost effective and practical measures currently used nationally and internationally for the activity.

24.3 Project Management

The project delivery method for the rail infrastructure is being considered by QR. For the purposes of this EMP the following roles have been used:

- Detailed Design Consultant;
- Environmental Consultant;
- Construction Contractor;
- Superintendent; and
- Rail Manager (QR).

24.4 Environmental Management Strategies

24.4.1 Structure

The structure of the environmental management strategies that follow are to assist in separate consideration of the relevant environmental issues. It is intended that this format be user-friendly and amenable to review and amendment. Where appropriate, management strategies for individual sections of the project have been identified. The contents of a typical strategy are described below:

- Commitment or Objective;
- Mitigation Measures (design, construction and operation where relevant); and
- Monitoring (if required).

24.4.2 Topography, Geology and Soils

Objectives

- To manage ground disturbance activities during pre-construction, construction and operational activities to minimise environmental impacts and maximise the potential for successful land rehabilitation following construction;
- To ensure any acid sulfate soils (ASS) that may be disturbed during pre-construction, construction and operational activities are identified and managed to minimise potential impacts to surrounding land and nearby water bodies;
- Manage the storage, transport and handling of hazardous materials during site construction and operational activities to protect human health and the environment;
- Manage the health and environmental risks from contaminated land;
- Manage the way contaminated soil is removed and disposed to ensure the risk is not relocated to another site;
- Minimise the potential and risk for hazardous events;
- Minimise soil erosion;
- Minimise loss of fertile topsoil material; and
- Aim to improve soil and geotechnical stability.

Mitigation Measures

Design

To minimise potential impacts discussed above the following mitigation measures will be applied in design:

- Fill embankments during detailed design need to be assessed in terms of both settlements and stability;

- The cut batters of the main line cutting will need to be assessed for global stability. The cut batter angles of the main line cutting (Forest Precinct) will need to be appraised during detailed design based on material strengths and other properties. Detailed investigations will be required to determine these properties. Stability analysis will be required to assess the factor of safety of these cut slopes;
- The detailed engineering design of the proposed rail infrastructure will need to be carried out in accordance with good engineering practice;
- The design process will require the input of a comprehensive level of information on the subsurface profile, the strength and reactivity properties of the various materials and groundwater information;
- A detailed geotechnical investigation will be required to obtain information relating to stability assessments (including a rock mechanics study – for cutting associated with the expansion of the north coast line), foundation design parameter requirements and potential settlement of fill embankments and foundations; and
- Consider whether the low level contaminated soil stockpile located on Lot 72 on SP122249 in the north coast line needs to be relocated during construction. If this stockpile is to be disturbed during construction then select an appropriate temporary and/or final location for this soil. An EPA Waste Disposal Permit is required if this soil is to be moved from this land parcel. Further assessment of the stockpile to confirm the contamination status, may be required in order to obtain an EPA Waste Disposal Permit.

Construction

To minimise potential impacts during construction, the following mitigation measures will be applied:

- A DPIF Approval Risk Management Plan (ARMP) will be prepared to minimise the risk of spreading Fire Ants. It will cover the procedures to be followed when planning for works in Fire Ant Restricted Areas and for moving High Risk items between sites in Restricted Areas or to sites out of Restricted Areas. A Fire Ant Management Plan shall be implemented prior to the commencement of any construction work;
- Bulk earthworks for both excavation at Borrow Hill 2 and filling of rail embankments will be carried out in a controlled manner. Works will be undertaken in accordance with an erosion and sediment control plan;
- Drainage and overland water flow will be carefully controlled so as to not impact on the stability of the rail embankments. Vegetation will be established as soon as practicable to prevent slope face degradation;
- Careful construction practices will be used in the vicinity of any settlement monitoring devices to avoid damaging the equipment;
- An ASS Management Plan will be required which outlines affected areas, ASS management practices and the required liming rates, location and operation of treatment areas; and
- The development, prior to commencement of construction, and implementation of a Soil Handling and Management Plan which covers:
  - ASS;
  - Fire Ants;
  - Erosion and Sediment Control;
  - The movement of actual or potentially contaminated soil (from the existing rail corridor or any properties listed on the EMR (ie Lots 71 and 72 on SP122249) including the application for an EPA Waste Disposal Permit (required for removal of soil from a land parcel which is listed on the EMR); and
  - Topsoil management.

Operation

To minimise potential impacts during operations, the following mitigation measures will be applied:

- A program of regular maintenance on surface and subsurface drains; and
- Vegetation on the rail embankment slopes will be maintained to prevent face degradation.

24.4.3 Land Use

Objectives

- Plan construction works in order to minimise the need for land resumption and adverse impacts to adjacent land uses;
- Set out procedures for accessing the work sites on public or private land, for the purpose of minimising potential impacts to the environment and to landowners and occupiers;
- Ensure through adequate mitigation that the railway design minimises the long-term impact of noise complying with Guidelines to local communities during the operational phase; and
- Ensure nuisance issues such as dust from loads and earth carried onto neighbouring sealed roads is controlled and managed appropriately.

Mitigation Measures

Design

During the detailed design stage QR will undertake the following:

- Continued consultation with directly affected property owners; and
- Where possible minimise private land requirements.

24.4.4 Transport and Traffic

Objectives

- To minimise the impact on existing traffic and infrastructure associated with the transport of plant, equipment and materials during pre-construction, construction and operations;
- Manage interactions between railway activities and other infrastructure;
- Develop and implement a Traffic Management Plan to minimise the disruption caused by construction machinery and material delivery schedules to existing public roads and traffic flows;
- Access from public roads to construction sites must be managed in accordance with all State regulatory requirements, including warning signage and transport control staff at critical intersections;
- Ensure the rail and road infrastructure and ancillary services operate in a safe and efficient manner; and
- Minimise disruption and delay to the existing rail network during construction.

Mitigation Measures

The following mitigation measures will be implemented:

Design

- Prepare a Traffic Management Plan in accordance with DMR requirements;
- QR will enter into an infrastructure agreement with the appropriate Agency or Council with respect to the impact on the DMR road network; and
- Impacts of additional train traffic are being addressed within the QR operational plan.

Construction

- Implement a Traffic Management Plan.

24.4.5 Hydrology and Hydraulics

Objectives

- In areas of current or future development there should be no worsening of flood levels in existing watercourses and culvert locations;
- Ensure flow rate and volume of site runoff does not cause a significant increase in stream energy in downstream waters such as is likely to cause stream bank or bed erosion; and
- Ensure that existing stormwater flows are not impeded and can discharge to receiving waters.

Mitigation Measures

During the detailed design phase options will be investigated to reduce the impacts of the following:

- Pipe culverts; and
- Box culverts.

24.4.6 Water Quality

Objectives

- To ensure that water quality entering creeks and waterways downstream during and post construction process meets with the approved statutory guidelines;
- Where the water quality of existing water bodies does not comply with the guidelines, water quality objectives should not exceed ambient historic and seasonal fluctuations;
- To protect the aesthetic quality of downstream water bodies, waters should be kept free from:
  - Floating debris, oil, grease and other objectionable matter;
  - Substances that produce undesirable colour, odour, taste or foaming; and
  - Substances that produce undesirable aquatic life, such as algal blooms, or dense growths of plants or insects.
- No sustained or significant increase in pollutant levels in receiving waterways;
- No visible evidence of contaminants leaving the site through stormwater runoff;
- No litter leaving the site during construction or operational phases;
- Maximise use of mitigation measures such as Water Sensitive Urban Design (WSUD) devices between construction and operational phases of the project; and
- Water quality during construction should be within any limits set by environmental authorities.

Mitigation Measures

The following mitigation measures will be implemented:

Design

- Finalise the Acid Sulfate Soils Management Plan; and
- Prepare a Waste Management Plan.

Construction

- Minimise the footprint of construction works within the project area in order to minimise encroachment upon vegetation as wetland communities and riparian zones are natural buffer zones;
- Stockpile materials and soils away from natural drainage areas;
- Implement mechanisms to slow and/or prevent overland runoff such as vegetation and/or artificial structures (bunds);
- Areas of erosion and/or dispersive soils are to be isolated or reinforced to prevent further degradation;
- Where possible undertake significant earthworks during the dry season and that temporary bunding or sediment traps are in place;
- To minimise the impact of a hydrocarbon or chemical spill, the following measures will be implemented:
  - As part of the Standard Operating Procedure all relevant employees will be educated in the response to a spill or leak;
  - Chemical spill kits will be located within all vehicles carrying chemicals and near chemical storage areas;
  - Chemical storage areas and wash down facilities are to be located away from existing drainage lines and have appropriate bunding and waste water collection mechanisms;
  - Chemical and hydrocarbon wastewater must be disposed of to a liquid waste disposal facility or company, or treated to an acceptable level for discharge to the sewer with the permission of the responsible authority;
  - Wastewater management will comply with the National Water Quality Management Strategy (Guidelines for Sewerage Systems - Use of Reclaimed Water (1999)); and
  - Waste storage facilities and spoil placement areas are to be located away from existing drainage lines and have appropriate bunding and drainage mechanisms.

Operation

- Spills and wastewater will be managed under the Waste Management Plan and hazardous substances Australian Standard AS 1940B1993; and
- Culverts within the project area will be maintained in accordance with QR network maintenance requirements.

24.4.7 Groundwater

Objectives

- Ensure construction activities have no adverse impact on the existing levels and water quality of local and regional groundwater;
- Develop and implement strict controls for the management and storage of all hazardous goods onsite and that a spill response programme and equipment, including training, are in place; and
- Manage the potential for impacts resulting from the migration of contaminated groundwater.

Mitigation Measures

Design

A water level and water quality monitoring programme will be implemented. Monitoring of water levels will be undertaken to obtain baseline groundwater quality and groundwater level data. This data will be used to determine the natural variability in the groundwater system. As a minimum, the groundwater quality analyses will include electrical; conductivity, Total Dissolved Solids (TDS), pH, major cations, major anions and the various components of alkalinity. Analysis for nutrients, volatile compounds or hydrocarbons is not warranted unless site specific data suggest otherwise.

Baseline monitoring data will be used to establish trigger levels of key parameters which can be used as a quantitative method of determining whether unexpected impacts are occurring during construction, or if variations in parameters are simply a result of natural variability. Typically, trigger values are applied to electrical conductivity, pH and water levels, however other parameters may be used if necessary. For electrical conductivity and groundwater levels, trigger values of two standard deviations greater or less than the maximum or minimum observed values are acceptable. In terms of pH, lower and upper trigger values of 6.0 and 9.5, respectively are appropriate.

Construction

During construction water level monitoring will be continued. Deviations from seasonal baseline water levels will be assessed and if necessary mitigation options formulated.

Some level of impact may be considered acceptable, particularly in relation to drawdown, however, inflows of acid groundwater to WICT excavations during construction is undesirable. Options to manage the collection of groundwater inflow include:

- Measurement of water volumes collected at sumps;
- Periodic measurement of electrical conductivity and pH;
- Reporting of analytical results;
- Treatment of the water by the addition of lime, if necessary, prior to disposal; and
- Cut off of excavations to limit infiltration.

24.4.8 Air Quality

Objectives

- To manage impacts to air quality during pre-construction, construction and operations due to emissions from vehicles, plant and equipment;
- To minimise the generation of dust and associated impacts during construction and operational activities such as vehicle travel on unsealed roads, earthworks, coal transport and stockpiling;
- Minimise potential for nuisance impacts as a result of dust emissions;
- Minimise emissions of pollutants from construction vehicles and machinery;
- Minimise potential odour impacts;
- Minimise greenhouse gas emissions (GHG) due to construction and operation of the Project; and
- Provide opportunities for minimising GHG emissions.

Mitigation Measures

Dust control measures that will be implemented during construction will include:

- Development of a dust management plan prior to construction commencing;

- Applying water on all exposed areas by water cart as required to minimise dust emissions, particularly from wheel-generated dust;
- Minimising significant dust-generating activities during high wind speeds where practicable and unwatered;
- Restricting vehicle speeds on unsealed haul roads to reduce dust generation;
- Avoiding spillages and ensuring prompt cleanup of any that occur;
- Covering haul vehicles moving outside the construction site;
- Stockpiled material should be treated appropriately to prevent wind erosion from the prevailing easterly wind direction;
- Regular cleaning of machinery and vehicle tyres will prevent track-out of dust to public roads;
- Minimising licensed burning or incineration onsite;
- Ensuring that roads are appropriately surfaced as soon as possible after the commencement of site activities;
- Routing roads away from sensitive areas wherever possible;
- Revegetating disturbed areas as soon as possible;
- Vehicles and equipment are to be appropriately maintained to minimise air emissions; and
- Visual monitoring of dust. Dust deposition gauges will be installed at nearby residences if required, only if all operational ways of reducing levels have been investigated and exhausted.

24.4.9 Waste

Objectives

- To minimise waste generation and ensure appropriate handling and disposal of domestic and industrial wastes generated during pre-construction, construction and maintenance activities; and
- All waste streams will have regard to the *Environment Protection (Waste Management) Policy 2000* principles, especially the waste management hierarchy of waste avoidance, reuse, recycling, treatment and disposal.

Mitigation Measures

Where possible, the quantity of wastes generated and removed from site will be reduced, with wastes to be segregated and recycled. Onsite reuse of wastes including soil, green waste and concrete is to be undertaken, with wastes associated with materials packaging returned to suppliers wherever possible. Remaining wastes during the construction phase will be recycled or disposed at Council’s landfill where recycling is not feasible. Regulated waste will be removed by a regulated waste contractor.

Waste collection practices will be designed to prevent the site from becoming contaminated by oil or chemical spills during construction. New opportunities to reduce, reuse or recycle waste that may become available throughout the construction period will be incorporated into the waste management strategy.

Appropriate disposal permits for the disposal of contaminated soil from site will be obtained in accordance with Section 424 of the EP Act. Disposal permits enable appropriate and legal disposal and tracking of contaminated soil or materials.

Operational

The types and quantities of rail infrastructure operational wastes and their likely treatment/disposal methods and associated environmental impacts are listed in Table 13.1.

Where practicable, green wastes and timber are to be chipped and reused onsite to minimise the quantity of waste removed from site.

Waste avoidance will be addressed through reuse of wastes generated onsite where possible and waste minimisation practices will be encouraged.

24.4.10 Noise and Vibration

Objectives

- Construction noise and vibration impacts to be reduced as far as practicable through the implementation of appropriate management procedures;
- Operational noise levels to be maintained by appropriate mitigation measures, including appropriate infrastructure design and noise mitigation measures;
- To minimise the impacts of noise and vibration associated with pre-construction, construction and operational activities on local residents, sensitive places and sensitive animals;
- Design and implement a public complaint system to deal with construction noise and other impacts from construction and operational traffic movements; and
- Design and implementation of mitigation measures to achieve compliance with the Project noise and vibration goals, where feasible and reasonable.

Mitigation Measures

The following mitigation measures will be implemented:

Construction

Noise

- Where appropriate implement the requirements of AS2436-1981 *Guide to Noise Control on Construction, Maintenance and Demolition Sites* only if all operational ways of reducing levels have been investigated and exhausted;
- Regular maintenance of equipment to keep it in good working order;
- Noise measurements of plant and equipment to maintain/check noise emissions in accordance with manufacturer's specifications and Australian Standards;
- Mobile plant and other diesel powered equipment to be fitted with residential class mufflers in accordance with manufacturer's specifications and Australian Standards;
- Minimise the usage of truck exhaust brakes onsite;
- Where possible, use silenced air compressors onsite;
- Construction work to occur within the daytime period wherever possible;
- Where practicable, avoid the coincidence of plant and equipment working simultaneously close together;
- Operators of construction equipment are to be made aware of the potential noise issues and of techniques to minimise noise emissions through a continuous process of operator education;
- Reversing alarms within construction areas cannot be avoided for safety reasons. Consideration should therefore be given to sourcing so-called "quiet" white-noise alarms whose annoying character diminishes quickly with distance and self-adjusting alarms which adjust emission levels relative to the local background noise level;
- Large rocks are to be placed in dump trucks not dropped;
- Horn signals should be kept at a low volume, where feasible without compromising public and employee safety;

- Implement, as part of the broader community involvement plan, a well-planned, focussed community awareness programme in order to improve the understanding of the noise and vibration issues and to assist in allaying potential fears and concerns, particularly where vibration is the perceived concern. This programme may include, for example:
  - Active community consultation and the maintenance of positive relations with residents;
  - Ensure measures are undertaken to reduce the noise and vibration impact at neighbouring properties;
  - In the event of a complaint, an investigation of construction noise will be required; and
  - Provision of a complaints phone number.
- Construction site personnel are to be made aware of all community attitudes and complaints; and
- Residents are to be made aware of the times and duration that they will likely be affected by significant noise events. Making residents aware of likely future occurrence of noise significantly reduces annoyance and allows people to make arrangements accordingly.

Vibration

Based on predicted vibration levels and safe working distances, no mitigation measures are required to reduce vibration levels at residences in the communities surrounding the Project.

Further investigations will occur for any structures within and around the safe working distances in order to determine if the "light weight" cosmetic damage criterion (as used for this assessment) is applicable, or, whether a higher value may be more appropriate prevention of any potential cosmetic damage.

Blasting

Vibration monitoring will be undertaken for site-specific activities and in any situations where the Regulatory Agency deems there is some doubt regarding the suitability of the plant or where there is believed to be a risk of exceeding the applicable vibration criteria.

Operational

The need for mitigation will depend on the severity of impact on sensitive receivers, and the circumstances of its occurrence. Investigation of noise levels post-commissioning will be carried out for confirmation of the impact and to assist in the development of the most appropriate mitigation strategy.

If exceedances of QR's noise criteria are identified during the detailed design phase, mitigation measures will need to be investigated and designed. This must be done in consultation with the affected property owners prior to implementation of any such measures.

Monitoring

In the event of a complaint, QR will:

- In the first instance alter procedures to reduce the nuisance; and
- Liaise with the administering authority and/or complainant over remedial action.

Where the above actions do not resolve the nuisance noise or vibration issue and, where appropriate, noise monitoring will be undertaken to investigate remedial actions and measures.

24.4.11 Terrestrial Flora and Fauna

Objectives

- To minimise the potential for impacts to terrestrial flora and fauna species and vegetation communities, particularly those of state and/or national listed significance, during pre-construction, construction, and operational activities;
- Minimise clearance of terrestrial vegetation and habitat;
- Rehabilitate disturbed areas and maintain to avoid colonisation by weeds;
- Implement fauna and habitat management measures that prevent injury to terrestrial fauna;
- Minimise impacts to terrestrial fauna during pre-construction and construction;
- Implement infrastructure design measures that minimise impacts to terrestrial fauna and habitats; and
- Implement a rehabilitation plan for the revegetation and reinstatement of terrestrial habitat.

Mitigation Measures

Design Phase

The following mitigation measures will be implemented during the detailed design phase of the project to minimise the impact on the fauna assemblage within the area:

- Consultation with DNRW, EPA and/or QPWS concerning works within the Calliope Conservation Park and Mount Stowe State Forest;
- Consultation with DNRW to identify potential offset requirements in accordance the DNRW Policy for Vegetation Management Offset;
- Obtain the necessary vegetation clearing approvals under the VM Act;
- Location and design of fuel and chemical storage facilities to provide sufficient buffer zone and limited pathway to aquatic and marine environments;
- Rail infrastructure lighting design to minimise visual impact on adjoining habitats;
- Design of structures to minimise risk to fauna (ie prevent bird nesting and/or roosting);
- Prepare a Vegetation Rehabilitation and Management Plan based on the potential rehabilitation areas shown on Figure 15.5.
- Ensure integrity of existing wildlife corridors – riparian zones, Mount Stowe State Forest and Calliope Conservation Park, southern portion of the Rail Maintenance Precinct, and Forest Precincts;
- Maximise retention of existing riparian vegetation along watercourses; and
- Include mechanisms to facilitate fauna movement (eg culvert design).

Construction Phase

Prior to the commencement of construction works, the following mitigation measures will be implemented:

- Designate rehabilitation zones and no go areas prior to clearing;
- All vegetation within the project area classified as an Endangered and Of Concern REs shall be clearly marked and contractors are to be briefed on clearing requirements and restrictions to prevent over clearing of these sensitive areas relative to any approved vegetation clearing permits for the project;
- Collection of seed from local native flora for propagation and use in rehabilitation works, particularly in REs mapped as Endangered and Of Concern by the EPA;
- Site offices, stockpiling and plant and equipment storage are to be located where possible on existing cleared lands or heavily disturbed areas;

- Prepare a Weed and Pest Management Plan (WPMP) that includes details of vehicle and pedestrian wash down bays and vehicle signage and training; and
- Fauna Management measures which include, but are not be limited to, will be prepared and implemented during the construction phase:
  - Staff will be informed that all native wildlife is protected and shall not be intentionally harmed as a result of works or workers actions;
  - Staff will be educated (on site induction) in relation to the risks of fauna deaths and how to manage animals which are injured or displaced;
  - Outline procedures to be undertaken if an animal (healthy or injured) is encountered during construction;
  - Any injured fauna must be safely bundled and taken to the nearest vet or reported to the EPA where further instructions will be given;
  - Recognised fauna spotter/catcher (ie holds a Damage Mitigation Permit and/or Rehabilitation Permit issued by the EPA) to inspect the sites prior to construction for any habitat trees and be present during construction for all vegetation and potential habitat removal;
  - Relocation of wildlife to similar habitats adjoining the project area;
  - Trees containing hollows to be marked prior to construction;
  - Where applicable hollow bearing trees that must be cleared shall be retained and used in rehabilitation programs and/or offset areas (eg habitat in form of artificial hollows and/or woody debris);
  - Where necessary hollow-bearing trees are tapped prior to demolishing;
  - Where applicable a ratio of 1:1 for replacement of any hollows knocked down or damaged during clearing shall be employed;
  - In areas where natural hollows are scarce, artificial nest boxes and/or hollows sourced from cleared areas are to be introduced;
  - Identify and mark nesting areas and provide a buffer zone around nesting species;
  - Identify and clearly mark feeder trees and glider flyways. These trees should be retained along with surrounding habitat ie hollow bearing trees wherever possible;
  - Procedures to check culverts, trenches and other excavations for fauna species (ie checked each morning and after periods of inactivity to ensure fauna are not trapped or likely to be harmed by construction activities);
  - Site works, such as trenches and excavations, will be designed to ensure fauna are not trapped or likely to be impacted by construction activities (eg install trench ramps at 15 degree slope every 30m or place branches or suitable material for fauna to climb and escape from trenches)
  - Contact details for recognised fauna spotter/catchers, qualified animal carers and vets within the area
  - Management requirements (ie organisational control and roles, review, reporting and corrective actions)

The works are located near the discovery site of the Red Imported Fire Ant (Fire Ant). Therefore controls on the movement of materials that may be of risk of transporting Fire Ant are required. The management actions detailed below reflect the “Red Imported Fire Ant Procedure” of Roads and Drainage Provider Unit. The Red Imported Fire Ant Management Plan shall be implemented prior to the commencement of any construction work.

Table 24.3 Red Imported Fire Ant Management Plan

Investigation Threshold	Strategy	Management Action
Inspection of site for Fire Ants not undertaken prior to commencement and monthly thereafter.	To inspect the site for the presence of fire ants prior to the start of works and at monthly intervals during the works period.	Prior to commencement of works, a Department of Primary Industries and Fisheries (DPIF) approved person shall carry out an inspection of the site. This inspection will identify whether the site is visually free or visually infested with Fire Ants. The inspection of the site shall be repeated every 28 days. The approved inspector will complete the Site Inspection Form (Issued by the DPIF).
Importation to the site of materials capable of transporting fire ants without inspection and clearance.	To only source restricted items (soil, plants etc) which are free of Fire Ants.	All incoming restricted items (soil, plants etc) must be visually inspected by an DPIF authorised person prior to entry into the site and shall only be sourced from providers outside the restricted area or with a DPIF Approved Risk Management Plan, and be accompanied by a written assurance that the material is Fire Ant free.
No records of imported materials from the restricted area.	To maintain records of any imported materials from the restricted area.	All incoming restricted items must be recorded detailing the nature, quantity and source of materials imported to the site. All records to be held onsite by the Construction Contractor.
Importation to the site of materials capable of transporting fire ants without inspection and clearance.	To minimise the risk of Fire Ants being transported to the site by equipment and machinery.	All equipment and machinery to be visually free of loose soil or other material capable of containing Fire Ants prior to entry on to site.
Materials being exported from the site without inspection and clearance.	Movement of materials from the site shall not increase the risk of spread of Fire Ants.	Materials shall only leave the site within 28 days of a site inspection, which finds no visible evidence of Fire Ants.
Visual evidence of Fire Ants onsite.	Visual evidence or suspicion of Fire Ants to be reported.	In the event that Fire Ants are detected or reasonable suspicion is held that Fire Ants are present on the site, the Superintendent shall be immediately notified. The area under suspicion shall be barricaded and works in that area shall cease. The Construction Contractor should notify the DPIF.
	Additional management measures to be implemented on detection of Fire Ants.	In the event of Fire Ants being detected onsite, additional management measure shall be implemented which are in accordance with Attachment 4 of the Red Imported Fire Ant Risk Management Plan.

The following measures will be implemented during the construction phase to mitigate impacts on flora and fauna assemblages within and adjacent to the project area:

- Clearing of remnant vegetation will be restricted to the minimum required to enable the safe construction, operation and maintenance of the railway line and associated infrastructure;
- Limits of clearing will be clearly marked (eg flagging tape, barricade webbing or similar high visibility marking);
- Protect and clearly define/mark all vegetation for retention;
- Minimal disturbance to riparian and instream vegetation to occur to prevent bank erosion and excess sedimentation in local waterways;
- Avoid proliferation of weed species;
- No areas to be cleared outside the agreed Clearing Plan;

- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible;
- Heavy machinery and equipment is stored in designated area(s). This should be an area that has been disturbed and/or cleared within the project area;
- Machinery and heavy equipment is inspected prior to entering site as per WPMP requirements;
- Where possible cleared vegetation is to be mulched and used in rehabilitation activities except for weed species outlined in the WPMP;
- During vegetation clearing, an appropriately skilled 'spotter and catcher' shall be engaged to visually check for any fauna present in trees and vegetation. Fauna shall be either persuaded by reasonable means to leave or be captured and relocated in the local environment prior to felling and trimming;
- Stockpiling of material (soil and mulch) to be within designated areas and/or offsite. This should be within areas that have been previously disturbed and/or cleared within the project area;
- Ensure all imported spoil is uncontaminated (abiotic and biotic);
- Adhere to a WPMP particularly regarding the prevention of pest and potential pest species proliferating in the project corridor, especially those listed under the LP Act;
- The introduction of weeds or other introduced vegetation are to be minimised onto the construction site as per WPMP requirements;
- Appropriate signage in prominent positions to reduce speed within the project area to promote awareness and provide safety for fauna crossing or inhabiting the area;
- Comply with the conditions of the reclamation approval (Permit No. 04SADB0287);
- Acid sulfate soils (onshore and offshore) are treated in accordance with the Acid Sulfate Soil Management Plan;
- Ensure there is an Environmental Officer onsite to address potential issues that may arise;
- Ensure dust suppression mechanisms are in place;
- Prepare and implement a Bushfire Management Plan;
- All native fauna is protected and shall not be intentionally impacted as a result of the works or worker actions;
- Removal and/or disturbance of REs are carried out in accordance with approval conditions; and
- Retain large 'stags' as potential nesting and roosting habitat where possible, especially near wetlands and watercourses;

Operational Phase

The following measures will be implemented to mitigate impacts on flora and fauna assemblages within and adjacent to the project area:

- Implement a Vegetation Rehabilitation and Management Plan (VRMP);
- Monitor the success of the rehabilitation strategies;
- Maintenance works are to be carried out within designated area(s) and/or offsite. This should be an area that has been disturbed and/or cleared within the project corridor;
- Maintenance contractors are to remain on designated tracks and not disturb surrounding vegetation;
- Exclude parking of vehicles, storage of plant and equipment and stockpiling from the drip zone of trees where possible;
- Machinery and heavy equipment is inspected prior to entering site as per WPMP requirements;
- Implement Bushfire Management Plan; and
- All native fauna is protected and shall not be intentionally impacted as a result of the works or worker actions.

24.4.12 Aquatic Ecology

Objectives

- Minimise impacts to aquatic flora and fauna resulting from modification of water flows, levels or quality;
- Undertake pro-active measures to improve aquatic habitat quality if disturbed by construction and operational activities;
- Avoid disturbance to marine plants;
- Prevent the pollution and sedimentation of stormwater runoff discharged from site to minimise impacts to aquatic flora and fauna;
- Implement fauna and habitat management measures that prevent injury to aquatic fauna;
- Minimise impacts to aquatic fauna during pre-construction and construction;
- Implement infrastructure design measures that minimise impacts to aquatic fauna and habitats; and
- Manage ASS affected material to prevent impacts to aquatic flora and fauna within the receiving waterways.

Mitigation Measures

The following mitigation measures will be implemented to minimise the potential impact on the aquatic environments within the area:

Design

- Consultation with EPA and/or QPWS concerning works within the Calliope Conservation Park and Mount Stowe State Forest
- Culvert design to minimise impact on riparian zones, fauna movement, watercourses and hydrological regimes;
- Prepare Rehabilitation Plan for the area, including a weed control strategy; and
- Access tracks should not be near waterways.

Construction

- Preserve remnant vegetation and minimise riparian removal by ensuring the contractor clearly marks the limit of clearing and trees to be removed/retained;
- Protect or establish native shrubs, trees and other vegetation along disturbed areas to prevent destabilising banks, trap sediment and filter other pollutants;
- Where possible vegetation removal should be minimised in the proximity of wetlands or waterways;
- Implement a weed control strategy during and after construction;
- Minimise operation of heavy equipment within the riparian zone or adjacent to waterways and ensure that construction vehicles and machinery must remain on designated areas or roadways;
- Where possible access tracks will be constructed clear of waterways;
- Implement procedures that will assist in the avoidance of material spills and ensure prompt clean up of any that occur;
- Install erosion and sediment control measures, prior to construction;
- Where sediment containment screens are used, joints should be over-lapping each other and be appropriately secured. Containment structures must be appropriately maintained and should be made of puncture and tear resistant material. Selection should also be fire retardancy, burst strength and ultra-violet resistance;
- No filling, draining or alteration of any waterway, excluding that necessary for the development;
- Culvert and other mechanisms to facilitate water and fauna movement within existing drainage lines;

- Culvert and other infrastructure should match the drainage lines morphology to minimise scouring and sedimentation; and
- Implement a revegetation/rehabilitation plan for the area. Implement a weed control strategy.

Operational

- Prepare and implement a Fire Management Plan to address the risk and management of operational activities in relation to fire risks;
- Where possible access tracks will be constructed clear of waterways; and
- Traffic to be constrained to constructed access tracks.

24.4.13 Cultural Heritage

Objectives

- Prevent the loss of, or damage to, items of Indigenous and non-Indigenous cultural heritage as a result of construction works;
- Ensure all indigenous and non-indigenous cultural heritage artefacts and sites of significance are identified, protected and managed in accordance with all relevant statutory requirements during pre-construction, construction and maintenance activities.

Mitigation Measures

To minimise the impact from construction on the existing Indigenous and Non-indigenous environment, the following management measures will be implemented:

- Ongoing consultation with Traditional Owner representatives;
- Finalise the draft CHMP (refer WICT EIS Appendix O) and obtain approval from DNRW;
- Project works to be undertaken in accordance with the ACH Act*;*
- Implement the CHMP, which will include requirements for monitoring construction, specifically excavation activities within the proposed project area;
- Construction staff to attend cultural heritage inductions, by Traditional Owner group representatives prior to commencement of works, to promote an understanding of the potential indigenous heritage existing within the development; and
- Construction staff will be made aware of the importance of the ACH Act and the Duty of Care.

The Operational EMP for the rail infrastructure will include the requirement to comply with the ACH Act.

24.4.14 Social

Objectives

- Minimise the impacts of construction activities on the existing values and structure of nearby local communities;
- Wherever possible, enhance the development of community well being and amenity, including the provision of commercial and employment opportunities;
- Develop and implement a comprehensive Community Liaison programme, including regular meetings with community representatives and a project construction awareness programme;
- Provide clear communication to community members of the project objectives, project definition and scope of the assessment to allow community members to consider the potential issues, benefits and impacts;
- Obtain community input to identifying local values and knowledge to be considered in the impact assessment investigations and development of the design; and

- Provide inclusive and regular opportunities for community members to participate in consultation.

Mitigation Measures

The following mitigation measures will be implemented:

- Regular consultation with directly affected property owners to address any issues as they arise;
- Provide support to families who need to be relocated (two families identified);
- Preparation and distribution of newsletters and fact sheets to residential areas in proximity to the project (ie Clinton and nearby rural residential properties) prior to the various phases of construction;
- Maintain liaison with other projects expected to be developed in the Gladstone region to coordinate construction and minimise/avoid potential overlap;
- Preassemble construction materials offsite, where possible, away from the Gladstone area to reduce the number of workers required at the site;
- Ensure efficient timing and management of the construction phase of the project and where possible, coordinate with other projects being undertaken in the Gladstone area;
- Encourage single workers to share accommodation to decrease the overall demand for dwelling units;
- Specifically target the employment of local and regional professionals, technical, skilled and semi-skilled workers;
- Share resources and promote on-going employment opportunities through the movement of construction workers from other major projects as they reach completion;
- It is expected that the Project's accommodation requirements can be met by the existing available accommodation supply together with the implementation of an Accommodation Management Strategy and the coordination of peak construction periods between different projects. Coordination between projects will be facilitated by a proposed State led Accommodation Working Group (refer Section 18.3.2) and regular consultation with the Department of Employment and Training and relevant industry. The Strategy will consider:
  - Monitoring of housing availability in response to demand associated with the timing of WICT and other projects;
  - Measures to provide assistance to workers in securing short-term and permanent housing;
  - Opportunities for the project proponents to provide direct intervention in housing supply in the region through State housing agencies;
  - Encouraging partnerships with developers, the local building industry and community to develop more housing; and
  - Developing a monitoring programme to measure performance against the key social planning principles;
- Other options for housing assistance will be considered as part of the Accommodation Strategy in consultation with State housing agencies; and
- Commence discussions with State agencies to initiate a whole of government response to meet additional social facilities and services needs arising from the major projects currently planned for the region.

24.4.15 Health and Safety

Objectives

- Establish a Workplace Safety Ethic and Programme;
- Ensure a prompt and appropriate response is made to unplanned incidents where life and property are threatened during the construction phase;

- Provide a safe work site during the construction phase, achieve sustained reductions in the number of accidents during the operation phase and maintain a safe and secure site environment;
- Ensure that satisfactory safety provisions are implemented during construction and for the operational phase of the Project; and
- Identify potential hazards and risks and apply appropriate impact treatment and/or prevention mitigation measures.

Mitigation Measures

The following mitigation measures will be implemented to minimise potential health and safety impacts:

Design

- Consideration should be given to potential mosquito breeding in the design stage. Queensland Health (2002) has published Guidelines to minimise mosquito and biting midge problems in new development areas. This document provides advice on how to prevent or minimise the impact of mosquitoes and other biting insects in new development areas; and
- Constructed wetlands, water impoundments, grass swales and open earth drains can all be designed so as to minimise mosquito breeding. The Australian Mosquito Control Manual (Mosquito Control Association of Australia 2002) has helpful advice on mosquito control. This manual can be purchased through the Association's website.

Construction

- Construction and installation of water storages should be carried out in accordance with Part 8, Mosquito Prevention and Destruction of the *Health Regulation 1996*. Where a risk assessment process has identified that there is a significant risk of mosquito borne disease, holding tanks for recycled water should be designed so as to prevent entry of mosquitoes; and

Operation

- Regular maintenance of all structures associated with storage or treatment of recycled water is necessary to minimise mosquito breeding. For example, if mosquitoes are present in an open water storage, water plants should be cleared away from the edge of the storage to reduce habitat for larvae. In particular, recent research suggests that dense mats of surface vegetation or fallen decaying material can encourage mosquito breeding (Dale *et al* 2001);
- When recycled water is used for irrigation, surface ponding should be prevented by appropriate irrigation scheduling;
- Open recycled water storages should be monitored regularly to identify presence of mosquito larvae; and
- If a potential health risk from mosquito breeding has been identified, biological control using natural predators, such as aquatic invertebrates or native fish known to prey upon mosquito larvae, may be considered.

24.4.16 Visual Amenity and Landscape Character

Objectives

- Implement revegetation measures to promote the use of native Australian vegetation species;
- To protect and enhance the visual amenity of the site and surrounding areas;
- To design and implement a landscape programme that integrates the development into the existing character of the site through the use of local native species;

- Minimise visual impacts of project; and
- Strengthen natural corridors and rehabilitate degraded areas.

Mitigation Measures

The following mitigation measures will be implemented:

- Minimise the area of existing vegetation to be cleared by minimising the footprint of the development at the design phase and at construction by confining the clearance of vegetation to that necessary to carry out construction;
- A vegetation buffer will be installed which will effectively screen the rail loop area form the surrounding viewpoints; and
- Minimise light spillage to areas outside the areas that need to be lit using suitable fittings and shields.

24.5 Environmental Management Process

24.5.1 Preamble

QR's Environmental, Planning and Processes Manual and documentation requirements are summarised below.

Environmental Management Plan (Planning) (EMP(P))

The EMP(P) summarises the assessment and lists management recommendations for planning, also including recommendations for design, construction and operations.

Design Drawings

Incorporates all environmental management measures that can realistically be shown on a drawing at this stage of the Project.

Environmental Design Report (EDR)

Documents how the planners and designers have incorporated the recommendations of the EMP(P) into planning and design.

Environmental Management Plan (Construction) (EMP(C))

The Construction Contractor, using information from the above sources, prepares the EMP(C). The plan would typically cover erosion and sediment control, the need for fauna spotter/catchers etc.

Construction Drawings

Incorporate as much direction on environmental management as practicable, eg siting of no-go vegetation areas, permanent erosion control devices etc.

Audit, Feedback and Improvement

This should at least be done at 'practical completion' stage, but could be done at any time. It can be formal or informal and include office and/or onsite issues.

Environmental Management Plan (Operation) (EMP (O))

Summarise the assessment and lists management recommendations for operations (may include above and/or below rail considerations relating to maintenance, decommissioning etc).

This EMP will be refined following a government decision on the Project and will form the EMP(P) for the Project.

24.5.2 Content of an EMP

The Construction and Operational EMPs should address the requirements of the relevant environmental management strategies outlined in the EMP in separate sections. The EMPs should provide information under several different headings (which complement those in the environmental management strategies) as outlined below.

- Overview of Impacts and Existing Situation – The anticipated construction and/or operational impacts of the Projects as determined in the EIS and EMP(P) should be detailed;
- Objectives – This section should provide the management objectives or environmental commitments to be achieved, as included in the ‘objectives' section of the relevant environmental management strategy;
- Mitigation Measures – This section should provide details of the actions to be performed onsite. These actions should be developed from the requirements provided in the ‘mitigation measures’ section of the relevant environmental management strategy;
- Monitoring - This section should provide information on the monitoring activities to be performed. The actions included in this section may be sourced from the ‘Monitoring' section of the relevant environmental management strategy;
- Reporting - This section should provide information on the reporting which will be performed by the Construction Contractor. The details included in this section may be able to be sourced from the ‘Reporting' section of the relevant environmental management strategy;
- Non Compliance – This section should provide information on the corrective actions to be implemented. The level or extent of corrective actions implemented should reflect the seriousness of the event. The various indicators which should trigger the implementation of corrective actions are provided in the ‘corrective actions' section of the relevant environmental management strategy; and
- Corrective Actions – This section should outline the action, or the commitment for action, to be implemented when a specified mitigation measures is not met or legislative requirements have been exceeded.

24.5.3 Submission of an EMP(C)

The Construction Contractor will submit an EMP(C) to QR for approval prior to major construction activities commencing.

The Construction Contractor will have overall responsibility for the full and complete implementation of the EMP(C).

24.5.4 Auditing

The Construction Contractor will include in the reporting section of the EMP(C) the requirement to submit weekly checklist audit reports to QR.

The Superintendent should audit the Construction Contractor's implementation of their EMP(C).

Actions to be undertaken by the Superintendent during the audit are likely to include:

- Check monitoring programme and reporting procedures;
- Undertake investigations where necessary;
- Review performance standards and criteria against results;
- Prepare audit reports over time (with respect to agreed schedule) and submit to the QR; and
- Procedures for non compliance and exceedence/investigation/intervention of indicators identification.

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Abbreviations

AADT	Annual Average Daily Traffic
AASS	Actual Acid Sulfate Soils
AAWT	Annual Average Weekday Traffic
ABS	Australian Bureau of Statistics
ACH Act	*Aboriginal Cultural Heritage Act 2003*
ADCQ	Anti-Discrimination Council Queensland
AEC	Areas of Environmental Concern
AHD	Australian Height Datum
AMS	Accommodation Management Strategy
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
AQIS	Australian Quarantine and Inspection Service
ARI	Average Recurrence Interval
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ARMP	Approved Risk Management Plan
AS	Australian Standard
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soil Management Plan
AUL	Auxillary Left Turn Treatment
BMA	BHP Billiton Mitsubishi Alliance
BoM	Bureau of Meteorology
BPCT	Barney Point Coal Terminal
CAMBA	China/Australia Migratory Bird Agreement
CAPEX	Capital Expenditure
CA Regulations	*Civil Aviation Regulations 1998*
CAR	Comalco Alumina Refinery
CAS	Community Advisory Service
CAS Regulations	*Civil Aviation Safety Regulations 1998*
CASA	Civil Aviation Safety Authority
CBD	Central Business District
CCMP	Community Consultation Management Plan
CEMP	Construction Environmental Management Plan
CG	Computable General Equilibrium
CHA	Cultural Heritage Assessment
CHMP	Cultural Heritage Management Plan

CID	Community Infrastructure Designation
CITES	Conservation of International Trade in Endangered Species
CLR	Contaminated Land Register
CMS	Convention on Migratory Species
CG	Coordinator-General
CoRTN	Calculation of Road Traffic Noise
Coastal Act	*Coastal Protection and Management Act 1995*
CPT	Cone Penetration Test
CQPA	Central Queensland Ports Authority
CQRGMF	Central Queensland Regional Growth Management Framework 2002
CSC	Calliope Shire Council
CSD	Cutter Suction Dredge
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cumec	Cubic metres per second (m^3/s)
CW	Connell Wagner
D&M	Dames and Moore
dBA	Decibel
DCDB	Digital Cadastre Database
DGSM	*Dangerous Goods Safety Management Act 2001*
DEM	Dust Extinction Moisture
DEMP	Dredge Environmental Management Plan
DES	Department of Emergency Services
DEST	Department of Education, Science and Training
DEW	Department of Environment and Water Resources
DHLGP	Department of Housing, Local Government and Planning
DIWA	Directory of Nationally Important Wetlands in Australia
DMR	Department of Main Roads
DN	Diameter Nominal
DNRMW	Department of Natural Resources, Mines and Water
DNRW	Depart of Natural Resources and Water
DoC	Department of Communities
DOH	Department of Housing
DOTARS	Department of Transport and Regional Services
DPA	Dugong Protection Area
DPI	Department of Primary Industries
DPIF	Department of Primary Industries and Fisheries
DSDIT	Department of State Development, Innovation and Trade

DTM	Digital Terrain Model
dwt	Dead Weight Tonnage
EIL	Environmental Investigation Level
EDR	Environmental Design Report
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Register
EP Act	*Environment Protection Act 1994*
EPA	Environmental Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPP(Air)	*Environmental Protection Policy (Air) 1997*
EPP(Noise)	*Environmental Protection Policy (Noise) 1997*
EPP(Water)	*Environmental Protection Policy (Water) 1997*
EP Reg	*Environmental Protection Regulation 1998*
ERA	Environmentally Relevant Activity
ESD	Environmentally Sustainable Development
ESP	Exchangeable Sodium Percentage
EV	Environmental Value
FHA	Fish Habitat Areas
FOB	Free on Board
FTE	Full Time Equivalent - jobs created on a full time basis for a full year
g/s	Grams per second
GAMS	Gladstone Airshed Modelling System
GAWB	Gladstone Area Water Board
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRMP Act	*Great Barrier Reef Marine Park Act 1975*
GBRWHA	Great Barrier Reef World Heritage Area
GCC	Gladstone City Council
GDE	Groundwater Dependent Ecosystem
GEIDB	Gladstone Economic and Industry Development Board
GHD	GHD Pty Ltd
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GOC	Government Owned Corporation
GOC Act	*Government Owned Corporation Act 1993*
GPN	Gladstone Pacific Nickel Limited

GQAL	Good Quality Agricultural Land
GRASP	Get Real About Social Partnerships
GSDA	Gladstone State Development Area
GW hrs	Gigawatt hours
Ha	Hectare
HAT	Highest Astronomical Tide
HERBRECS	Queensland Herbarium Records System
HIL	Health Investigation Level
HREOC	Human Rights and Equal Opportunity Commission
HTS	Household Travel Survey
HV	Heavy Vehicles
ID	Identification Cards
IAS	Initial Advice Statement
IDAS	Integrated Development Approval System
IEMS	Integrated Environment Management System
IPA	*Integrated Planning Act 1997*
IPCC	Intergovernmental Panel on Climate Change
IR	Industrial Relations
IRTP	Integrated Regional Transport Plan
ISQG	Interim Sediment Quality Guidelines
IUCN	International Union for Conservation of Nature and Natural Resources
JAMBA	Japan/Australia Migratory Bird Agreement
Km	Kilometre
kV	Kilovolt
L_{A10}	A-weighted sound pressure level exceeded for 10% of the time
L_{A90}	A-weighted sound pressure level exceeded for 90% of the time (background)
L_{Aeq}	Average A-weighted sound pressure level
L_{AMAX}	Maximum A-weighted sound pressure level
L/s	Litres per second
LGA	Local Government Area
LGCDC	Local Government Counter Disaster Committee
LOA	Length Over All
LOR	Level of Reporting
LP Act	*Land Protection (Pest and Stock Route Management) Act 2002*
LP Regulation	*Land Protection (Pest and Stock Route Management) Regulation 2003*
LV	Light Vehicle
m	Metre

m^3	Cubic metres
m/s	Metres per second
MCU	Material Change of Use
mg/L	Milligrams per Litre (10^{-3})
mg/m^2/day	Milligram per square meter per day
ML	Million Litres (10^6)
MLWS	Mean low water spring
Mm	Millimetre
MOS	Manuals of Standards
MSDS	Material Safety Data Sheets
MSIC	Maritime Security Identification Card
MSL	Moura Short Line
MSQ	Maritime Safety Queensland
Mt	Mount
Mtpa	Million tonnes per annum
N/m^2	Newton per square metre
NATA	National Accredited Testing Authority
NC Act	*Nature Conservation Act 1992*
NCL	North Coast Line
NC Regulation	*Nature Conservation (Wildlife) Regulation 1994*
NE	North east
NEPC	National Environment Protection Council
NEPM(Air)	National Environment Protection Measure
NES	National Environmental Significance
NESB	Non-English Speaking Background(s)
NHMRC	National Health and Medical Research Council
NIMPIS	National Marine Pest Information System
NODGDM	National Ocean Disposal Guidelines for Dredged Material
NPI	National Pollutant Inventory
NPV	Net Present Value
NRTC	National Road Transport Commission
NTU	Nephelometric Turbidity Unit - used to measure turbidity (water clarity).
OESR	Office of Economic and Statistical Research
OPEX	Operational Expenditure
ORP	Oxidation Reduction Potential - the reduction and oxidation characteristics of water, which gives an indication of what oxygen levels are likely to be
PAH	Polynuclear Aromatic Hydrocarbons

PASS	Potential Acid Sulfate Soils
PCB	Polychlorinated Biphenyls
PDLU	Preferred Dominant Land Use
PER	Public Environment Report
PIFU	Planning, Information and Forecasting Unit
PM_{10}	Particulate matter less than 10 µm in aerodynamic diameter
PM_{20}	Particulate matter less than 20 µm in aerodynamic diameter
PMAV	Property Map of Assessable Vegetation
PMF	Probable Maximum Flow
PNL	Planning Noise Level
PPE	Personal Protective Equipment
PPV	Peak Particle Velocity
Ppb	Parts per billion (by volume)
Ppm	Parts per million (by volume)
QASSIT	Queensland Acid Sulfate Soil Investigation Team
QCA	Queensland Competition Authority
QPWS	Queensland Parks and Wildlife Service
QR	Queensland Rail
QSIA	Queensland Seafood Industry Association - the body representing the interests of commercial fishermen in Queensland
QT	Queensland Transport
QWQG	Queensland Water Quality Guidelines
RBL	Rating Background Level
RCP	Reinforced Concrete Pipe
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
REF	Review of Environmental Factors
RFGM	The Regional Framework for Growth Management
RGTCT	RG Tanna Coal Terminal
RIFA	Red Imported Fire Ants
RL	Relative Level
RPDM	Road Planning and Design Manual (DMR)
RTYAR	Rio Tinto Yarwun Alumina Refinery
RUMP	Road Use Management Plan
SAP	Sampling and Analysis Plan
SD	Statistical Division
SLA	Statistical Local Areas

SNL	Specific Noise Level
SPDWO Act	*State Development and Public Works Organisation Act 1971*
SPL	Strategic Port Land
SPP	State Planning Policy
SPP02/02	State Planning Policy SPP02/02 Planning and Managing Development Involving Acid Sulphate Soils
Strata	Layers or beds of sedimentary rock deposited on top of each other.
SW	South west
SWL	Standing Water Level
t	Tonne
TBT	Tributyltin
TDS	Total Dissolved Solids
TEOM	Tapered Element Oscillating Microbalance
TIA	*Transport Infrastructure Act 1994*
TO	Traditional Owners
ToR	Terms of Reference
tph	Tonnes per hour
TSHD	Trailer Suction Hopper Dredge
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
UCL	Upper Concentration Limit
USEPA	United States Environmental Protection Authority
VHT	Vehicle Hours of Travel
VKT	Vehicle Kilometres Travelled
VMA	*Vegetation Management Act 1999*
VMC	Vegetation Management Code
vpd	Vehicles per day
VRMP	Vegetation Rehabilitation and Management Plan
W/m^2	Watts per square metre
WHA	World Heritage Area
WICT	Wiggins Island Coal Terminal
WPMP	Weed and Pest Management Plan
WQO	Water Quality Objectives
WSUD	Water Sensitive Urban Design
WTP	Water Treatment Plant
$\mu g/m^3$	Micrograms per cubic metre