

16. Aquatic ecology

16.1 Summary

The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology in the area, as the changes relate to infrastructure design and are located within the existing WICET development footprint approved under the EIS. The changes will not increase the intensity or area of disturbance of the Terminal above what has already been approved for the Project.

An additional operational stormwater outlet to the Anabran from the proposed operational stormwater settlement pond at the western end of Reclamation Area B will result in a minor increase in the cumulative volume of periodic stormwater releases, due to the increase in stockyard catchment area. The additional outlet will assist with the dispersal of stormwater, rather than being restricted to one operational outfall as proposed in the original design. The discharge from this outfall will also be inert, as it will need to fully comply with relevant permits and approval conditions (ie ERA 50).

Any impacts on marine fauna will be managed through the WICET Construction EMP and Species Management Plan.

Reclamation activities, including the clearing of marine vegetation, has commenced as part of the WICET Stage 1 project.

16.2 Introduction

This chapter provides a description of the aquatic ecological communities within the Project area. The assessment focused on the distribution and health of the seagrass meadows, macroalgae, mangroves, benthic fauna, fisheries, and conservational and ecologically significant species and habitats.

This chapter also assesses the potential and likely impacts of the proposed Terminal infrastructure changes on these communities, and recommends mitigation measures to minimise potential impacts.

Potential impacts to aquatic ecology within the Project area were originally outlined in the EIS and SEIS (refer Appendix 1). Whilst the Project area has not changed, this Change Request provides an updated assessment to address current legislative requirements and changes to the Terminal design which was approved under the EIS and controlled action approvals.

16.3 Legislation

The conservation value of aquatic flora and fauna within the immediate vicinity of Wiggins Island area and Port Curtis are recognised by a variety of Commonwealth and State legislation, including the following:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Nature Conservation Act 1992 and Nature Conservation (Wildlife) Regulation 2006*
- *Vegetation Management Act 1999* (VMA)
- *Great Barrier Reef Marine Park Act 1975, Great Barrier Reef Marine Park Regulation 1983 and Marine Parks Act 2004*
- *Sustainable Planning Act 2009* (SPA), *Coastal Protection and Management Act 1995* and *Local Government Planning Schemes*
- *Fisheries Act 1994 and Fisheries Regulation 2008*

Details of relevant legislation are described within Chapter 5.

16.4 Methodology

The Project area encompasses freshwater, marine and estuarine environments. A detailed assessment of the aquatic biodiversity from a regional perspective (Port Curtis) to a local context (Wiggins Island area) was undertaken during Autumn/Winter 2006 for the WICT EIS (Appendix 1), targeting aquatic species, communities and aquatic habitats that may be affected by the proposed development.

Species of conservation and ecological significance within and surrounding the Project area were also a focus of the aquatic assessment, including habitat/species sensitivity to disturbance. The general habitat types targeted within the assessment included:

- Seagrass communities
- Mangrove communities
- Intertidal and subtidal communities
- Saltmarsh and mudflat communities
- Estuarine communities
- Freshwater communities

Figure 16.1 illustrates aquatic monitoring locations targeted during the WICT EIS ecological surveys.

16.5 Watercourses

The WICET Project area is located in the lower reaches of the Calliope River catchment below the level of tidal influence. The Terminal infrastructure (ie conveyor system) intersects Pyealy Creek sub-catchment and also drainage lines of Beales Creek. The lower reaches of these systems are influenced by tidal influx from the Calliope River, while the mid and upper reaches are ephemeral, with sporadic environmental flows associated with overland runoff within the sub-catchments.

These watercourses are shown in Figure 9.1 of this request and are discussed further in the WICT EIS (refer Appendix 1).

Chapter 9 details the water quality objectives and performance criteria for discharges from the WICET Project.

16.6 Significant Wetlands

The majority of the coal terminal infrastructure is located within the Port Curtis wetland, which is considered to be a nationally significant wetland and is listed in the Directory of Important Wetlands in Australia (DIWA) (refer Figure 16.1). The inclusion of Port Curtis as an important wetland is in recognition of the areas geomorphology, cultural and socio-economic value and ecological diversity. The area supports a diverse range of wildlife, including significant flora and fauna, as well as being the preferred feeding grounds of several CAMBA (China-Australia Migratory Bird Agreement), JAMBA (Japan-Australia Migratory Bird Agreement) and Convention on Migratory Species (Bonn Agreement) listed migratory birds (refer Chapter 15).

In conjunction with the Calliope River there are a number of freshwater wetland ecosystems, natural and artificial, within the Project area (refer Chapter 9). Wetland ecosystems are of high ecological value and are also important buffering systems. This occurs by protecting against flooding and filtering out excess nutrients and sediment from runoff that would otherwise enter receiving environments. Overland flows and floods along watercourses are important processes for maintaining wetland health.

Additional impacts to the Port Curtis wetland are not expected as the footprint of the changed Project is wholly contained in the footprint approved under the WICT EIS.



Legend

- Project Area
- Directory of Imp
- Great Barrier Reef
- Local Drainage
- Fish Monitoring
- Mangrove Moni
- Macro Benthos

Source:
World Heritage Area: DERM
Directory of Important Wetlands: DERM

16.7 Intertidal Wetlands

The intertidal wetlands of Port Curtis are characterised by strong zonation and extensive saltflats. Danaher *et al* (2005) mapped a total of 30 intertidal habitats within The Narrows and Port Curtis (Ramsay Crossing to Colosseum Inlet and seaward side of the Curtis and Facing Islands). The dominant habitats were exposed mud and sandbanks (24%), closed Rhizophora (20%) and salt pans (18%).

General zonation patterns within Port Curtis show exposed mud and sandbanks with or without seagrass occurring on the seaward side of the mangroves. On the seaward side mangroves were generally closed Rhizophora communities with an Avicennia/Cerriops community on the landward side. There are also extensive salt pans with no apparent vegetation. Where conditions are favourable samphires and saline grassland communities may occur (Danaher *et al* 2005).

Along watercourses with freshwater input Closed Rhizophora/Avicennia communities occur. On accreting banks within winding watercourses Aegiceras communities occur with the upper reaches showing a mix of communities (Danaher *et al* 2005). Figure 16.2 illustrates the intertidal communities within and adjacent to the Project area.

16.7.1 Mangroves

Works associated with the WEXP1 and WEXP2 overland conveyors and associated infrastructure are contained wholly within the approved project footprint.

Any clearing of mangroves will be undertaken in accordance with the existing marine plants disturbance operational works permits, through amendment to existing applications or submission of new applications (if required)

The changed Project is wholly contained within the development footprint approved under the EIS, therefore any removal or disturbance from the changed Terminal design is not expected to have a significant impact on the mangrove communities within the area.

16.7.2 Saltmarsh/Saltpan

A saltpan covering an area of approximately 127 ha dominates the area of Reclamation Area B (refer Figure 16.2). Bordering this saltpan is Gladstone-Mount Larcom Road, the Golding Point access track, saline grasslands and the Calliope River Anabranh. Tidal flows from Sandfly Creek and the Calliope River Anabranh are the main inundation pathways.

The changed Project is wholly contained within the development footprint approved under the EIS, therefore any removal or disturbance is not expected to have a significant impact on the saltmarsh communities within the area.

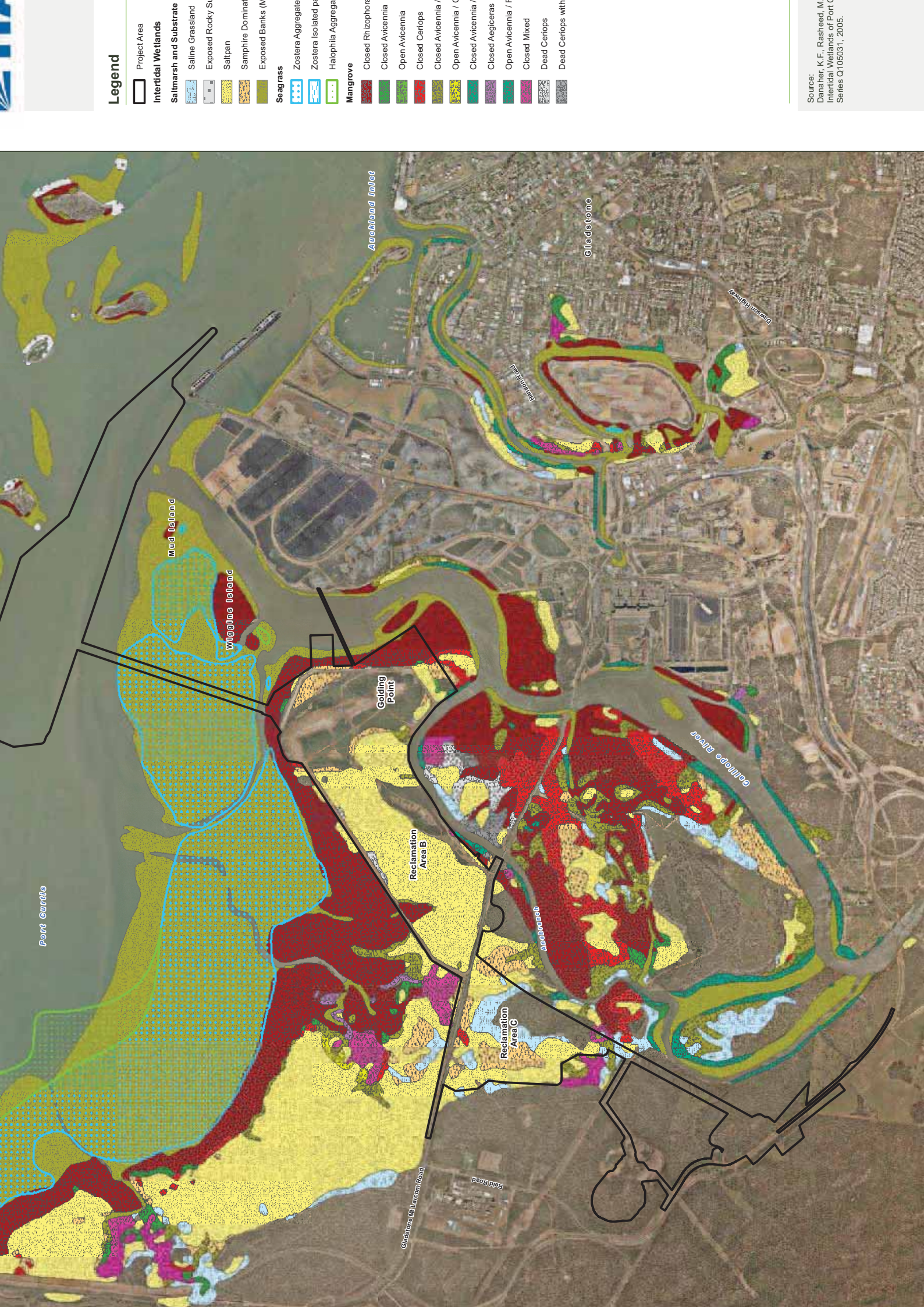
Any clearing of saltmarsh/saltpan (if required) will be undertaken in accordance with the existing marine plants disturbance operational works permits, through amendment to existing applications or submission of new applications (if required)

16.7.3 Intertidal Banks






















During the 2004 mapping of the Port Curtis intertidal wetlands (Danaher *et al* 2005) approximately 5,144 ha of unvegetated exposed mud and sandbanks were recorded. Within the vicinity of the Project area, three major intertidal banks were identified:

- Fisherman's Landing
- Golding Point
- Wiggins Island

No additional intertidal banks are required to be disturbed as part of the Project.



Legend

-  Project Area
- Interstitial Wetlands**
- Saltmarsh and Substrate**
-  Saline Grassland
-  Exposed Rocky Substrate
-  Saltpan
-  Samphire Dominant
-  Exposed Banks (V)
- Seagrass**
-  *Zostera* Aggregate
-  *Zostera* Isolated patches
-  *Halophila* Aggregate
- Mangrove**
-  Closed Rhizophoraceae
-  Closed Avicennia
-  Open Avicennia
-  Closed Ceriops
-  Closed Avicennia
-  Open Avicennia / Ceriops
-  Closed Avicennia
-  Closed Aegiceras
-  Open Avicennia / Ceriops
-  Closed Mixed
-  Dead Ceriops
-  Dead Ceriops with

Source:
 Danaher, K.F., Rasheed, M.
 Interstitial Wetlands of Port M.
 Series Q1105031, 2005.

16.7.4 Seagrass Communities

The scope of dredging for the Project is unchanged. Further details regarding the existing environmental values within and adjoining the dredge area are discussed in Chapter 9 (Water Quality) and the WICET DMP (refer Appendix 23.18).

No seagrass communities are present within the dredging footprints for the Project (refer Figure 16.3)

16.7.5 Subtidal Waters (including reef and sand habitats)

The proposed marine structures and dredging activities will occur within the Great Barrier Reef World Heritage Area (WHA), while the majority of the terrestrial and intertidal habitats of the Project area occur outside the WHA (refer Figure 16.1).

An assessment of the potential impacts on the WHA is outlined in the Potential Impacts on Matters of National Environmental Significance Report (refer Appendix B2 of the EIS, attached in Appendix 1).

The offshore footprint for the Project is unchanged. Figure 16.4 shows where the footprint intersects areas of the shipping channel subtidal and subtidal sandy channel (refer Figure 16.4).

There are no proposed changes to the dredging activities, approved by DEHP on 13th April 2012, as included in the WICT EIS and SEIS. Potential impacts will be managed as part of the WICET DMP (refer Appendix 23.18) and the WICET Species Management Plan (SMP) (refer Appendix 23.11).

16.8 Fauna Communities

16.8.1 Macroinvertebrates

Benthic invertebrates live either on the surface of bedforms (eg rock, coral or sediment - epibenthos) or within sedimentary deposits (infauna), and comprise several types of trophic groups (eg deposit-feeders, filter-feeders, grazers and predators). The abundance, density, biomass and species composition of benthic invertebrates can be used as an indicator of changing environmental conditions.

16.8.2 Fish and Nektobenthos

The updated EPBC Act Protected Matters Report identified 34 syngnathids (Seahorse and their relatives) which may potentially inhabit the near shore environment (refer Appendix 15.1). The EPBC Act Protected Matters Report generated during the EIS process identified 37 syngnathids. No species were recorded from the area during the EIS fieldwork activities, however other studies within the area identified three species, including one species of seahorse *Hippocampus* sp. and one species of pipefish.

16.8.3 Marine Megafauna

No additional marine megafauna have been identified beyond those identified in the WICT EIS within the Project area or surrounds. Potential impacts to marine megafauna will be managed as part of the WICET SMP (refer Appendix 23.11) and the DMP (refer Appendix 23.18).

16.8.4 Reptiles

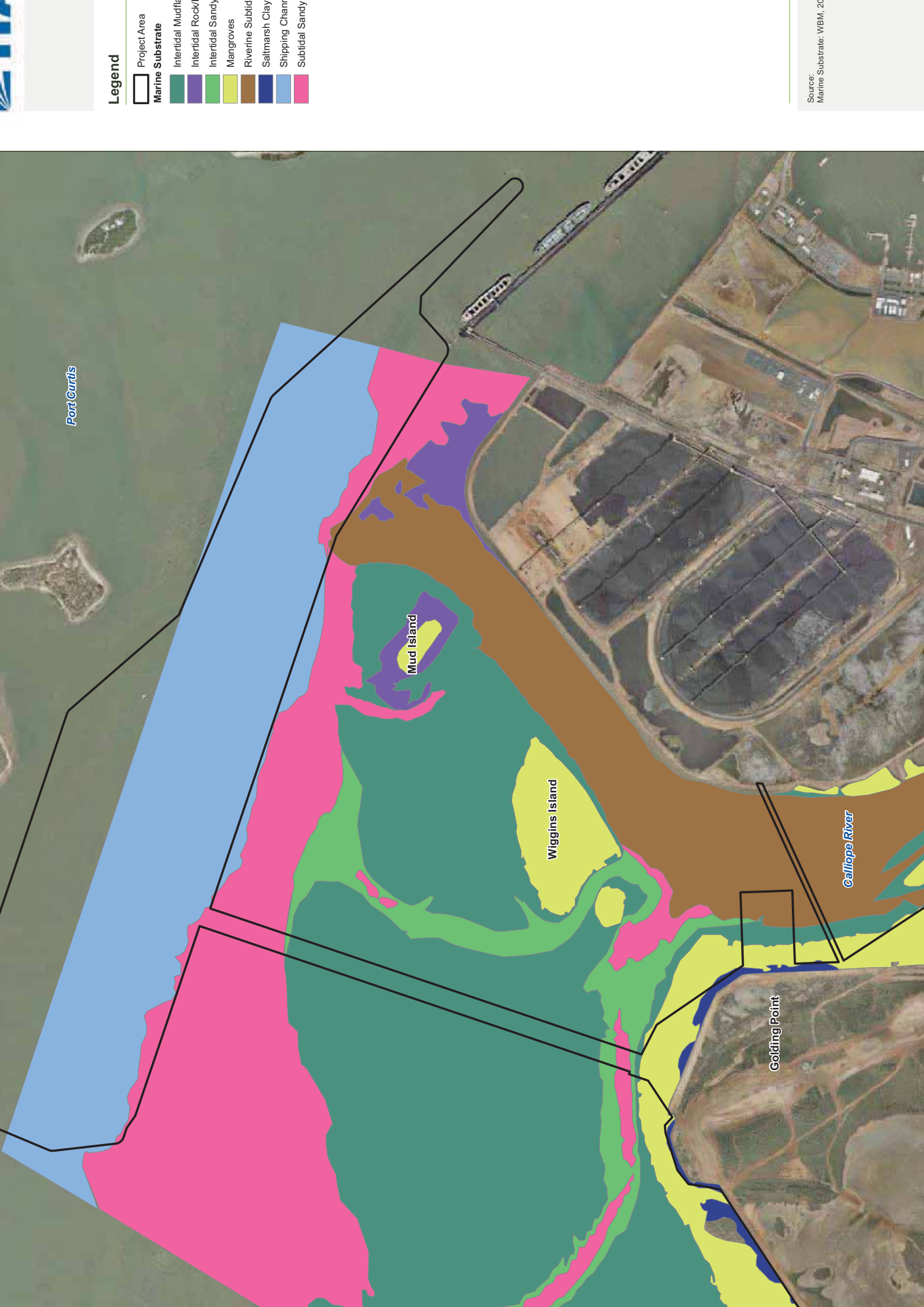
No additional marine reptiles have been identified beyond those identified in the WICT EIS within the Project area or surrounds. Potential impacts to marine reptiles will be managed as part of the WICET SMP (refer Appendix 23.11) and the DMP (refer Appendix 23.18).



Legend

- Project Area
- Seagrass Distribution
- Halodule uninervis
- Halophila ovalis
- Light Halodule
- Light Halodule uninervis
- Light Halodule
- Light Halophila
- Light Halophila
- Light Zostera cc
- Light Zostera cc
- Light Zostera cc
- Light Zostera cc uninervis (narrow)
- Light Zostera cc
- Moderate Haloc
- Moderate Halop
- Moderate Halop
- Moderate Halop
- Moderate Zostete
- Zostera capricorn

Source: Seagrass Distribution, PCIN



Legend

- Project Area
- Marine Substrate**
- Intertidal Mudflats
- Intertidal Rock/Shell
- Intertidal Sandy
- Mangroves
- Riverine Subtidal
- Saltmarsh Clay
- Shipping Channel
- Subtidal Sandy

Port Currits

Mud Island

Wiggins Island

Callope River

Golding Point

16.8.5 Marine Pests

Marine pests will be managed as part of the CEMP Pest Management Plan (PMP) and SMP (refer Appendix 23.14 and 23.11).

16.9 Potential Construction Impacts

The potential construction impacts associated with the proposed coal terminal are detailed in the WICT EIS (refer Appendix 1). However, the amendments to the Project design post EIS have resulted in minor changes to the potential impacts to the existing environment as a result of the Project construction activities associated with the Terminal.

16.9.1 Earthwork Activities

Existing Approvals

GPC 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 was 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 11.1 for location of dredging and reclamation areas) to a minimum level of 3.7 m Australia Height Datum (AHD) and 5.968 m Lowest Astronomical Tide (LAT), so as to render it fit for port land and industrial purposes.

An amendment to the existing Harbours Act reclamation approval has been granted under the SPA to remove Reclamation Area A from the development footprint and to extend the approval currency period until 5 October 2021.

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 B	193
Reclamation Area C	140
Total Reclamation Area	333

The approved WICET Project will result in the physical disturbance of approximately 135 ha of marine plants as defined under the *Fisheries Act 1994*. The disturbance of the marine plants is associated with the reclamation and marine structures required to construct a coal terminal. Approvals for marine plant removal have been obtained. The Project changes as a result of WEXP1 and WEXP2 are wholly contained within the proposed development footprint, however an amendment to the development approval for marine plant disturbance (or new development approval) will be required for a small area associated with the new operational stormwater outfall, along with the additional disturbance at Pyealy and Beales Creeks.

A list of obtained approvals for the WICET Project are summarised in Table 16.2.

Table 16.2 Summary of marine plant approvals obtained for WICET

Location	Marine plant type	Approximate area (ha)	Permit Reference No.
Reclamation Area B	Mangroves, Saltmarsh, Saltcouch	34	04S0DB0287
Reclamation Area B extension	Marine plants	10.2	IPDC01748109 & IPDC01748209 2010DB0025

Location	Marine plant type	Approximate area (ha)	Permit Reference No.
Gladstone- Mount Larcom Road Reserve & Lot 101 SP215262	Marine plants	4.2	IPDC01239908 2008DB0261
Reclamation Area C (access roads)	Saltcouch and Samphire species	3	2006DB0084
Gladstone- Mount Larcom Road, Offshore Approach Jetty & Dredge Spoil Pipeline	Marine plants	80.9	IPDC01322508 2009DB0029
Beales Creek	Marine plants	3	SPDC00470910 2010DB0192
Pyealy Creek	Marine plants	0.05	SPDC00428810 2010DB0269
Berth Wharf 1, Offshore Approach Jetty	Marine plants	0.01	SPDC00682310 2010DB0248
Barge Wharf	Marine plants	0.4	SPDC00419210 2010DB0203

Intertidal areas

No additional intertidal areas are proposed as a result of changes to the Project.

Watercourses

The majority of the works associated with the Terminal are below the limit of tidal influence and are subject to approvals under the *Fisheries Act 1994* and the Coastal Act. However, the Project footprint includes the construction of a conveyor system that crosses two creeks.

The changes proposed for the Project are not expected to have an increased impact on the watercourses in the area, as the changes to the infrastructure design are contained within the original development footprint. The proposed additional operational stormwater outfall to the anabranch of the Calliope River will be contained within the Project footprint approved under the WICT EIS.

Although this change is contained within the original development footprint, an increase in the cumulative volume of periodic releases will occur due to the increase in stockyard catchment area. However, the design of the settlement pond and outfall will ensure that the quality and rate of stormwater discharge will be compliant with modelling undertaken in the approved EIS. The stormwater discharge will also be compliant with water quality release limits required in the EPBC Act controlled action approval (refer Chapter 9). Therefore the minor changes proposed for the Project are not expected to have a significant impact during construction on the aquatic communities in the area.

Flora and fauna

The proposed WEXP1 and WEXP2 overland conveyors will retain the buffer zone between the development and the intertidal wetlands of the Calliope River Anabranch from 80 m to 100 m.

The Project changes (as a result of WEXP1 and WEXP2) will be contained within the development footprint approved under the WICT EIS (refer Appendix 1). The changes include an alteration to the infrastructure design layout, however this is not expected to have any additional impact on flora and fauna assemblages within Reclamation Area B, as the entire area has already been approved for clearing.

Mitigation measures will be implemented to reduce and offset the potential impacts through a variety of different methods and techniques (refer Chapter 23 and WICET CEMP).

16.9.2 Dredging Activities

Dredging will take place to create six berth pockets and channel deepening and widening to provide ready and safe passage associated with the bulk carrier vessels. This is unchanged from the WICT EIS (refer Appendix 1). The approved dredging operations will occur in the subtidal environment of the Project area (refer Figure 11.1).

16.9.3 Reclamation pond dewatering and discharges

The beneficial reuse of the marine dredge spoil within Reclamation Areas B and C will result in controlled and measured discharge of the settlement water into the Calliope River Anabran. The changed Project proposes to use a new stormwater settlement pond on the southern end of the Stockyard Area B and a new stormwater outfall to the Anabran. The Stage 1 stormwater pond at the northern end of Stockyard Area B will require extension in both WEXP1 and WEXP2.

A minor increase in the cumulative volume of periodic stormwater releases will occur, due to the increase in stockyard catchment area. The additional operational outfall will assist with the dispersal of stormwater discharges, rather than being restricted to one operational outfall as proposed in the original design.

The discharge from the two stormwater outlets has the potential to impact upon the system into which it is released, however, no significant impact upon the ecological values of the system is envisaged as resulting from the dewatering process as the discharge will be inert and fully comply with relevant permits and approval conditions. The rate of stormwater discharge will be in compliance with modelling undertaken and reported within the WICT EIS (refer Appendix 1) and WICET DMP (refer Appendix 23.18).

Chapter 9 details the water quality objectives and performance criteria the discharges will be required to satisfy.

Mitigation measures to reduce the impacts during the dredging activities are discussed further in Section 16.11 and the WICET DMP.

16.9.4 Marine Structures and Vessel Movements

Impact sources

No additional disturbance to seagrass communities is expected to occur from the changed Project as there has been no change to the marine Project footprint approved under the EIS.

The Project's construction activities with potential to impact on aquatic ecology will include:

- Construction of the marine jetty and berths
- Marine vessel movements for construction of jetty and wharfs
- Marine vessel movements to and from the construction barge wharf, delivering construction materials
- Abrasive blasting activities that will occur in proximity to and/or over marine waters

16.10 Potential Operational Impacts

16.10.1 Maintenance dredging

There are no proposed changes to the approved dredging and maintenance dredging, as included in the WICT EIS and SEIS.

16.10.2 Operational and Marine Vessel Traffic

No additional vessel movements are expected as a result of the Project changes

The port currently operates in accordance with a number of legislative acts governing waste, ballast waters, discharges and maritime safety. The current GPC Integrated Environmental Management System (IEMS) and safety procedures will be reviewed and updated prior to operation to reflect the new berths and associated operations.

16.10.3 Other Operational Activities

The following operational activities/infrastructure have potential to impact on aquatic ecology:

- Conveyor system operation
- Coal stockyard operation
- Coal loading into ships
- Maintenance of marine structures

Potential impacts include the generation of dust, risk of coal/chemical spills and/or contamination and waste, light and noise generation.

Noise and Vibration

Noise will be generated by a range of operational activities, including the use of heavy equipment and haulage vehicles, commercial vessels and any maintenance dredging. There is limited available information on the level of impact, underwater noise has on marine life. The regulation of underwater noise in Queensland is governed by the *Nature Conservation Act 1992* and Section 88 of supporting Regulations in which reference is made to conservation management plans and noise impact, and the *Environmental Protection Act 1994* defines noise as an 'environmental nuisance'.

Marine mammals and turtles will show avoidance of disturbance and noise, moving away and/or staying at a distance where they feel safe. As such, there is not expected to be a significant impact upon marine mammals and turtles once they have become accustomed to the additional levels of activity.

The use of a conveyor structure to transport coal from the dump station to the Terminal will ensure a buffer of 100 m remains between the proposed works and the intertidal wetlands of the Calliope River Anabranch.

The semi-enclosed conveyor system should also minimise visual disturbances within the Project footprint by reducing light pollution, noise, vibration and dust generation. The retention of terrestrial communities within the Project footprint should also assist in limiting the visual disturbances associated with the conveyor system (refer Chapter 15).

Lighting

Artificial lighting is known to affect marine turtle behaviour (Environment Australia 2003). However, there are no nesting sites within the Project area and the closest known nesting area is on the eastern side of Facing Island within Port Curtis.

Turtles are frequently found within the Project area and surrounding waters (The Narrows and Calliope River mouth have both been identified as major turtle foraging areas). As such there is a potential for the artificial lighting to affect marine turtle behaviour. However, this impact is likely to be minimal to the turtle populations due to the existing elevated lux levels at the current port facilities.

Lighting pollution may also be an issue for roosting waterbirds, shorebirds and flying fox colonies within the immediate area.

Water Quality

The operational impacts upon water quality are similar to those during construction and are also discussed within the water quality chapter (refer Chapter 9). Handling of substances

hazardous to health; oil and hydrocarbon facilities; spills and discharges will be addressed through the WICET Operational EMP.

Oil and Chemical Spills

Good site management will reduce the risk of chemical and oil spills. Procedures are in place at the port to minimise any spills into the terrestrial and/or marine environment therefore the potential for impact is minimal if the WICET Operational EMP is implemented appropriately.

Air Quality

The air quality issues associated with the changed Project are considered within Chapter 12 of this request. The loading of bulk cargoes, including coal ships can create air pollution in the form of dust. Impacts from dust during loading are primarily concentrated around loading terminals and port environs. The cleaning of bulk cargo residues from ships' holds may also create a dust nuisance or health hazard, as well as a source of water pollution (Australian Maritime Safety Authority 2003).

The WICET Dust Management Plan will be prepared prior to operation. As such, implementing the WICET Dust Management Plan should result in minimised air quality impacts on the aquatic values of the area.

16.11 Mitigation and Monitoring

It is an objective of the WICET to have minimal impact on the aquatic ecology of the area during construction and operational activities. To assist in achieving this objective, the mitigation strategies described below will be implemented.

16.11.1 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 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 feasible 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 maintenance dredging
- Implementation of the approved DMP (refer Appendix 23.18)
- Submit marine plant applications for the removal and/or disturbance of marine plants within the Project area (where required)
- Where practical, high noise construction activities will be planned to commence outside the bird migration period (October to May)

16.11.2 Construction

The mitigation measures contained in the WICET DMP, WICET CEMP (and supporting management plans) and below will be implemented during the construction phase of the Project to minimise the impact on the aquatic environments within the area. The WICET CEMP will be reviewed during the detailed design phase of the WEXP1 and WEXP2 to address changes in design, construction methodologies and improvements identified during the Stage 1 construction works. The following mitigation measures will be implemented during construction to minimise the impact on the aquatic environments within the area:

- Areas around construction works will be maintained and/or restored to their natural state

- 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 given the Project scope and design, vegetation should not be removed within 30 m 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 to ensure the dredge program is completed within the shortest possible timeframe, thereby minimising the available window for potential impacts to occur
- 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
- Bund walls will be designed and constructed in general accordance with best practice. 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. 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 DEHP *Guideline: 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 will cease
- The WICET Waste Management Plan (refer Chapter 23 and Appendix 23.17) will be implemented. This Plan specifically addresses 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 to 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 shown in the approved design
- Construction vehicles and machinery will remain within construction footprint and on designated tracks and roadways
- Install erosion and sediment control measures, prior to construction and modify as necessary
- Retain and treat overland runoff and stormwater from the site prior to discharge
- Comply rigorously with the conditions of all approvals
- Implement a revegetation/rehabilitation plan for the area. Rehabilitating riparian buffers is key to restoring natural stream functions and aquatic habitats
- Implement the WICET Pest Management Plan (refer Appendix 23.14)
- Implement the WICET Species Management Plan (refer Appendix 23.11)
- Implement mechanisms to minimise the risk of entanglement and mortality of migratory species (eg shorebirds, dugongs and turtles)

16.11.3 Operational

The following mitigation measures will be implemented during the operational phase of the Project to minimise the impact on the aquatic environments within the area:

- 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 dredged material should be monitored to ensure that the sediments continue to be classified as non-contaminated
- Access tracks will be constructed clear of waterways, wherever possible
- A fire management plan will be implemented to address the risk and management of operational activities in relation to fire risks
- Extend construction cataloguing and encourage community participation in compiling information on significant species within Port Curtis
- Implement the Pest Management Plan (PMP) (refer Appendix 23.14)
- Regular monitoring of the health of the intertidal wetlands, including the seagrass and mangrove communities

16.12 Conclusions

The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology in the area, as the changes relate to infrastructure design and are located within the existing WICET development footprint approved under the EIS. The changes will not increase the intensity or area of disturbance of the Terminal above what has already been approved for the Project.

An additional operational stormwater outlet to the Anabran from the proposed operational stormwater settlement pond at the western end of Reclamation Area B will result in a minor increase in the cumulative volume of periodic stormwater releases, due to the increase in stockyard catchment area. The additional outlet will assist with the dispersal of stormwater, rather than being restricted to one operational outfall as proposed in the original design. The discharge from this outfall will also be inert, as it will need to fully comply with relevant permits and approval conditions (ie ERA 50).

The implementation of mitigation and management measures during the construction and operation of the Terminal will minimise potential impacts to the aquatic environment within Port Curtis.

Dredging activities are not proposed to be changed as part of the changed Project (WEXP1 and WEXP2).

In summary, any potential aquatic ecology impacts from the proposed Project changes are considered minor and represent minimal to no change to the potential impacts addressed in the WICT EIS.

Conclusion 1: The changes proposed for the Project are not expected to cause a significant change to the disturbance of the aquatic ecology, as the changes relate to infrastructure design and are located within the existing development footprint.

Conclusion 2: Any impacts on marine fauna will be managed through the WICET Construction EMP and Species Management Plan.

Conclusion 3: The overall loss of marine plants will be mitigated by implementing the GPC approved offset strategy.

17. Cultural heritage

17.1 Summary

The changed Project (as a result of WEXP1 and WEXP2) does not extend past the Project footprint assessed in the EIS and controlled action, therefore there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP.

To ensure Indigenous and Non-indigenous duty of care is implemented during the Project and to avoid or minimise the damage or destruction of items of cultural heritage, the CHMPs (refer Appendix 23.6 and 23.7) will be implemented prior and during the Project activities.

17.2 Introduction

This chapter summarises the cultural heritage associated with the WICET Project located to the west and directly opposite the Calliope River from the existing RG Tanna Coal Terminal. The Project footprint 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.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

17.3 Cultural Heritage Management Plan

The potential for cultural and archaeological sites/items to be uncovered during construction activities within the Project footprint is most likely to occur during the Stage 1 phase of the Project.

As a requirement of the ACH Act Section 87, a CHMP is mandatory for activities requiring an EIS. In the event of a potentially significant find, actions should be undertaken in accordance with the CHMP. The implementation of the Cultural Heritage Management Plan (CHMP) will manage Project activities to avoid or minimise the impact on cultural heritage. As WEXP1 and WEXP2 do not extend past the approved Project footprint, there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMPs.

Appendices 23.6 and 23.7 contain the complete management and mitigation measures within the CHMPs.

17.4 Future Cultural Heritage Consultation

GPC is the lessor of the site and has been contracted as the operator of the Terminal on behalf of WICET. GPC are committed to Indigenous employment initiatives and innovative employment practices. GPC adopted a Reconciliation Action Plan in 2010, which consisted of four targets:

- Strengthening relationships
- Fostering respect
- Increasing opportunities
- Ensuring accountability

This plan was reinforced by the Indigenous Employment Policy which seeks to increase Indigenous employment to be representative of the region's Indigenous population by 2015 and to have an Indigenous employment rate of 5% by 2020 (Aurecon Hatch 2011). To achieve this, an Indigenous Liaison person and a monthly meeting committee have been established and a series of bursaries, scholarships, traineeships and apprenticeships will be offered to encourage Indigenous participation in the workforce.

The Future Direction Indigenous Liaison Group (FDILG) was established in 2008 by GPC to manage their involvement with the Indigenous community. Their role is to ensure that the Indigenous community benefits from the growth and prosperity of the Port of Gladstone.

WICET will continue to consult regularly with the Indigenous community to build a future generation of Indigenous leaders in Gladstone and promote cultural awareness among current and future employees.

17.5 Conclusion

A Cultural Heritage desktop study was undertaken as part of the WICT EIS (2006) process. This study included undertaking a review of the Queensland Heritage Register, the Australian Heritage Database and the Aboriginal and Torres Strait Islander Cultural Heritage Databases to determine the location of potentially impacted Cultural Heritage locations within the vicinity of the WICET. The Australian Heritage Database identified two locations of heritage significance within the region; these being the Great Barrier Reef World Heritage Area (GBRWHA) and the North Reef Light Station located on Curtis Island.

A five day field assessment was undertaken by ARCHAEO in collaboration with the Traditional Owners (TOs) of the region in order to locate any previously unidentified culturally significant locations and/or artefacts. In total, 25 heritage artefacts and places were located within the vicinity of the WICET project area including one site of Indigenous cultural significance and four sites of historic significance.

A CHMP was developed in 2008 for the WICET Project in consultation with the TOs of the region. The CHMP will be implemented onsite during construction and operation of the WICET to prevent damaging harm to both known locations and undiscovered locations of Indigenous and European heritage significance.

WEXP1 and WEXP2 do not extend past the Project footprint approved under the EIS and controlled action, therefore there are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP.

To ensure Indigenous and Non-indigenous duty of care is implemented during the Project and to avoid or minimise the damage or destruction of items of cultural heritage, the CHMPs (refer Appendix 23.6 and 23.7) will be implemented prior and during the Project activities.

Conclusion 1: There are no additional requirements for further cultural heritage field investigations or for amendments to the CHMP as a result of WEXP1 and WEXP2.

18. Social

18.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in minor changes to impacts on the local community. WICET has established and implemented (as part of Stage 1) a stakeholder engagement programme, and a Communication, Community and Stakeholder Management Plan (as part of this Request for Project Change) that will engage early, and adopt a clear communication approach to help manage community expectations, and to identify and communicate how the implementation of the design addresses community concerns.

Proactive planning and investment in the Maritime Precinct and the Maroon Group Accommodation Facility demonstrate that WICET has identified and assessed social and environment impacts, both adverse and beneficial, in the Project's area of influence.

The estimated peak workforce for the changed Project is 1,100 employees inclusive of construction labour, engineering and management staff. This compares with 1,450 employees assessed during the EIS and SEIS (should Stage 1, 2 and 3, as defined in the EIS all occur concurrently). The peak is expected to occur during WEXP1 construction as Stage 1 is completed and commences operation. Given the WEXP1 construction workforce is planned to ramp up as Stage 1 construction ramps down, it is expected that the 1,100 peak workforce will be sustained for a longer period than originally anticipated in the EIS and SEIS.

Provision of rooms from WICET's allocation within the Maroon Group Accommodation Facility will cater for the majority of non-Gladstone based workers required for the Project.

WICET has developed the over-arching Communications Plan, which details the communications process to be utilised throughout of Terminal's lifespan and the Community Relations Plan to address communication specifically relating to site establishment and construction phases of the Terminal.

The impacts arising from increased workforce requirements and concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the surrounding community.

18.2 Introduction

Historically, the Gladstone region has experienced periods of economic growth and decline, relating to the major industrial development in the region and the associated migration of short-term construction workers. Gladstone has been recognised by the Queensland Government as a major industrial centre for the future of Australia and there is now a focus on attracting workers to Gladstone and retaining this population on a more permanent basis.

As part of the WICT EIS, a social impact assessment (SIA) was undertaken. This was updated as part of the Project Change Request with new information and data that has become available since the WICT EIS was prepared, and is attached in Appendix 18.

This chapter provides a summary of the updated SIA.

18.3 Overview of previous Environmental Impact Statement Approval

The original WICT EIS was produced in 2006 and submissions from key stakeholders and the community were made. The Project was granted "Significant Project" status by the Queensland Coordinator-General on 29 September 2005, requiring an Environmental Impact Statement (EIS) to be developed. A SEIS was produced in 2007 which included social impacts, which captured comments received during the WICT EIS consultation process relevant to social issues (refer Appendix 1).

The full EIS assessment was completed in 2007 and the Coordinator-General's Report assessing the EIS and SEIS was approved on 7 January 2008. The Coordinator-General determined the Project could proceed subject to ten conditions as outlined in the Change Request. Seven of these conditions related to transport and road impacts, one to soils, one to air quality and one to environmental management plans.

Commitments from the conditions of approval included the requirement for a series of EMPs to be developed to address the Coordinator-General's assessment of the Project. The Coordinator-General's Report included the requirement for a community liaison programme to address the range of issues identified in the EIS.

Due to delays in the execution of the WICET Project, and the increase in industry in the region (eg LNG industry on Curtis Island), the commitment to community liaison is potentially of even greater significance now than it was in 2006.

18.4 Queensland Government context - Social Impact Management

The Queensland Government committed to undertaking the Gladstone Growth Management Initiative in 2001. This initiative was aimed at planning for the potential impact of and opportunities arising from population growth and cumulative impacts arising from the development of major industrial projects in the Gladstone/Calliope area.

During June/July 2011 within the Gladstone/Calliope area, eight projects were identified as currently under construction, seven projects had completed an EIS, and nine projects were classified as pending/proposed (GEIDB 2011).

Since 2006, the Queensland Government has released key policy documents that may impact on the Project, in particular the *Sustainable Resource Communities Policy* (2008) and the *2010 Surat Basin Future Directions Statement*, in response to the need to manage growth in the resource development areas of the Surat Basin, Bowen Basin and north-west Queensland minerals province.

Under the Sustainable Resource Communities Policy and the 2010 Surat Basin Future Directions Statement, proponents of new or expanded major resource development projects, need to develop a Social Impact Management Plan (SIMP) in consultation with government and key stakeholders.

The *Major Resource Projects Housing Policy* (MRPHP) in August 2011, which delivers a set of core principles to guide the identification and assessment of accommodation and housing impacts and development of mitigation and management strategies.

The MRPHP will apply to all projects for which an Environmental Impact Assessment is undertaken and works alongside the SIA process and the SIMP Guideline to ensure that SIAs and SIMPs are comprehensive and take account of Queensland Government policy settings.

18.5 Project response to updated policies

The WICET EIS (Appendix 1) was approved prior to these state government policies and legislation changes, which now require project proponents to conduct a social impact assessment and then develop social impact management plans, in collaboration with stakeholders.

While the WICET Project is not bound by legislation to develop a SIMP, a *Social Impacts Management Report* was prepared by Aurecon in May 2011. This Change Request updates the profile of the population and housing environments of Gladstone. It also provides current housing availability data and a picture of industry and the potential growth in workforce numbers in Gladstone in the coming years.

If required in future, this report may provide a basis for WICET to develop a formal social impact management plan (SIMP), in collaboration with stakeholders.

18.6 Housing and accommodation

Accommodation Management Strategy (AMS)

As stated in the Project's original EIS/SEIS (Appendix 1), the accommodation requirements of the Project are expected to be met by the existing available accommodation, the implementation of an Accommodation Management Strategy (AMS) and the coordination of peak construction periods between different projects.

Coordination between different projects will occur with regular consultation with DSDIP and the relevant industry organisations. This will enable information sharing, to formally keep abreast of timing issues and to achieve a coordinated outcome in the provision of accommodation in the study area. Ongoing working group meetings will also enable the actions from the AMS to be monitored and for any high-level issues to be discussed.

Key components and mitigation measures that will 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 the Maroon Group Accommodation Facility, funded by WICET, which will cater for the majority of non-Gladstone based workers needed for construction (discussed later)
- Securing additional rooms as the Accommodation Facility expands
- Providing rooms in the Accommodation Facility for fly-in fly-out construction workers with families who do not plan on living full-time within the region
- Encouraging contractors to achieve around 80% local workforce participation
- Forming alliances with regional builders and/or other projects/developers
- Discouraging the construction workforce from using rental properties and instead, utilising the Accommodation Facility
- Providing feasible transport options for those construction workers to and from their place of temporary residence, including a bus to and from the Project on a daily basis, with a route directed away from the Gladstone city centre
- Approaching State housing agencies to increase the public housing supply in the region to support low income households
- Monitoring housing availability and affordability in response to demand associated with the timing of major projects in the Gladstone area
- Developing a monitoring programme to measure the performance of the AMS against key social planning principles established by the working group

Potential Project Impacts on Housing Availability

Most of the projects have estimated peak workforce numbers and estimated timing of their projects. In order to accurately capture the cumulative workforce data from each approved EIS as approved needs to be added to the currently approved workforce data. Project delays and inaccurate workforce data may result in the EIS figures being less accurate as the projects reach construction.

The Australian Pacific LNG (APLNG) Project EIS, used as raw data APLNG figures, plus those of a number (13) of other projects for the region which have produced worker figures through EISs or other documents. This EIS concludes that if multiple projects were under construction at the same time, then the region could conceivably be trying to house upwards of 9,000 construction workers in the year of 2012-2013 (GRC 2010a).

The *Voluntary Industry Contributions Framework* (GEIDB 2010) identified housing and accommodation recommendations for investment for new companies proposing to develop large scale projects within the Gladstone region:

Provide new workers' accommodation using a range of housing types and models aimed at increasing the supply of affordable housing to alleviate stress on existing stock, in the Gladstone/Boyne Island and Tannum Sands areas (page 31).

WICET Workforce Accommodation

A key factor in trying to assess whether residential land development and dwelling unit construction activity will meet the needs of the community, is to estimate the workforce numbers of major projects.

The WICT EIS estimated that the peak workforce for construction phases would be 1,450, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently. Table 18.1 provides a summary of the EIS estimate staffing (adapted from Table 18.18 of the EIS).

Table 18.1 WICET construction staffing requirements as detailed in the EIS

Stage	EIS Estimate Staffing
Stage 1	650
Stage 2	450
Stage 3	350
Total	1,450

However, the peak construction workforce for the Project is now expected to be 1,100 personnel (during Stage 1 and WEXP1 construction) (refer Table 18.2). Accommodation and transport strategies have been implemented by WICET including the allocation of over 650 rooms in the Maroon Group Accommodation Facility and bus transport between the facility and the Project site.

In the Project Overview Briefing to GRC in March 2011, the WICET Project Director estimated the staffing and accommodation needs, summarised in Table 18.2.

Table 18.2 WICET Staffing and accommodation requirements

Stage	Date	Rooms	Estimate Staffing
Stage 1	July 2011	240	300
Stage 2	Dec 2012	400	450
Stage 3	Aug 2012	260	350
Total		900	1,100

The Maroon Group Pty Ltd has developed a workers accommodation facility for 2,265 people at Calliope, approximately 20 minutes' drive west of Gladstone. WICET has secured 240 rooms for Stage 1 and a further 408 rooms as the facility develops. There is also the option to secure an additional allocation of the remaining rooms.

WICET has also previously committed to employing a local workforce where possible to further reduce the impact of the Project on housing availability and affordability as it is assumed that a local workforce will already have suitable accommodation and will not contribute to further demand for housing in the area. Contractors are encouraged to achieve around an 80% local workforce.

WICET will contribute to the implementation of the AMS as part of a collaborative effort to address the housing shortage and housing affordability.

18.7 Project Impacts

18.7.1 Land Use

The proposed changes to the Project do not exceed the footprint of the approved Project under the EIS and will not directly impact on any additional landholdings (refer Chapter 5). The proposed changes to the Project are consistent with the existing and future land uses of the surrounding area and will improve the throughput of the Terminal to ensure the Port of Gladstone can satisfy the transport demands of the rapidly increasing coal export market.

The Project is partially located within the Yarwun Precinct of the GSDA, a dedicated area for industrial development. The RG Tanna Coal Terminal is directly adjacent to the Project and may reduce the perceived negative impacts associated with the Project.

18.8 Cumulative Impacts

When a number of projects are being planned over a similar timeframe it becomes necessary to try to estimate the potential cumulative workforce numbers that will impact on the housing market. GRC's *Regional Growth Report* (2010) sought to appraise Council of potential regional growth issues as the region moves towards its next period of major industrial development generated growth.

This Report states:

"Until some finite decisions are made by Government and project proponents, it will not be possible to firm up workforce estimates. As decisions are made, some scenarios can be eliminated or "firmed up", thereby increasing the confidence with which such estimates are made." (page 11).

There is a huge number of variables that may contribute to an influx in construction workers, ranging from anywhere between 2,000 to almost 8,000.

The study area has experienced significant industrial growth over the past decade with over \$60 billion worth of projects currently under investigation in Gladstone LGA. Among these are a number of projects in the LNG industry, located within close proximity to the WICET Project, with proposals to construct LNG facilities around the Port of Gladstone for processing and exporting LNG.

The Gladstone Economic and Industry Development Board (GEIDB) was established by the Queensland Government to facilitate project and infrastructure establishment in Gladstone. According to a recent project review by GEIDB, eight projects are under construction, seven projects have a completed EIS and are awaiting construction and nine projects are pending/proposed (GEIDB 2011).

These projects are summarised in Table 18A in Appendix 18. It should be noted that the timing of the listed projects will need to be reconfirmed prior to commencement of the expansion phases, WEXP1 and WEXP2.

These projects may operate concurrently with WEXP1 and WEXP2 and may result in cumulative social impact within the study area.

Construction

As indicated by Table 18.3, construction for Stage 1 of the Project is expected to occur between 2011 and 2014 with a peak construction workforce of 800 employees. WEXP1 and WEXP2 are expected to have a peak construction workforce of 1,100 employees and an additional 67 employees for operation. It is intended that the construction workforce will transition from the WICET Stage 1 construction into the WEXP1 and WEXP2 construction, with a peak of 1,100 personnel for the Project.

Table 18.3 WICET Stage 1 construction timeline and workforce

Project/proponent	Construction timeline	Peak construction workforce
Stage 1 coal terminal (Wiggins Island Coal Export Terminal Pty Ltd)	Construction to occur between 2011 and 2014	Construction: 800 Operation: 120
WEXP1/WEXP2	Construction of WEXP1 to commence mid 2012	Construction: 1,100 Operation: 67

Impact of this Project

The cumulative impacts arising from concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the study area. Projects in the Gladstone region that are likely to coincide with the proposed expansions WEXP1 and WEXP2 include the Moura Link – Aldoga Rail Project, the Balaclava Island Coal Export Terminal (still in EIS phase) and various LNG projects. As previously stated the timing of these projects is uncertain and should be monitored during detailed design and prior to construction.

Gladstone is experiencing a skills shortage as the demand from industrial development in Gladstone is exceeding the local supply of workers. Temporary workers from outside Gladstone are being hired to address this shortage. Additional pressure is being placed on accommodation with a lack of short term housing options, increasing housing prices and increased rental prices with low vacancy rates.

Housing and Accommodation

With the influx of projects and workers to the region, the pressure on housing availability is evident through the latest rental RP data. Between January to March 2011, less than 150 units or houses were available across the region.

18.8.1 Project Responses to Mitigate Impacts

Gladstone Coal Exporters Maritime Precinct

Current EIS approvals set conditions for the proponent to make a community amenity contribution in isolation or collaboration with other projects. This amenity contribution is a feature of the government's response to the LNG projects seeking EIS approvals. WICET was not bound by these EIS approval processes but has developed a proposed project for community amenity contribution to mitigate potential social impacts of the Project.

Therefore, it is proposed that WICET will directly fund works with GPC to provide a Gladstone Coal Exporters Maritime Precinct. The precinct will extend from O'Connell Wharf to the mouth of Auckland Inlet on the east shore of Auckland Creek and including the side of Auckland Hill Park.

The precinct would focus on the maritime history of Gladstone and be designed for families with parklands, cafes, a water park and fishing platforms. It is proposed WICET's costs for delivering this precinct would be approximately \$35 million. This contribution from WICET will deliver a long term, high quality amenity to the Gladstone community. There are positive opportunities for WICET to promote the Marine Precinct and to seek community involvement in the development of this precinct.

Hanson Road Upgrade

WICET is currently undertaking the \$70M upgrade of Hanson Road which will result in a four lane carriage way over a two kilometre stretch as part of DTMR's ultimate upgrade of Hanson Road.

As part of expansion works, and consistent with the current EIS conditions, WICET will construct a grade separated overpass. Design has commenced on this overpass, which is expected to cost between \$20 and \$25M and improve the safety of road users on Hanson Road and those accessing the terminal.

Community Impacts and Engagement

In addition to addressing worker accommodation impacts, WICET has put in place a series of plans/programs to support the community relations function of the WICET Project.

WICET commissioned the Social Impacts Management Report in 2011 to document the range of plans and programs that the WICET Project team have established to effectively manage the social impacts of the Project.

WICET has developed an over-arching *Communications Plan (April 2011)* detailing the communications process to be utilised throughout the lifespan of the coal terminal development. It is the master reference designed primarily for internal use, which explains the philosophy and messaging behind all WICET communications.

This communication plan is designed to support key Project management documentation, including the:

- Environmental Management Plans (Appendix 23) (and sub plans addressing such issues as bushfire management, soil and water quality, energy and water use, noise and vibration, dangerous goods, waste management, landscape and rehabilitation, and air quality)
- Traffic Management Plan (Appendix 23.16)
- Emergency and Disaster Management Plan

The Community Relations Plan 2011 (Appendix 23.8) addresses communication specifically relating to the site establishment and construction phases of the Terminal. This Plan details how the local community and stakeholders are to be kept informed about all aspects of the Project throughout its lifespan.

WICET has also developed a Communication, Community and Stakeholder Management Plan (April 2012) as part of this Request for Project Change (refer Appendix 18).

The Plan is designed to outline the additional communication, community relations and engagement activities which will be undertaken to effectively inform, educate and engage with all stakeholders who may be directly impacted by the proposed changes to the expansion phases of the WICET Project.

It complements the existing Communication, Community and Stakeholder Management Plan for Stage One Project Delivery, which details the approach and processes being utilised to ensure the Gladstone community and key stakeholders are properly informed and engaged throughout the delivery of Stage One.

Stakeholder Engagement

WICET has established an approach to engage the community to ensure relationships with stakeholders are appropriately managed to ensure the Project's goals are effectively met. Key community, government and internal stakeholders and groups have been identified in the Community Relations Plan, and are discussed in the sections below.

The Stakeholder Engagement Plan (within the Community Relations Plan)

This plan aims to assist in building awareness, acceptance and ultimately endorsement of the Project by external stakeholders. This plan focuses on stakeholder issues likely to be encountered in the lead up to financial close and commencement of construction.

Social and Community Support Plan

A sub-plan of the Communications Plan, the Social and Community Support Plan details WICET's approach to support in the community and links to both the Communications and the Community Relations Plans to ensure the program delivers positive outcomes. A key component of this plan is to spell out exactly what the Project wishes to be known for in terms of its long term legacy to the community.

Community Engagement and Consultation –Construction

The Procurement, Construction and Management (PCM) Process for the WICET Stage 1 has been awarded to a PCM Project Manager – Worley Parsons. Worley Parsons will engage the services of specialised construction contractors to construct WICET Stage 1.

Worley Parsons will manage all matters requiring communication or coordination with the contractors to ensure that there is always 'one point of contact' during the course of the WICET Stage 1. However, the management of the engagement with key stakeholders in relation to the Project will be managed by WICET. It is expected that similar arrangements will be made with the WEXP1/WEXP2 PCM Project Management.

To ensure this engagement process is effectively managed from the beginning of the construction phase, an Early Works Plan has been developed. This plan highlights the specific actions required to inform the community and industry neighbours about potential community impacts.

Local Industry Participation Plan

In accordance with the Local Industry Policy 2008 document and State Government legislation, WICET is voluntarily complying with the Queensland Government's requirement to ensure the local industry is provided with full, fair and reasonable opportunity to tender for work on infrastructure and resource-based projects and major procurements in Queensland.

The Local Industry Participation Plan outlines how these policies will be met and how local industries will be informed of opportunities.

Obligations Database Plan

WICET's current database provides for environmental obligations and has the potential to cover other areas. A plan to cover its application and uses is to be developed by the Project PCM.

18.9 Conclusion

This social impact chapter has provided an updated profile of the Gladstone region – the people, the workforce and a profile of their community lifestyle and access to recreation, employment and accommodation.

In conjunction with the Queensland government, the GRC is proactively planning for the coming increases in population and workforce numbers to the region as a result of extensive industry approvals.

With over \$60 billion worth of major industry projects currently under investigation in the Gladstone region, GRC has been proactive in planning for the social infrastructure needs of the community. Key Council planning documents have been referenced in this request and their relevance to the WICET Project discussed.

Media coverage indicates that government, industry and local communities generally welcome WICET and its expansion in Gladstone because of the broader benefits it presents.

However, these benefits could be overshadowed if the local impacts of construction and ongoing operations are not effectively managed.

The WICT EIS and Coordinator General's Report identified environmental impacts and benefits that will occur in the region due to the Project. Construction and operational impacts are likely for both internal port stakeholders as well as local Gladstone stakeholders. It is anticipated that the Project will bring local construction impacts from noise and vibration, dust, lighting and traffic. Abiding by the goals of the Environmental Management Plans will ensure that environmental impacts from WEXP1 and WEXP2 will be mitigated in appropriate ways.

WICET has established a stakeholder engagement programme that will engage early, and adopt clear communication approach to help manage community expectations, and to identify and communicate how the implementation of the design addresses community concerns.

Proactive planning and investment in the Maritime Precinct and the Maroon Group Accommodation Facility demonstrate that WICET has identified and assessed social and environment impacts, both adverse and beneficial, in the Project's area of influence.

Conclusion 1: The impacts arising from increased workforce requirements and concurrent projects include a shortage of necessary skills, a decrease in accommodation availability and increased pressure on social infrastructure in the surrounding community

Conclusion 2: The estimated peak construction workforce for the changed Project is estimated to peak at 1,100 personnel, inclusive of construction labour, engineering and management staff. This is during construction of Stage 1 and WEXP1.

Conclusion 3: Provision of rooms from WICET's allocation within the Maroon Group Accommodation Facility will cater for the majority of non-Gladstone based workers required for the Project.

Conclusion 4: WICET will provide \$35 million towards a Gladstone Coal Exporters Maritime Precinct along the east shore of Auckland Creek to deliver a long term, high quality amenity to the Gladstone community.

Conclusion 5: WICET has developed the over-arching Communications Plan, which details the communications process to be utilised throughout of Terminal's lifespan and the Community Relations Plan to address communication specifically relating to site establishment and construction phases of the Terminal.

19. Health and safety

19.1 Summary

There are potential health and safety risks to the community and workforce from WEXP1 and WEXP2 construction and operation, including construction and operational health and safety risks, and environmental risks (eg dust, noise and disease vectors). The implementation of workplace health and safety procedures and the EMP (refer Chapter 23) will minimise the potential Project risks to acceptable levels.

With fewer bulldozers proposed as part of the operation of the changed Project, fewer personnel will be exposed to heavy mobile equipment risk.

Modelling of cumulative operational noise levels from WICET Stage 1, WEXP1 and WEXP2 resulted in an increase in the number of sensitive receptor locations being exposed to exceedances of relevant noise criterion during neutral and 'worst case' weather conditions. Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

19.2 Introduction

This chapter summarises the requirements for the management of health and safety for the workforce (construction and operational) and the community. The Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

The main community concerns regarding health and safety that were raised during a public consultation period during the WICT EIS (2006) process included:

- Air quality from construction activities and coal dust emissions
- Hearing damage from excessive noise and chronic injuries from machinery operation
- Impacts on sensitive receptors particularly from dust and noise pollution

Air quality and noise and vibration have been reassessed as part of this Change Request and are further discussed in Chapter 12 (Air Quality) and Chapter 14 (Noise and Vibration).

19.3 Background Information

Queensland's *Workplace Health and Safety Act 1995* (WHS Act 1995) provides the legislative framework and obligations for health and safety in the workplace. The *Workplace Health and Safety Regulation 2008* (WHS Reg) sets out the requirements to meet the WHS Act 1995 such as prohibiting certain activities or prescribing methods to reduce risks.

Nationally uniform laws that were introduced in Australia on 1 January 2012 will replace the existing workplace health and safety legislation in all states, territories and the Commonwealth. Queensland is adopting the *Work Health and Safety Act 2011* (WHS Act 2011) to replace the current WHS Act 1995. This new legislation aims to provide a framework to protect the health, safety and welfare of all workers at work and of all other people who might be affected by the work.

A key difference in the legislation, particularly relevant to the construction and operation of the expansion phases WEXP1 and WEXP2, is that officers, as defined under the *Commonwealth Corporations Act 2001*, have a duty to exercise due diligence to ensure work health and safety obligations are met. Unlike in the WHS Act 1995, this duty applies regardless of whether there has been an incident and irrespective of whether there has been prosecution.

The WHS Act 2011 applies to those:

- Who have responsibility for the health and safety of people on the construction site
- Who may affect the health or safety of people as a result of construction activities
- Whose health or safety may be affected at a construction site or as a result of construction activities

The health and safety objective of the proponent (WICET Pty Ltd) is to have zero incidents that risk or harm the people involved in the Project. WICET has developed a Health, Safety, Environment and Community (HSEC) Policy to be implemented during design, construction and commissioning.

The Owner's Health and Safety Management Plan has been produced by WICET for the construction activities relating to the Project. It will describe the strategies and guidelines to be used to implement the WICET HSEC Policy and address WICET's obligations under the WHS Act 1995 and from 1 January 2012, the WHS Act 2011.

GPC is to be the operator of the Terminal and as such will implement their Workplace Health and Safety Policy during operation. Appendix 19 contains a copy of each policy.

19.4 Description of Environmental Values

The main community concerns regarding health and safety that arose during the Project's public consultation period include air quality from construction activities and coal dust emissions, hearing damage from excessive noise and chronic injuries from machinery operation (Connell Hatch 2007). There are also concerns over the impact on sensitive receptors particularly from dust and noise pollution.

Information regarding air quality modelling and noise modelling can be found in Chapters 12 and 14 respectively.

19.4.1 Sensitive Locations

The nearest sensitive receptor locations surrounding the Project are identified in Figure 19.1. Examples of sensitive receptors include the following:

- Residential areas
- Educational facilities
- Hospitals and medical centres
- Aged care facilities
- Recreational areas
- The marine environment

19.5 Potential Impacts

19.5.1 Impacts on Workforce

Construction Workforce

The WICET Health and Safety Management Plan will be implemented for the construction workforce employed on the Project. The potential safety hazards associated with construction activities for the Project detailed in the EIS (Appendix 1) and proposed changes to the Project will include:

- Working at heights – risk of falling, risk of falling debris/objects
- Working over water – risk of drowning
- Working in the vicinity of heavy equipment – risk of accident/injury
- Working in confined spaces – risk of suffocation, risk of entrapment
- Working with electricity – risk of electrocution
- Working with chemicals/hazardous substances – risk of spillage, fire and/or injury, risks from materials exposure



Legend

- Project Area
- Rail
- Sensitive Receptor**
- Education Facility
- Health Care
- Recreation
- Residence
- General Receptor



- Working with tools – risk due to unsafe work practices
- Heavy lifting – risk of injury

A summary of the potential health and safety risks and appropriate mitigation measures for the construction phase of the Project (including expansion phases WEXP1 and WEXP2) are outlined in Table 19.1 below.

Table 19.1 Potential Workplace Health and Safety Risks and Mitigation Measures

Health and safety risks	Mitigation measure(s)
Construction workplace accidents	A construction Safety Management Plan will be developed for all Project phases which will be reviewed and approved by WICET before implementation
Occupational noise exposure	Contractor will identify areas where occupational noise will reach levels where hearing protection is required and will ensure that hearing protection is used within these areas. Refer to Chapter 14 regarding noise mitigation techniques
Hazardous chemicals and materials exposure	Contractor will develop a construction Safety Management Plan for all Project phases which will be reviewed and approved by WICET before implementation
Dust exposure	Contractor will employ dust mitigation methods such as regular watering of construction access roads during dry and windy period. Refer to Chapter 12 for more information regarding air quality and dust mitigation techniques (refer CEMP in Appendix 23.2)

Personal Protective Equipment (PPE) includes any items of clothing, equipment or devices that are designed to protect a person from risk of injury or illness. To increase general site safety and to assist in preventing minor injuries during Project construction activities, the following PPE must be worn as a minimum:

- Hard hat
- Safety glasses
- Gloves
- Steel capped boots
- Long sleeve shirt (Hi-Viz, reflective strips and SPF50)
- Long pants
- Ear protection when conditions warrant their use
- Dust masks when conditions warrant their use

Operational Workforce

The WICET Health and Safety Management Plan will be implemented for the operational workforce employed at the Terminal. Listed below is a summary of potential health and safety risks that may be present during operation of the Terminal.

- Working at heights – risk of falling, risk of falling debris/objects
- Working over water – risk of drowning
- Working in the vicinity of heavy mobile equipment – risk of accident/injury
- Working in confined spaces – risk of suffocation, risk of entrapment
- Working near live conveyors – risk of entanglement
- Interaction between operating and construction sites

With fewer dozers proposed as part of the operation of the changed Project (due to a stacker-reclaimer yard being proposed for the eastern side of Golding Point), fewer personnel will be exposed to heavy mobile equipment risk. Other risks are essentially unchanged from the WICT EIS.

Site Inductions

All visitors to the Project site will be required to undertake a Visitors Induction prior to entry and accompanied at all times. All contractor personnel will be required to complete a site specific induction for the Project site. This induction will be mandatory for all contractor personnel prior to their start in construction work. Other training may be required for employees and the level of training will depend on the inherent risk and complexities of the control measures. There will be measures in place to assess the employee's competency and determine the effectiveness of the training, as well as a process to effectively maintain training records will also be implemented.

19.5.2 Potential Impacts on the Community

Air Quality

One of the major community concerns regarding health and safety is air quality, particularly dust from the cut and fill operations during construction and coal dust emissions during the operation of the Project. Odour has been considered and is expected to be well below levels of concern.

The Project is separated from residential locations by a distance of over 1.2 km, therefore dust impacts to the community are unlikely to be substantial. Air quality monitoring predicted that cumulative 24-hour average ground-level PM₁₀ concentrations are predicted to exceed the EPP (Air) objective of 50 µg/m³ at the Marina, located 2.5 km east of WICET, on seven occasions, however, this is due to existing industries and background concentrations (refer Appendix 12.1).

Chapter 12 summarises the likely impacts relating to air quality from the proposed changes to the Project.

Mitigation measures for dust produced during construction are shown in the Air Quality Management Plan (refer Appendix 23.3) while the mitigation measures for operation are outlined in Chapter 12.

Noise

An obligation under Queensland legislation is to ensure that the workforce is not to be exposed to excessive noise at work, as defined under the WHS Reg. The Queensland Codes of Practice provide methods that can be employed to manage the exposure to risks, including excessive noise.

Construction noise from the changed Project is not expected to be significantly different from that modelled as part of the SEIS (refer Appendix 1). Mitigation measures for construction noise will be based on AS2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*" as detailed in Chapter 14.

Under neutral weather conditions, the investigation into operational noise emissions found that the revised operational noise levels for the complete Terminal, inclusive of Stage 1, WEXP1 and WEXP2, (for overland conveyors with low noise steel idlers and all other conveyors with low noise aluminium idlers) show that all receivers are predicted to be below the noise criteria excluding Tide Island and Lot 1 on Plan RP614414 at Callemondah.

Modelling under 'worst case' weather conditions for the complete Terminal indicated that the operational noise criteria will be exceeded at 19 receivers by 4 dBA or more. However, during 'typical' operating scenarios, it is expected that noise levels at sensitive receptors will be 2-3 dBA lower than that predicted as it is assumed that not all infrastructure and equipment will be operating simultaneously.

Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

Disease Vectors

In Queensland, mosquitoes are carriers of several diseases including Barmah Forest virus, dengue fever, Japanese Encephalitis virus, Murray Valley Encephalitis and Ross River virus (Queensland Health 2010). There are no vaccines currently available for dengue fever and Ross River virus; mosquito control is an important step in preventing the spread of disease. Mosquitoes can breed in most water types, including polluted, and common breeding sites include natural or constructed ground sites as well as artificial containers, including water storage tanks and constructed drains.

It is imperative that the implementation of water recycling does not enhance mosquito breeding and the transmission and spread of disease. The Local Government Association of Queensland (LGAQ) produced a Mosquito Management Code of Practice (2002) to demonstrate reasonable and practicable measures to reduce the risk of outbreaks of arthroborne disease.

19.6 Mitigation Measures

With the proposed Project changes involved with WEXP1 and WEXP2, there is potential for additional mosquito breeding areas. The new stacker-reclaimer yard on Reclamation Area B will include a new settlement pond to treat and retain stormwater collected from the coal stockpiles prior to discharge.

The WICET Owner's Health and Safety Management Plan and the construction and operation health and safety risks associated with WEXP1 and WEXP2 will be reviewed during the detailed design phase.

The following strategies have been taken from the Queensland Water Recycling Guidelines (Environmental Protection Agency 2005) and will be adopted during the Project cycle to minimise the spread of arthroborne disease:

Design

- Consideration should be given to minimising potential mosquito breeding sites. Queensland Health (2002) has published guidelines to minimise mosquito and biting midge problems in new development areas. This document advises on methods to prevent or minimise the impact of mosquitoes in new development areas
- The design of constructed wetlands, water impoundments, grass swales and open earth drains can influence mosquito breeding. The Australian Mosquito Control Manual (Morris et al. 2002) provides useful advice on mosquito control

Construction

- Under Division 2 of the *Public Health Regulation 2005*, there is a requirement that the Project site does not become a breeding site for mosquitoes. The construction and installation of water storages shall be carried out in accordance with this regulation. Where a significant risk of arthroborne disease has been identified, such as holding tanks for recycled water, the design should prevent entry of mosquitoes
- The new settlement pond will be designed with steep clean sides to prevent vegetative habitat for mosquito breeding and the site will be graded to remove hollows that allow the ponding of water

Operation

- All structures associated with storage or treatment of recycled water, such as the settlement ponds, should be regularly maintained to minimise mosquito breeding. An example is clearing water plants away from the edge of open water storage to reduce the habitat for mosquito larvae. Research by Dale et al. (2001) suggests that dense mats of surface vegetation or fallen decaying material can encourage mosquito breeding

- If using recycled water for irrigation, surface ponding should be prevented by appropriate irrigation scheduling
- Open recycled water storages should be monitored regularly to assess the presence of mosquito larvae
- Biological control methods using native predators, such as aquatic invertebrates or native fish, may be considered if there is a potential health risk from mosquito breeding

19.7 Conclusion

There are potential health and safety risks to the community and workforce from WEXP1 and WEXP2 construction and operation, including construction and operational health and safety risks, and environmental risks (eg dust, noise and disease vectors). The implementation of workplace health and safety procedures and the EMP (refer Chapter 23) will minimise the potential Project risks to acceptable levels.

Conclusion 1: With fewer bulldozers proposed as part of the operation of the changed Project, fewer personnel will be exposed to heavy mobile equipment risk.

Conclusion 2: Under the 'worst case' weather scenario, the complete Terminal may exceed operational noise criteria at 19 receivers. Noise mitigation is likely to be required for these sites and will be addressed during the detailed design process.

20. Economics

20.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in positive changes to economics of the Gladstone region and State of Queensland. The changes are mainly attributable to timing changes with the project, with the approved Terminal output capacity (84 Mtpa) being achieved earlier than originally predicted, due to higher than expected demands for Queensland coals.

The proposed Project changes are in response to WICET's customer's requirements and results in an improved marketability of Queensland coals.

The Project is ideally located in the Port of Gladstone and provides a unique link in the coal supply chain from the Surat and southern Bowen Basins. RGTCT and BPCT have reached their ultimate capacity and are unable to expand further due to physical restraints.

The expansion phases of WICET are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project. Given this, and the projected increase in demand, this Project is considered essential infrastructure, critical in ensuring continuity in the supply of coal to the export market.

The peak construction workforce, which was originally predicted at more than 1,450 (assuming Stage 1, 2 and 3, as defined in the EIS were undertaken concurrently), is expected to reach 1,100 workers along with the total capital expenditure for construction works, as a result of the cascading of WEXP1 and WEXP2 following on from commencement of WICET Stage 1.

20.2 Introduction

This chapter provides an update of the existing economic situation in Gladstone and provides background information regarding the coal industry in Queensland. The economic impacts associated with the changed Project are also discussed.

This Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

20.3 Background Information

The Port of Gladstone (the Port) is the world's fifth largest coal export ports with coal representing over 70% of all cargo and commodities exported. Gladstone Ports Corporation (GPC) currently owns and operates two coal export terminals in the Port, including RG Tanna Coal Terminal (RGTCT) and Barney Point Coal Terminal (BPCT). This Project, is funded and owned by a consortium of 16 coal companies and is targeted for Stage 1 operations (approximately 27 Mtpa) to commence in early 2014.

The Port has been identified by the Queensland Government as a major industrial centre for the future of Australia. It has a vital role in the regional, Queensland and Australian economies. Other major exports for the port include alumina, cement, petroleum, aluminium and grain. Gladstone provides a link between the imports/exports from the port and the coal mining, agricultural and pastoral areas of Queensland, including the Callide/Dawson Valleys, Central Highlands, Bowen Basin and in the future; the Surat Basin. However, the demand for coal exports is projected to exceed the capacity of the RGTCT, BCPT and Stage 1 of the WICET Project. WEXP1 and WEXP2, as outlined in Chapter 3, are critical to facilitating the coal export supply chain and the future development of the Gladstone region.

20.4 Existing Economic Environment

20.4.1 Economic Profile of Gladstone Region

The Gladstone region consists of the City of Gladstone, and multiple townships within the Gladstone Regional Council. It is an area of heavy industrialisation and strong economic development, based around resource extraction, agriculture, manufacturing, port facilities and processing and export. The Gladstone region has attracted these industries by the quality and versatility of infrastructure, services, availability of suitable land, a naturally deep and sheltered harbour, skilled local workforce, proximity to natural resources, including coal, gas and water and relatively short export times to the Asia Pacific region. The Queensland Government's support and promotion of the region, through the allocation of the Gladstone State Development Area, has also contributed to the industrial growth of the Gladstone region.

Population

Preliminary population estimates in the Gladstone region, as at 30 June 2010, was at 60,316 persons, representing 1.3% of Queensland's population. The annual average growth rate of the Gladstone region between 2006 and 2010 was 3.0% compared with Queensland's annual growth of 2.6%.

Population projections published by the Queensland Treasury's Office of Economic and Statistical Research in May 2011 estimate that the population for the Gladstone region will increase from 53,941 persons in 2006 to approximately 111,690 persons in 2031. This corresponds to total change for the same period of 107% compared with a total change of 61% for Queensland.

Further information regarding population growth and trends is detailed in Chapter 18 (Social) of this request.

Labour

The unemployment rate in the Gladstone region is 5.2% with 1,700 unemployed persons and is comparable to the Queensland and Australia unemployment rates of 5.5% and 5.1%, respectively (March Quarter 2011). Prior to June 2010, the unemployment rate in the Gladstone region exceeded that of Queensland and both experienced an increasing trend, peaking at 5.7% (Department of Education, Employment and Workplace Relations 2011). More recently, however, the unemployment rate in Queensland remained relatively constant, while the rate in the Gladstone region declined to current levels.

The occupation with the largest number of employed persons in 2006 in the Gladstone region was technicians and trades workers with 5,217 employed persons. Other occupations with high numbers of employed persons included labourers, accounting for 3,238 persons, machinery operators and drivers with 3,116 persons and professionals, accounting for 2,935 employed persons.

In the Gladstone region in 2006, the greatest degree of specialisation occurred in the occupations of machinery operators and drivers, technicians and trade workers and labourers. The proportion of persons employed as machinery operators and drivers in the Gladstone region was 13.1%, compared with 7.2% in Queensland. Technicians and trade workers represented 21.9% of all employed persons in the Gladstone region compared with 15.4% in Queensland. Labourers accounted for 13.6% of employed persons in the Gladstone region compared with 11.9% in Queensland. While this data is derived from the 2006 Census, there is a high likelihood that that this distribution of labour is representative of current occupations.

Businesses

The construction industry dominates the business count in the Gladstone region with 763 construction businesses in June 2009, representing 24.0% of all businesses in the region. The following next two largest industries in the region for this period were:

- The agriculture, forestry and fishing industry accounted for 367 businesses or 11.5%
- The renting and hiring and real estate industry accounted for 326 businesses or 10.2%

The number of businesses per industry in the Gladstone region in June 2009 compared with Queensland is displayed in Table 20.1.

Table 20.1 Number of businesses by industry in the Gladstone region 2009

Industry	Region (Number)	Percentage of Total	Queensland (Number)	Percentage of Total
Accommodation cafes and restaurants	130	4.1%	14,950	3.6%
Administrative and support services	102	3.2%	15,724	3.7%
Agriculture, forestry and fishing	367	11.5%	46,624	11.1%
Arts and recreation services	30	0.9%	5,313	1.3%
Construction	763	24.0%	78,768	18.8%
Education and training	33	1.0%	4,559	1.1%
Electricity, gas and water services	3	0.1%	1,039	0.2%
Financial and insurance services	162	5.1%	25,827	6.2%
Health care and social assistance	94	3.0%	17,630	4.2%
Information, media and telecommunications	6	0.2%	2,772	0.7%
Manufacturing	168	5.3%	18,193	4.3%
Mining	15	0.5%	1,913	0.5%
Not classified*	44	1.4%	9,533	2.3%
Other services	195	6.1%	18,591	4.4%
Professional, scientific and technical services	274	8.6%	41,509	9.9%
Public administration and safety	12	0.4%	1,460	0.3%
Renting, hiring and real estate	326	10.2%	46,636	11.1%
Retail trade	207	6.5%	27,747	6.6%
Transport, postal and warehousing	218	6.8%	27,180	6.5%
Wholesale trade	36	1.1%	13,442	3.2%
Total	3,185	100.0%	419,410	100.0%

Table Note * This Category consists of businesses that are yet to be coded to an industry
Source ABS 2011, Counts of Australian Businesses, including Entries and Exits, Jun 2007 to Jun 2009

The greatest degree of specialisation occurred within other services which represented 6.1% of businesses in the Gladstone region compared with 4.4% in Queensland. The construction industry and the manufacturing industry also experienced a high degree of specialisation in the Gladstone region. The construction industry represented 24.0% of businesses in the Gladstone region compared with 18.8% in Queensland, while the manufacturing industry represented 5.3% of businesses in Gladstone compared with 4.3% in Queensland.

On the employment front, according to the 2006 Census, the largest employer in the Gladstone region was manufacturing which accounted for 4,735 (19.9%) of the region's

employed labour force. Other industries with relatively large numbers of employed persons included the construction industry, with 3,007 employees (12.6%), retail trade with 2,484 employees (10.4%) and the transport, postal and warehousing industry with 1,690 employees (7.1%).

20.4.2 Coal Industry

Background

Global demand for coal has increased considerably in the past decade. It is the fastest growing source of electricity due to its low cost, abundance, safe extraction and use relative to alternative fossil fuels. This demand is expected to remain strong with industrial development and population growth, particularly in emerging countries. Currently Asia receives over 88% of Australia's coal exports with Japan, South Korea, Taiwan, China and India the main buyers. For the year ending 30 June 2010, the total coal exports from Australia were approximately 292 Mega tonnes (Mt) (ABARES 2011).

It is estimated that Australia holds over 39.2 Giga tonnes (Gt) of black and brown coal reserves, the majority of which are concentrated in Queensland (56%) and New South Wales (40%), with Sydney Basin in New South Wales and Bowen Basin in Queensland containing the largest reserves (ABARES 2010). For the year ending 30 June 2010 Queensland produced a total of 205.7 Mt of saleable coal, representing 56.7% of Australia's saleable coal (ABARES 2011). Of this, Gladstone exported 60.4 Mt (27.6 %) to various international markets (this proportion is likely to increase). In 2010, there were a total of 54 mines in operation in Queensland, comprising 41 open-cut and 13 underground mines. The Queensland coal industry also directly employed a workforce of 17,388 employees for the same year.

Bowen Basin

The Bowen Basin is located in Central Queensland, from Collinsville extending south to Moura and Rolleston. It represents a significant economic driver for the state and national economies. The Bowen Basin is the most important source of coal in Queensland as it produces the majority of the viable prime coking coal. The basin produces a variety of coal types, which are sold into all sectors of international markets, including (Department of Mines and Energy 2007):

- High-grade metallurgical coking coal for iron and steel industry
- Blending coals for coke making for iron and steel industry
- PCI coals for iron and steel industry
- High and lower volatile thermal coals for power generation
- High to low volatile thermal coals for the industrial market (cement manufacturing, pulp and paper manufacturing and chemical industry)

The international markets for coal produced in the Bowen Basin include Japan, South Korea, India, Taiwan, China, Europe and Brazil.

Surat Basin

The Surat Basin contains over 4 billion tonnes of proven thermal coal resources, which are largely undeveloped at this point in time (Department of Mines and Energy 2007). Major deposits in this basin are located near Macallister and Chinchilla and also near Wandoan and Taroom. Coal from Surat Basin is used domestically in coal-fired power stations and is exported internationally for power generation and industrial use. The coal from this basin is a low sulphur coal not suitable for metallurgical coke making. The Surat Basin has potential for open-cut coal mines and has attracted domestic and international interest as a major source of high-volatile thermal coal, however may be impeded by a lack of infrastructure, particularly port access; to support coal mines.

Galilee Basin

The Galilee Basin is located to the west of the Bowen Basin in western Central Queensland. It contains large reserves of thermal coal but has not been subject to large-scale coal mining to date. This is due to the basin's remote location, lack of supporting infrastructure and the lower quality of coal. Recently, however, there has been renewed interest in coal exploration of the eastern margin of the Galilee Basin with the aim to develop thermal coal mines (Department of Mines and Energy 2007).

20.4.3 Coal Exports

The coal resources of Queensland are extensive and well exceed the domestic needs of Australia for the foreseeable future. As a result, Queensland will be able to maintain high levels of coal exports into the future, a major contributor to the State economy. Other benefits of the strong coal industry in Queensland are through exports, major financial returns, increasing employment opportunities and improving regional development.

In the year to 30 June 2010, the Queensland coal industry recorded a total of 275.2 Mt of raw coal mined, from which 205.7 Mt of saleable coal was produced, an increase of 7.8% from the previous year (Department of Employment, Education, Development and Innovation (DEEDI) 2010). Coal exports in the year to 30 June 2010 totalled 183 Mt (89 % of production), an increase of 14.9% from the previous year. These coal exports comprised 124.6 Mt (68.1%) of metallurgical coal and 58.4 Mt (31.9%) of thermal coal. The Port of Gladstone exported approximately 60.4 Mt of this coal.

Coal export sales in the year to 30 June 2010 generated approximately AUD\$24.5 billion of Australia's AUD\$40.9 billion of export. Average coal prices in the year to 30 June 2010 were AUD\$151.98 per tonne for metallurgical coal and AUD\$95.44 per tonne for thermal coal (DEEDI 2010). The price of coal per tonne was down 51.3% for metallurgical coal and 30.0% for thermal coal from the previous year. The Global Financial Crisis caused a reduction in the price of various commodities, including coal, due to the high level of uncertainty within the global economy that lead to a reduction in demand from countries including China. The steel production industry, a major importer of Queensland's metallurgical coal, took a significant hit during the economic downturn, which has contributed to reduced coal prices.

Following the price declines resulting from the GFC, the coal industry is recovering with data for the March Quarter 2011 indicating coal prices for high quality metallurgical and thermal coal were at AUD\$217.25 per tonne (up 4% from mid-2010) and AUD\$98.88 per tonne (up 4%) respectively (ABARES 2011).

Japan is the largest importer of Queensland coals, receiving 57.3 Mt or 31.3% of the State's 2009/10 coal exports. China was the second largest market for Queensland coals at 30.8 Mt (16.8%), followed by India with 28.1 Mt (15.4%), Korea with 22.6 Mt (12.3%) and Taiwan with 13.9 Mt (7.6%) (DEEDI 2010). Europe accounts for 11.4% of Queensland's coal exports. It is anticipated that in China and India an increase in electricity demand and steel production is expected to increase the consumption of coal, thereby increasing the demand on imported coal from Queensland (ABARES 2010).

The Project is ideally located in the Port of Gladstone and provides a unique link in the coal supply chain from the Surat and southern Bowen Basins. RGTCT and BPCT have reached their ultimate capacity and are unable to expand further due to physical restraints. Given this, and the projected increase in demand, this Project is critical in ensuring continuity in the supply of coal to the export market.

20.5 Assessment of Potential Impacts

20.5.1 Summary of the Approved Project

Economic modelling was undertaken during the EIS process to determine the economic impacts of the construction and operational phases of the Project. It is considered to be

representative of the Stage 1 construction phase and ultimate operational capacity of the broader WICET Project (including previously defined Stages 2 and 3). The timeline of the economic modelling was for the period from 2007, with the commencement of preconstruction activities till operations to 2040.

Significant results derived from the economic modelling include the following:

- Peak construction workforce of 800 for Stage 1, with an estimated 1,200 additional jobs elsewhere in Queensland
- Peak workforce for construction phases, assuming Stage, 1, 2 and 3 (as defined in the EIS) were undertaken concurrently, estimated to be 1,450
- When developed to the ultimate capacity, coal production and export will increase Gross State Product (GSP) by an estimated aggregated total of \$183 billion to 2040
- When it reaches the ultimate capacity, economic activity directly attributable to the forecast coal production and export volumes will be in the range of \$6.4 billion to \$8.3 billion annually to 2040
- The Project will facilitate the generation of \$140 billion in total coal export earnings to 2040 and around \$5.5 billion annually from when ultimate capacity is reached

The EIS and SEIS further detail information regarding the results of economic modelling outlined above (refer Appendix 1).

20.5.2 Likely Economic Impacts of the changed Project

The nominal throughput used in the EIS economic modelling was 27 Mtpa for Stage 1 and cumulatively, 50 Mtpa for Stage 2 and 70 Mtpa for Stage 3. WEXP1 and WEXP2 will allow the Terminal output to achieve the ultimate EIS and controlled action approved capacity of 84 Mtpa. This increase in coal export throughput, combined with the rise in coal prices, will increase the GSP, which is currently predicted at \$183 billion over the life of the Project. The total coal export earnings to 2040, currently estimated at \$140 billion, will also increase due to the increase in the nominal capacity and the rise in coal prices. The approved ultimate capacity of 84 Mtpa will be achieved earlier than originally anticipated as a result of WEXP1 and WEXP2.

The peak construction workforce, which was originally predicted at more than 800 for post-Stage 1 construction, is expected to increase to 1,100 workers along with the total capital expenditure for construction works, as a result of the cascading of WEXP1 and WEXP2 following on from commencement of WICET Stage 1.

Indirect impacts of the Project may include the exploration and development of further coal mines in the Bowen, Surat and Galilee Basins, which will have flow-on benefits for the coal industry in Queensland and the surrounding regional communities.

The expansion phases of WICET are key to the opening of the Surat Basin coal reserves and provide the export link to the recently approved Surat Basin Rail Project.

Conclusion 1: Gross State Product from the complete WICET Project is expected to earn an aggregate \$183 billion by the year 2040.

Conclusion 2: The peak construction workforce for the Project is 1,100 personnel. This will occur during construction of Stage 1 and WEXP1.

21. Hazard and risk

21.1 Summary

The changes proposed as part of WEXP1 and WEXP2 are expected to result in a reduction in hazards and risk to personnel onsite. This is primarily due to WEXP2; the development of a stacker-reclaimer yard on the eastern half of Golding Point in lieu of the approved bridge stacker/dozer reclaim yard in this area. This proposed change will result in less bulldozers being required for pushing of coal and removes the requirement for reclaim tunnels on the eastern half of Golding point (confined spaces), reducing risks to onsite personnel.

There are no expected changes to the potential hazards and risks associated with coal terminal operations, which were addressed the EIS (Appendix 1).

Potential hazards and risks associated with the Ultimate WICET Project will be managed in accordance with the CEMP and subordinate management plans and the approval conditions for the Project.

21.2 Introduction

The Request for Project Change provides an updated assessment to address changes to the Project which were assessed in the Coordinator-General's (CG) Report (January 2008) and EPBC Act controlled action approval (April 2008).

This chapter of the Change Request discusses the potential hazards and risks that may be associated with the construction and operation of the WICET Project including how these have changed as a result of the proposed changes associated with WEXP1 and WEXP2.

Potential hazards and risks associated with the Project were identified and assessed through an EIS process as being manageable for the site. These potential hazards and risks, and the associated mitigation measures, were approved in the Coordinator-General's (CG) Report dated January 2008 and the EPBC Act controlled action approval in April 2008 (EPBC 2005/2374).

The potential cumulative hazards and risks associated with the operation of Stage 1 of the WICET Project and its expansion through WEXP1 and WEXP2 are also identified, and management processes identified to effectively mitigate these hazards and risks.

21.3 Potential Hazard and Risks

The potential hazards and risks associated with coal terminal operations were addressed the EIS (Appendix 1), including:

- Risks and hazards associated with oil spills, pilotage and vessel movement
- Introduction of exotic marine species from ballast waters
- Decrease in water quality from dredging operations, abrasive blasting over water and other Port operational discharges

The changed Project will not increase or change any of these potential risks and hazards.

The potential impacts of both natural and induced emergency situations, including land emergencies and shipping operations emergencies as a result of the Project were outlined in the EIS (refer Appendix 1). The changes introduced in WEXP1 and WEXP2 will not result in additional potential hazards or risks, and will have minimal cumulative impact on the potential for emergency situations, as the volumes of hazardous materials and extent of risks will be largely unchanged.

21.4 Potential Impacts and Mitigation Measure for Hazardous Substances

The EIS for the WICET Project outlined a number of hazardous substances that may be stored and used onsite, including:

- Petroleum distillates
- Motor spirits
- Aerosols
- Adhesives
- Corrosive liquids
- Paint
- Hydrochloric acid
- Ethanol
- Flammable liquids

The majority of the hazardous substances listed will be stored in small quantities and are to be stored in locked cupboards/storage until issued for use. Unleaded Petrol and diesel will be stored in bunded above ground tanks in accordance with the Australian Standard *AS1940: The storage and handling of flammable and combustible goods*, including design specifications to hold 110% of the volume of the largest tank in each bund.

Relevant statutory approvals such as Environmentally Relevant Activity 8 – Chemical storage and Flammable and Combustible Liquids Licences will be obtained by WICET where required.

The management of these substances will be outlined in the Emergency Procedures that apply to the WICET Project (refer CEMP in Appendix 23.2).

The construction and operation of WEXP1 and WEXP2 will not involve a substantial increase in volumes of the substances approved under the EIS, or include additional types of hazardous substances.

21.5 Mitigation Measures

21.5.1 Emergency Management and Response Strategies and Plans

The WICET Project approved under the EIS outlined a number of emergency procedures developed by GPC who were the proponent of the Project at the time. These procedures remain applicable to the Project and WEXP1/WEXP2 (where approved), until such time as the WICET Project completes its site-specific hazard and risk management documentation for the expansion.

GPC's procedures, combined with National and State plans, provide a comprehensive coverage of potential emergencies. These include:

- GPC Emergency Procedures
- The National Plan
- Queensland Coastal Contingency Action Plan
- Oil Pollution First-Strike Response Deed
- Port of Gladstone First-Strike Oil Response Plan
- Maritime Safety Queensland's role in dealing with the discharge of ship-sourced pollutants in QLD
- Gladstone Regional Council Local Disaster Management Plan
- Scientific Unit of the Queensland Fire and Rescue Service's role in the management of chemical incidents

An integrated risk management plan is being developed by GPC for their entire port operation, including the WICET Terminal, providing an overall strategy for the extension of existing plans and procedures.

Safety Plans relating to the construction and operation of port facilities will be provided to the Department of Emergency Services and other agencies prior to the commencement of each construction phase and priority to operate commencement respectively.

The development of the Terminal will be effectively managed under these plans and procedures, and is not expected to impact on current emergency management and response strategies.

21.6 Risk Assessment

21.6.1 Risk Assessment Process

Risk assessments are completed, monitored and continually updated during both the planning and implementation of each phase of the Terminal development stages. The assessments involve a process of identification of hazards, causes, and likelihood/consequence of risk and determination of mitigation measures to reduce the risk of occurrence.

Using the likelihood/consequence severity criteria (as shown in the tables below) a matrix was developed to assess the qualitative risk to the environment from potential impacts. Risk levels included:

- Extreme – Intolerable environmental risk with significant and urgent actions required to reduce the risk
- High and Moderate – Implement actions necessary to reduce risk to As Low As Reasonably Practicable (ALARP) within the EMP
- Low – Monitor and manage risk to extent necessary

Table 21.2 Likelihood table

Rating	Likelihood description and indicative frequency	Indicative probability
A Almost certain	Very high probability of occurrence, could occur several times per year. Has occurred several times on similar projects at this location	>0.8
B Likely	High probability, likely to occur approximately once per year. Similar event has occurred several times per year on similar projects for this organization	0.5 to 0.8
C Possible	Possible, reasonable probability that it may occur at least once in a 1 to 10 year period. A similar event has occurred at some time on other similar projects for this organization	0.1 to 0.5
D Unlikely	Plausible, unlikely to occur during the Project, could occur over the next 10 to 40 years. A similar event has occurred on other similar projects in this industry	0.02 to 0.1
E Rare	Very low likelihood but not impossible, unlikely to occur during the next 40 years. A similar event has occurred elsewhere in the world in this industry	<0.02

Table 21.3 Risk descriptions

Rating	Technical Performance	Project Cost	Project Schedule	Health & Safety	Reputation	Legal/Regulatory	Environment
E - 5 (Catastrophic)	60% of design capacity not achieved. Increase in operating costs	Greater than 30% cost overrun	Greater than 50% delay in completion of the Project	Multiple fatalities	Adverse global media coverage. Government inquiry. Major public concerns. Major loss of shareholder support	Very significant fines and prosecutions Multiple litigations	Long term environmental damage – 5 years or more requiring > \$5M to remediate, study and/or penalties
D - 4 (Major)	Cannot achieve 80% of design capacity without significant capital expenditure. Increase in operating costs	10% to 30% cost overrun	17% to 50% delay in completion of the Project	Fatality Injury resulting in permanent disabilities	Adverse national media coverage. Government member involved. Senior management changed. Significant shareholder support	Significant fines and prosecution. Very serious litigation, including class actions	Medium term – 1 to 5 years, environmental damage requiring \$1M to \$5M to remediate, study and/or penalties
C - 3 (Significant)	Cannot achieve 100% design capacity without significant capital expenditure. 10% to 30% increase in operating costs	2% to 10% cost overrun	8% to 17% delay in completion of the Project	Serious injuries. Extended lost time	Adverse media coverage. Board involved. Significant decrease in shareholder support	Major breach of regulation. Major litigation	Short-term < 1 year, environmental damage requiring up to \$1M to remediate, study and/or penalties
B - 2 (Moderate)	Cannot achieve 100% design capacity without some capital expenditure. <10% increase in operating costs	0.5% to 2% overrun	3% to 8% delay in the completion of the Project	Significant injury. Limited lost time	Adverse local media coverage. Report to Board. Shareholder concerns raised	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible	Environmental damage requiring up to \$250K to remediate, study and/or penalties
A - 1 (Minor)	Minor Difficulties	Less than 0.5%	Less than 3% delay	Minor injuries or near miss	No media attention Issue raised by workers	Low level legal or approval issue	Negligible environmental impact, managed within budgets

Table 21.3 Risk evaluation matrix

Likelihood	Consequence				
	A - 1 Minor	B - 2 Moderate	C - 3 Significant	D - 4 Major	E - 5 Catastrophic
A - 1 Almost Certain	Moderate 11	High 16	High 20	Extreme 23	Extreme 25
B - 2 Likely	Moderate 7	Moderate 12	High 17	High 21	Extreme 24
C - 3 Possible	Low 4	Moderate 8	Moderate 13	High 18	High 22
D - 4 Unlikely	Low 2	Low 5	Moderate 9	Moderate 14	High 19
E - 5 Rare	Low 1	Low 3	Moderate 6	Moderate 10	High 15

21.6.2 Risk Assessment

The risk assessment completed during the planning phase and the TFS for the WICET Project identified risks with a rating of moderate or higher included:

- Accommodation services and social infrastructure etc
- Flora/ Fauna – onshore
- Traffic management
- Construction Noise – onshore and offshore
- Hydrocarbon and chemical spillage – onshore and offshore
- Sediment erosion
- Negative publicity
- Restricting public access
- Restricting fishing access
- Ballast water – introduction of exotic marine species
- Water quality – during dredging
- Dredging and spoil disposal
- Maintenance of offshore structures
- Ships (quarantine) waste
- Spillage of hazardous chemicals and materials
- Fire
- Erosion and flood damage
- Coal Spillage
- Dust pollution
- Fuel/ oil/ chemical storage
- Fuel handling
- Discharge of contaminants to surface drainage
- Discharge of waste water
- Cattle on rail corridor

The development of the Project (including changes associated with WEXP1 and WEXP2) is not expected to include any additional risks or significantly increase the likelihood or impacts of the risks approved in the EIS for the Project.

Table 21.4 isolates the environmental risks that relate to the key Project changes listed below:

- Expansion of the stacker-reclaimer yard, on Reclamation Area B
- Construction of a new settlement pond and stormwater outfall from Reclamation Area B to the Anabranh
- A change in yard type on the eastern half of Golding Point from a bridge stacker to a stacker-reclaimer yard

Table 21.4 WEXP1 and WEXP2 Risk Assessment

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
Construction noise and vibration - onshore	Construction equipment/ vehicles Pile driving/ Increased traffic	Nuisance noise and vibration Drives away fauna	Noise suppression on equipment CEMP usage Timing of works TMP usage	75%	Possible	Moderate	8	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	4	No Action
Sediment erosion	Poor construction practices/ planning Non-compliance with operating procedures Flood water ingress to site	Water quality Erosion Reduced treatment efficiency of onsite storm water Product contamination Non-compliance with licence conditions Negative publicity Impacts to marine flora and fauna	CEMP usage SWQMP usage SMP usage Site drainage network	90%	Possible	Moderate	8	Medium Term	Management Plan in place Monitor and control Audit long term maintenance plan OEMP	Rare	Minor	1	No Action
Negative Publicity	Inadequate consultation and communication about Project changes	Complaints Community relations Loss of reputation	Community consultation program	80%	Possible	Moderate	8	Medium Term	Continue consultation	Possible	Moderate	8	Medium Term

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
Acid Sulfate Soils	Earthworks Pile driving	Water quality Erosion Reduced treatment efficiency of onsite storm water Product contamination Impacts to marine flora and fauna	Acid Sulfate Soil Management Plan approved by DERM SWQMP usage SMP usage	80%	Possible	Moderate	8	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	Low	No Action
Offshore lighting	Impact on community due to additional lighting Disturbance to marine/migratory species	Visual amenity Nuisance - light pollution	Shielding Directional lighting Address in design phase SMP usage	50%	Possible	Minor	4	No Action	No further action required				
Dust	Earthworks and operations works Increased traffic	Visual amenity Nuisance – dust emissions	Dust Management Plan	80%	Possible	Moderate	8	Medium Term	Management Plan in place Monitor and control restricted hours of construction on critical activities Consultation Source controls	Possible	Minor	Low	No Action

Table Notes

- CEMP
- OEMP
- TMP
- SMP
- SWQMP
- DPIF
- DERM
- Construction Environmental Management Plan
- Operational Environmental Management Plan
- Traffic Management Plan
- Species Management Plan
- Soil and Water Quality Management Plan
- Department of Primary Industries and Fisheries
- Department of Environment and Resource Management

21.7 Conclusion

The Proposed Project changes are not expected to significantly increase the hazards and risks that were approved for the construction and operation of the WICET Project. The mitigation measures outlined in the SEIS, CEMP and subordinate management plan as well as the approval conditions for the Project will be applied to WEXP1 and WEXP2 (where approved) and are considered adequate to address the potential hazards or risks identified.

The GPC emergency procedures and the integrated risk management plan for their entire port operation, combined with the State and National plans will continue to provide a comprehensive coverage of potential emergencies for the site.

These procedures will remain reasonably applicable to the Project including WEXP1 and WEXP2 (where approved), until more specific and better informed hazard and risk management documentation consistent with the relevant legislative requirements and the hazards and risks associated with site operations.

Conclusion 1: The Proposed Project changes are not expected to significantly increase the hazards and risks that were approved for the construction and operation of the WICET Project.

Conclusion 2: Potential hazards and risks associated with the WICET Project will be managed in accordance with the CEMP and subordinate management plans, approved ASSMP and the approval conditions for the Project.