



Port Expansion Project EIS

Part C

Section C2.2 – Construction
Environmental Management
Plan

(C2.2)1.0 Introduction

This Construction Environmental Management Plan (CEMP) details environmental management procedures to be incorporated into contractor's Environmental Management Plans (EMP) during the construction phase of the Port of Townsville Limited (POTL) Port Expansion Project (PEP).

The aim of the CEMP is to manage risk and reduce the potential for negative impacts on the environment associated with PEP construction. The CEMP has been developed from, and is consistent with, the PEP Environmental Impact Statement (EIS).

(C2.2)1.1 Project Overview

The Port of Townsville is located on Cleveland Bay, approximately three kilometres east of the city centre in Townsville, North Queensland (refer to Figure C.2.2.1). The port is situated in the Great Barrier Reef World Heritage Area and the majority of the port infrastructure is positioned in an excised portion of the Great Barrier Reef Marine Park.

The Port of Townsville is a multi-purpose port that handles predominantly bulk and general cargo. POTL proposes an expansion of the port to address current capacity constraints and accommodate the forecast growth in trade at the port over a planning horizon to 2040.

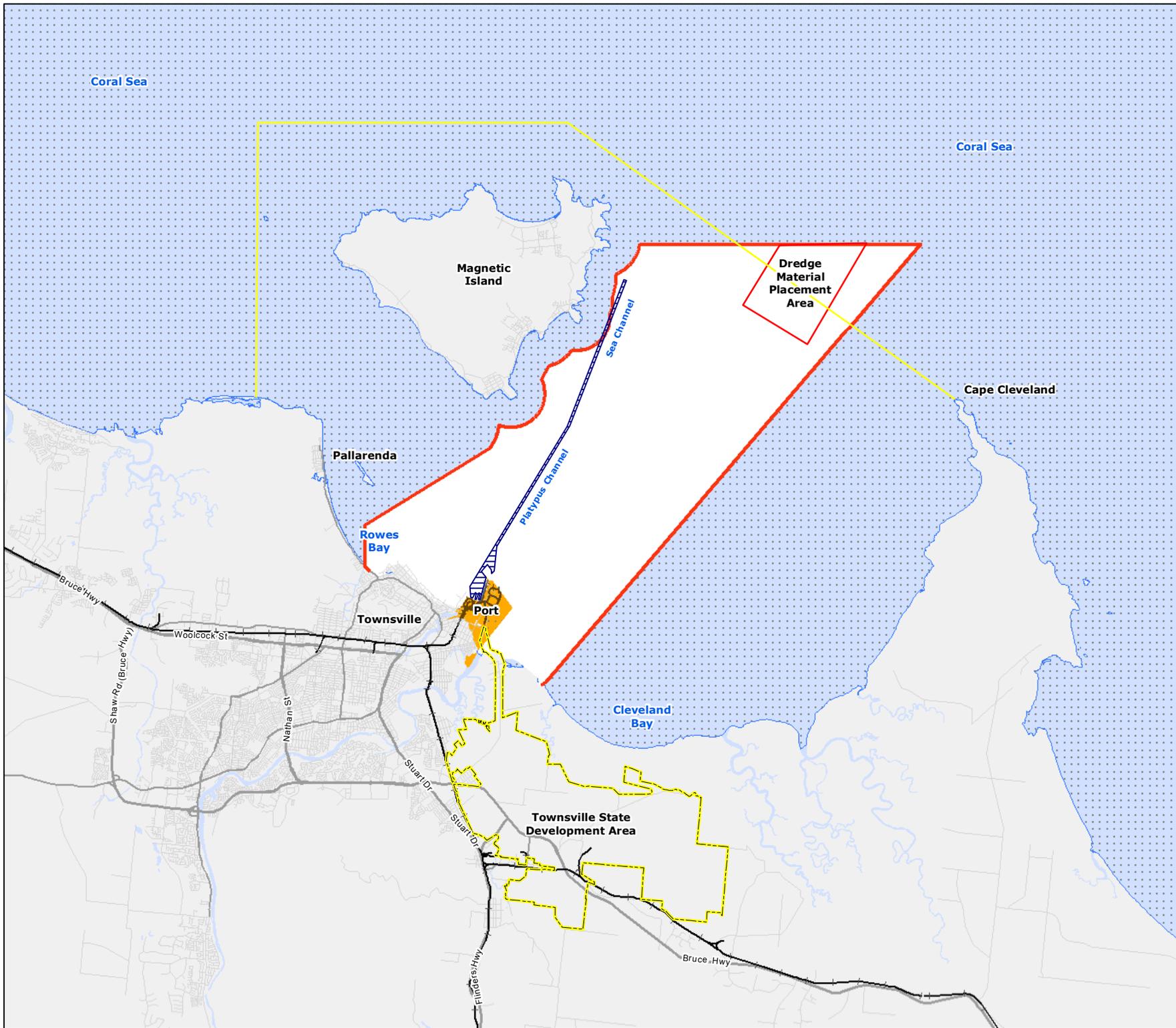
The PEP includes development of port infrastructure and work to 'top of wharf': dredging, reclamation, breakwaters and revetments, wharves, access roads, rail loop, and trunk services and utilities. The PEP does not include the development 'above wharf', which may include terminal pavements, shiploaders and unloaders, materials conveyors, storage buildings for transhipped products, rail loaders and unloaders, stacking and reclaiming equipment, storage tanks and pipelines.

As the Port develops individual Port tenant operations will be subject to separate statutory assessment and approval requirements. Operators will be required to obtain all necessary approvals and licenses in accordance with their statutory requirements prior to the start of operations or in accordance with statutory timing requirements.

PORT EXPANSION PROJECT
EIS

Port of Townsville

Figure C.2.2.1

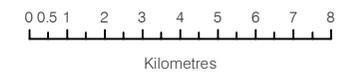


Legend

- Highways
- Main Roads
- Local Roads
- +— Railway Line
- Port Limits
- ▨ Channel
- ▭ Townsville State Development Area
- ▭ Existing Port Land
- ▭ Dredge Material Placement Area
- ▭ Great Barrier Reef Marine Park Boundary
- ⋯ GBRWHA/National Heritage Place



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(C2.2)1.2 Purpose

The purpose of this CEMP is to identify the preferred means of addressing and reducing potential adverse environmental impacts associated with the construction phase of the PEP. The CEMP:

- describes POTL's commitments regarding environmental performance and the reduction of adverse impacts
- specifies the actions that would be taken to implement the commitments (such as monitoring)
- identifies corrective actions to rectify any deviation from performance standards
- provides an action program to enable delivery of the environmental commitments so they are achieved and implemented.

The contents of this CEMP may be incorporated into either the successful construction tenderer(s) management plans or undertaken by the Port depending on ultimate contractual arrangements.

(C2.2)1.3 Scope

This CEMP only applies to the on land construction phase of the PEP.

Separate Dredge Management Plan (DMP), Vessel Traffic Management Plan for Construction (VTMPC) and a Maritime Operations Management Plan (MOMP) have been prepared to cover the in-water aspects and management associated with the dredging phase and vessel movements of the PEP and the future outer harbour operations.

A separate Operational Environmental management Plan (OEMP) has been prepared to cover operational activities associated with POTL's operation of the expanded port.

The key environmental values likely to be affected by on land construction activities associated with the PEP were identified in the EIS. These values are specified in Section (C2.2)1.8. For each key value identified, the environmental management procedures to address potential risks and impacts have been provided.

General environmental requirements for the construction phase are provided at Section (C2.2)1.7.

(C2.2)1.4 Terms of Reference

The CEMP also responds to the Queensland Government's *Townsville Port Expansion Project - Terms of reference for an environmental impact statement*, February 2012, issued by the Coordinator General (Appendix A1). Section 10 of the Terms of Reference states the detail required in the EMPs. The requirements of Section 10, and where these requirements are addressed in this CEMP, are shown in Table 1.

Table 1 Terms of Reference Section 10 - EMP Requirements

Requirement	Where addressed in this CEMP
Detail the EMPs for both the construction and operation phases of the Project.	This CEMP details the management measures for the construction phase. Separate EMPs have been prepared for operations, dredging and shipping.
The EMP is developed from, and be consistent with, the information in the EIS. The EMP must address discrete project elements and provide life-of-proposal control strategies. It must be capable of being read as a stand-alone document without reference to other parts of the EIS.	The Project elements from the EIS that require management measures are detailed in Section (C2.2)1.6 and form the basis of this CEMP.
The EMP must comprise the following components for performance criteria and implementation strategies: <ul style="list-style-type: none"> ▪ the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting. 	Refer to Section (C2.2)1.5 for an outline of POTL's environmental management system. Refer to Section (C2.2)1.8 for specific environmental commitments during construction.

Requirement	Where addressed in this CEMP
<ul style="list-style-type: none"> ▪ impact prevention or mitigation actions to implement the commitments. 	Management actions are provided in Section (C.2.2)1.8.
<ul style="list-style-type: none"> ▪ corrective actions to rectify any deviation from performance standards 	Management actions are provided in Section (C.2.2)1.8.
<ul style="list-style-type: none"> ▪ an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to: <ul style="list-style-type: none"> ▪ continuous improvement ▪ environmental auditing ▪ monitoring ▪ reporting ▪ staff training ▪ a rehabilitation program for land to be disturbed under each relevant aspect of the proposal. 	An action program is provided in Section (C.2.2)1.9. Management actions are provided in Section (C.2.2)1.8.
The recommended structure of each element of the EMP is: <ul style="list-style-type: none"> ▪ element/issue ▪ operational policy ▪ performance criteria ▪ implementation strategy ▪ monitoring ▪ auditing ▪ reporting ▪ corrective action 	Refer to Section C.1.8.1.

The Terms of Reference also refer to additional information that is to be provided in the EMPs. The information required - and where these requirements are addressed in this CEMP - are paraphrased in Table 2.

Table 2 Terms of Reference - Additional EMP requirements

Section from Terms of Reference	Requirement	Where addressed in this CEMP
5. Environmental values and management impacts	<i>The mitigation measures, monitoring programs etc., identified in ... the EIS should be used to develop the EMP for the Project.</i>	The CEMP has been developed from, and is consistent with, the PEP EIS.
3.6.2 Objectives of the EIS	<i>The purpose of the EIS is to... provide information to formulate the Project's EMP</i>	
5.3.5 Transport management strategies	<i>Conditions of approval for transport management impacts should also be detailed in the EMP.</i>	Transport impacts and transport management measures are provided in Section C.1.8.10.
5.5.1 Sensitive environmental areas	<i>Outline how these measures [to mitigate impacts on sensitive environmental areas] will be implemented in the overall EMP for the Project.</i>	Measures to mitigate impacts on sensitive marine and land environments are provided in Section (C.2.2)1.8.
	<i>The overall EMP for the Project should address the performance requirements of the relevant policies and regional vegetation management codes published by DERM.</i>	There is no on-land vegetation impact by the PEP. DEHP performance requirements are not applicable. Mitigation measures for terrestrial ecology are provided in Section C.1.8.5.
5.5.2 Terrestrial flora	<i>Include details of any post construction monitoring programs.</i>	Not applicable. There is no terrestrial flora to monitor. .
	<i>Outline how these measures [addressing harm to the ecological values of the area] will be implemented in the overall EMP for the Project.</i>	Not applicable. There are no terrestrial flora impacts to mitigate.

Section from Terms of Reference	Requirement	Where addressed in this CEMP
	<i>Discuss the [weed management] strategies in accordance with provisions of the Land Protection (Pest and Stock Route Management) Act 2002 (Qld)...in the pest management plan in the EMP for the Project.</i>	Pest management element is provided at Section 8.15.
5.5.3 Terrestrial Fauna	<i>Outline how these measures [for protecting rare or threatened species] will be implemented in the overall EMP for the PEP.</i>	Mitigation measures for terrestrial ecology are provided in Section C.1.8.5.
	<i>Discuss the [feral animal (including pest)] strategies in accordance with the provisions of the Land Protection (Pest and Stock Route Management) Act ... in the pest management plan in the EMP for the PEP.</i>	Pest Management element is provided at Section 8.15.
5.5.4 Aquatic ecology	<i>Outline how ... [aquatic ecosystem] measures will be implemented in the overall EMP for the PEP.</i>	Aquatic ecology aspects are covered in the Construction Dredging Management Plan.
5.6.2 Potential impacts and mitigation measures	Incorporate strategies to enhance water resource values into the EMP. (paraphrased).	Mitigation measures for water resources are provided in Section C.1.8.3.
13 Appendices – Consultation report	<i>...plans for ongoing consultation to be outlined and included in the EMP.</i>	Refer Section (C2.2)1.10

This CEMP has also been prepared to satisfy the requirements of Section 5.11 of the *Commonwealth Guidelines for an Environmental Impact Statement for Port of Townsville Port Expansion Project, Queensland*, as they apply to the construction phase.

C.1.4.1 Legislation

The CEMP has been developed cognisant of legislative requirements set out in Commonwealth and State Government Acts and Regulations. Specific requirements including permits and works approvals are described in Section C1.0 – Overview of environmental management.

C.1.4.1.1 Commonwealth Legislation

Commonwealth legislation considered in development of this CEMP (including Acts implementing relevant international conventions) includes:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Great Barrier Reef Marine Park Act 1975.*

C.1.4.1.2 State Legislation

The following State legislation is relevant to the construction and has been considered in the development of this CEMP:

- *State Development and Public Works Organisation Act 1971*
- *Coastal Protection and Management Act 1995 and Coastal Management Plans*
- *Environmental Protection Act 1994*
- *Fisheries Act 1994 and Regulations*
- *Marine Parks Act 2004 and Marine Parks (Great Barrier Reef) Zoning Plan*
- *Land Act 1994*
- *Nature Conservation Act 1992*
- *Transport Infrastructure Act 1994*
- *Sustainable Planning Act 2009 and Regulations.*

C.1.4.1.3 State Policies and Plans

The following State policies and plans are relevant to the construction and have been considered in the development of this CEMP:

- Environmental Protection Policies
- Conservation Plans
- Queensland Coastal Plan
- Port notices and Port Land Use Plan.

(C2.2)1.5 Environmental Management Framework

This section describes POTL's commitments regarding environmental performance and the reduction of adverse impacts.

C.1.5.1 Environmental Management System

POTL maintains its commitment to sustainable development and operation through its Environmental Management System (EMS). The EMS provides a framework for environmental management at the port and reflects POTL's Environmental Policy and commitments to manage its activities with concern for people and the environment.

POTL's EMS is compliant with AS/NZS ISO 14001 2004 and facilitates continual improvement of environmental performance by:

- integrating environmental considerations into decision making and work practices related to the Corporation's core functions
- maintaining a high level of environmental awareness throughout the Corporation and the wider port community
- utilising systems which act to reduce the risk of environmental harm through the identification reporting, assessment, monitoring and control of environmental risks.

This CEMP includes the work elements necessary to satisfy environmental requirements in the construction phase of the PEP and generally complies with applicable elements of POTL's EMS.

Continuous improvement is a mandatory requirement of POTL's EMS. As part of the continuous improvement, the CEMP may be updated or amended as required, which may include being merged with other documents to streamline the EMP documentation or be incorporated into the contractors CEMP. Any future amendments will take into account the intent of this document and the conditions of the existing approvals.

C.1.5.2 Environmental Policy

POTL Environmental Policy applies to POTL lands, including the common user areas of the port. It is:

- displayed at prominent locations in the workplace of POTL employees and on the website
- communicated to POTL employees and contractors during induction and training
- reviewed regularly.

POTL personnel, contractors and visitors must comply with the spirit and intent of the policy.

POTL's Environmental Policy (POTL, 2011a) states:

Port of Townsville Limited (the Corporation) and its senior management are committed to the protection of the environment and considers it as critical corporate value in the delivery and maintenance of port infrastructure and services and in planning for the future development of the Port of Townsville and Port of Lucinda.

The Corporation is committed to sustainable development and operation through responsible environmental management and continual improvement of environmental performance and the effectiveness of its Environmental Management System.

To achieve corporate performance consistent with this policy, the Corporation will employ the following principles:

- Integrate environmental considerations into decision making and work practices related to the Corporation's core functions.
- Maintain a high level of environmental awareness throughout the Corporation and the wider port community.
- Implement systems which act to minimise the risk of environmental harm through the identification, reporting, assessment, monitoring and control of environmental risks.
- Establish a framework for setting and reviewing environmental objectives and targets and measuring the Corporation's performance.
- Establish and maintain systems for assessing the environmental impacts associated with the Corporation's activities, identifying and acting on opportunities for improvement.
- Compliance with all relevant legislation, codes of practice and standards.
- Core functions to be conducted in a manner that will minimise waste, prevent pollution, promote efficient use of resources, reduce environmental impacts, and continually improve environmental and management system performance.
- Providing adequate resources including finances, to facilitate the fulfilment of the Corporation's environmental responsibilities.

Senior Management is responsible for providing the leadership to support the development and implementation of this Policy and for ensuring it is effectively applied.

This policy will be regularly reviewed following legislative or organisational changes, or as a minimum, every three years.

(C2.2)1.6 Project Description

This section describes the construction phases of the PEP and the key components of work (Table 3).

Table 3 Summary of Key PEP Construction Components

Component	Description
Construction of breakwater and land perimeter revetments	
Breakwater and revetment infrastructure (around reclamation perimeter).	<ul style="list-style-type: none"> ▪ A new north-eastern rubble mound breakwater with rock armouring will be constructed approximately one kilometre seaward of the existing eastern breakwater. ▪ Revetments with rock armouring will be constructed to protect the north-eastern and eastern edges of the reclamation area. ▪ The breakwater and revetment layouts will be configured to provide a protected outer harbour basin and the structural design will address extreme wave and water level events for the port infrastructure and land reclamation.
Western Breakwater (if required).	<ul style="list-style-type: none"> ▪ Contingent upon detailed analysis, construction of a new western breakwater for additional outer harbour protection without affecting the port design and operations.
Dredging works for augmentation of channels and development of outer harbour	
Handling and placement of dredged sediments (onshore).	<ul style="list-style-type: none"> ▪ Approximately 4,300,000 m³ of dredged marine sediments from the outer harbour basin will be placed in bunds in tidal waters as part of land reclamation activities (note that management of dredge tailwater is addressed in the DMP, Chapter C2.1) ▪ Dewatering and ground improvement of emplaced sediments on tidal lands will be undertaken.
Development of Port Land	
Bunds and treatment areas	<ul style="list-style-type: none"> ▪ A reclaimed area of approximately 100ha will be developed on tidal lands eastwards of the existing harbour (and defined by the north-eastern and eastern revetments and the wharf alignments).

Component	Description
	<ul style="list-style-type: none"> ▪ Selected fill material from land sources will be used to build bunds over tidal lands, constructed as conventional earth/rock fill structures, to contain the reclamation material. ▪ Internal bunds will be constructed on the alignments of future key infrastructure (including rail and roads) as suitable foundations for heavy loading. ▪ Bund structures will be constructed and configured to retain fill in stages and provide settlement areas for the temporary management and treatment of reclamation tailwater and thereafter permanent reclamation areas for created land. ▪ Select ponds will be used for the treatment of stormwater. ▪ A surface capping layer (approximately one metre thickness) and pavement layer will be applied over land-sourced fill material (approximately 700,000 m³ imported fill).
Port Infrastructure	
Berths and wharves	<ul style="list-style-type: none"> ▪ Up to six berths will be constructed in the outer harbour (termed Berth 14 through Berth 19) to support import and export trades and cargo handling requirements ▪ At berths, wharves will be constructed similar to the existing wharf structures for vessel berthing, mooring, loading and unloading of general cargo, dry bulk and bulk liquid goods. ▪ Berths will be sized for vessels with a nominal length overall of 250 metres. ▪ Construction will be staged to meet the demand for cargo throughput. This may be sequential on a berth-by-berth basis, or in stages involving multiple berth development. ▪ Berth pockets will be dredged to an all-tides depth of approximately - 15.5 m CD.
Development on port land and ancillary services	
Cargo storage and handling areas	<ul style="list-style-type: none"> ▪ Land area of approximately 100 ha to accommodate: <ul style="list-style-type: none"> ▪ cargo operations, from approximately 52 metres behind the quayline ▪ cargo storage area approximately 175m wide ▪ road and rail transport corridors ▪ cargo storage area in rail loop ▪ Final finished reclamation level nominally + 7.5m CD (+ 5.6m AHD) adjacent to the wharf structures and falling to the eastern revetment to accommodate drainage of stormwater.
Road Infrastructure	<ul style="list-style-type: none"> ▪ Internal circulation road in a corridor 25 metres wide on the reclamation area to access facilities and key infrastructure. Vehicles ranging from cars to articulated combination vehicles will have access. ▪ Connection via existing Benwell Road to the Eastern Access Corridor (currently under construction). ▪ A turning area for articulated combination vehicles at northern end of the main access road. ▪ The road corridor will include a single traffic lane in each direction. Smaller access corridors along the back of wharves and from the main access road to storage areas will be built.
Rail Infrastructure	<ul style="list-style-type: none"> ▪ A rail reserve 25 metres wide on the reclamation area to service bulk goods haulage. ▪ A 200 metre radius, three track rail loop behind cargo storage and handling areas with provision for future train lengths of 1,500 metres. ▪ Connection to the Eastern Access Corridor and existing rail network.
Buildings	<ul style="list-style-type: none"> ▪ A port operations building to include administration facilities for POTL may be constructed.

Component	Description
	<ul style="list-style-type: none"> ▪ A harbour control tower may be constructed. ▪ Provision for infrastructure for cargo storage and transfer in relation to rail and road access.
Utilities and other services	<ul style="list-style-type: none"> ▪ Installation of services infrastructure relating to stormwater, water supply (including for fire fighting), power supply, waste water reticulation and telecommunications. ▪ Below ground services in the road corridor. ▪ Installation of a Zone substation in the port expansion area consisting of two (66kV to 11kV) transformers. ▪ Port security infrastructure. ▪ Area and road lighting.
Maritime operations	
Vessel movements during construction	<ul style="list-style-type: none"> ▪ Management of vessels in regards to fauna strike. ▪ Implementation of safe vessel practises. ▪ Establishment of temporary navigational aids. ▪ Setting of vessel speed limits and movement areas. <p>Refer to Vessel Traffic Management Plan (Construction) for full details.</p>

C.1.6.1 Construction Activities

The construction phase of the PEP includes the development of the following infrastructure and construction activities:

- construction of a new breakwater approximately 1km seaward of the existing eastern breakwater to form a new deep water outer harbour
- possible construction of a new western breakwater to protect the outer harbour
- construction of up to six additional berths in the new outer harbour (Berth 14 through Berth 19) sized for vessels with a nominal length overall of 250m
- creation of approximately 100ha of reclaimed land backing the new berths to accommodate a cargo operations zone of 52m behind the wharf; a cargo storage area (175m deep to allow for two material storage facilities and associated equipment) a rail loop; and internal bunds to facilitate effective land reclamation
- installation of new aids to navigation
- construction of new road and rail infrastructure (road reserve 25m wide; and rail reserve 25m wide for three tracks) in the Project footprint and connection to the Eastern Access Corridor (EAC) currently under construction
- installation of new services infrastructure – stormwater, water supply, power, waste water, telecommunications, Port security infrastructure and areas and road lighting
- located in the reclamation area, construction of pond(s) for the treatment of tailwater from dredged material, for the separate containment of any contaminated material arising from the dredging, and for treatment of stormwater during the construction phase.

The spatial dimensions of the development and its layout are shown on Figure C.2.2.1.

C.1.6.2 Materials

The land area required for the PEP will be reclaimed using dredged material from the outer harbour basin.

Selected fill material will be required from land sources to build bund structures to retain the dredged fill, to protect the reclamation from erosion and wave attack, and provide settlement areas for the management and treatment of the reclamation tailwater. Good quality fill material will also be required for construction of capping and pavement layers on the surface of the reclamation.

The bund walls will be constructed as conventional earth/rock fill structures. POTL intends to use the quarry (POTL) to supply the rock required for the breakwaters, revetments and bund walls for the PEP. The quarry is located in the Pinnacles area, 30km south-west of Townsville.

Concrete for wharf construction will be transported to the site by road from various suppliers in the region via the new EAC.

Steel piles will be used for wharf construction. It is expected that the piles will be delivered by ship directly to the port and transported from the wharf to the construction site by the port’s internal road system.

Other construction materials (steel reinforcement, pipes, culverts, etc) will be transported to the site by road from various suppliers in the region via the new EAC.

C.1.6.3 Design Requirements

Those perimeter bund walls exposed to the sea will be designed to withstand extreme metocean conditions with limited overtopping.

The construction of the walls will be made impervious to retain the tailwater and avoid turbidity plumes generated by the draining of water containing fine material from the dredged material escaping untreated to the sea.

The perimeter bund structure would typically incorporate a height adjustable weir box in the last settling pond to control the overflow tailwater discharge over a period of time.

Internal bund walls will control the movement of sediment and water so that areas can be dewatered and suspended sediments can settle to control the quality of tailwater. As for the perimeter walls, internal bund walls need to be fully impermeable but are only required to withstand wind-wave action that may be generated from the bunded areas.

Height adjustable weir boxes are required between bunded areas to control the flow of water and suspended sediments. These are generally located to create a long path for the movement of water to maximise retention time.

C.1.6.4 Construction Period

Construction of the PEP berths and associated land-side infrastructure is scheduled to occur over many years as shown below:

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Stage A	Berths 14 & 15																	
Stage B					Berth 16													
Stage C													Berth 17					
Stage D																	Berths 18 & 19	

Prior to Stage A, a pre-construction period leading up to 2014 will be required for preparatory and site establishment activities required prior to construction proper.

Construction of berths is scheduled over four stages (Stage A to D).

There are six key construction activities over the sequence of stages:

- Construction of the Main Breakwater and Perimeter Revetments. Construction will be undertaken in Stage A and completed in Stage D.
- Construction of the Western Breakwater (if required). Construction would be undertaken in Stage A.
- Dredging. Dredging is covered in the DMP. Dredging of the outer harbour basin would occur during Stages A, B and C.
- Construction of the reclamation area – commences in Stage A and continues throughout construction phases.
- Installation of road, rail, civil works and services – commences in Stage A and continues throughout construction phases.

- *Wharf construction* – commences in Stage A and continues throughout each of the construction phases for the respective berths.

C.1.6.5 Construction Equipment

During the construction phase, for the land-based construction activities, a range of plant and equipment will be used to develop the Port, including:

- trucks (on road and off-road)
- excavators
- bulldozers
- cranes
- utility vehicles
- transport barges and tug/s for barges
- workboats
- survey boat/s
- front end loaders
- stone column or wick drain rig
- bobcats
- grader
- paving machine
- track machine
- barge mounted pile driver.

(C2.2)1.7 General Requirements

This Section outlines the general environmental requirements that Construction Contractors would be expected to fulfil, in addition to meeting specified requirements for the environmental values set out in Section (C2.2)1.8.

Contractors would be expected to address these general requirements as part of project planning, and throughout the construction period. This is to confirm that activities are being carried out consistently with any existing procedures or protocols and comply with relevant environmental duties and obligations as set out in Queensland legislation and with environmental permit requirements.

C.1.7.1 General Method Statement

For each construction work package, a general method statement will be prepared outlining the intended scope of works and methodology to be employed. At a minimum, the method statement will include the following:

- introduction
- description of the general scope of works (noting this may need to be by Stage only)
- references to relevant legislation, company standards (such as quality, OHS and environment management systems), how they apply to the current project and any other project specific document.
- responsibilities of the contractor and key staff.
- a clear map of the areas where the construction activities are to take place consistent with regulatory approvals.
- a general description of the construction process and the specifics of the plant to be used including the construction methods and controls.
- specific work Method Statements.

C.1.7.2 Site/Activity-Based Environmental Management Plan

A site/activity-based EMP will need to be prepared by the construction contractor prior to commencement of construction. The contractor's EMP must address the following:

- environmental commitments – including a commitment by senior management of the contractor to achieve specified and relevant environmental goals
- identification of environmental risks and potential impacts
- control measures for routine operations to reduce the likelihood of environmental harm
- a suitable Emergency Spill/Incident Response Plan and Cyclone Plan
- contingency plans and Emergency Response Procedures for non-routine situations organisational structure and responsibility
- effective communication
- monitoring of contaminant releases
- conducting environmental assessments
- staff training
- record keeping
- periodic review of environmental performance and continual improvement
- develop and implement hazardous material handling procedures.

C.1.7.3 Hazardous Substances, Health and Safety

The construction contractor will meet OHS requirements as they will be contractually obliged from POTL.

Precautions will be taken to protect the health and safety of people working at the site. Particularly in light of climate change impacts and potential for increased high-temperature days, cyclones and storm events. The construction contractor will consider precautions including:

- developing stop-work procedures for extreme heat days
- providing appropriate PPE and educate/induct staff on managing heat stress
- monitoring heat stress incidents and adjusting practices if the number of incidents increases
- site evacuation training.

C.1.7.4 Maintenance of Measures, Plant and Equipment

The construction contractor must check that measures, plant and equipment necessary to undertake the activity are operated and maintained in a proper and efficient condition.

This includes appropriate servicing and maintenance of engines and emission control devices such that emissions comply with relevant guidelines and standards.

C.1.7.5 Reasonable and Practicable Measures

The construction contractor must take reasonable and practicable measures to prevent and/or reduce the likelihood of environmental harm being caused.

C.1.7.6 Notification of Environmental Harm

The construction contractor is responsible for ceasing activities and notifying POTL if it becomes aware of material or serious environmental harm (as defined in the Queensland *Environmental Protection Act 1994*) as a result of carrying out of the construction works. In such circumstances, the contractor must also contact POTL and the Queensland Department of Environment and Heritage Protection (DEHP) Pollution Hotline or local DEHP office as soon as practicable after becoming aware of any release or emissions not in accordance with conditions of approval or licences. Additionally to otherwise express the general environmental duty which is to '.....do all that is reasonable and practicable to minimise the risk of environmental harm'.

Other notifications may be required in accordance with legislation and port notices as relevant to the specific environmental harm event.

(C2.2)1.8 CEMP Elements

This section of the CEMP identifies specific environmental management procedures related to the on-land construction phase of the PEP. The requirements in this section are intended to apply in addition to the general requirements outlined in Section (C2.2)1.7 of this CEMP. In most cases it will need to be integrated in broader site-based management plans and documentation and any conditions of approval imposed on the PEP under relevant legislation.

These requirements are to be addressed by either POTL or its construction contractor (whomever is applicable) as part of project planning so that the activities being carried out are consistent with any existing procedures or protocols in port limits or under relevant corporate environmental policies or strategies.

C.1.8.1 Structure of the EMP

The following environmental values have been identified in the EIS as key risks for the set of factors that require consideration in the CEMP:

- land
- water resources (surface water aspects) *
- marine water quality (reclamation aspects) *
- marine sediment quality (reclamation aspects) *
- marine ecology and conservation (reclamation aspects) *
- terrestrial ecology;
- air quality
- noise and vibration
- greenhouse gases
- waste
- transport and infrastructure
- indigenous cultural heritage
- visual amenity and lighting
- pest management
- hazards and hazardous materials.

*Note: Marine aspects in relation to these factors are described in the DEMP.

For each value identified, an environmental management strategy and actions have been developed to address potential risks that may arise. Each value has a stated environmental objective, performance criteria, management actions, monitoring, reporting, and corrective actions. The structure used for the strategy and actions is outlined in Table 4.

Table 4 CEMP Structure

Order of implementation	Plan Component	Description of Content
1	Environmental risks (Aspect-Impact)	The environmental aspect of construction requiring management response - strategies and actions.
2	Environmental Performance Objective	The guiding performance objective that applies to the values of the factor.
5	Management Actions	The mechanisms and management actions through which the performance objective will be achieved.

Order of implementation	Plan Component	Description of Content
3	Performance Criteria	The criteria by which the success of the implementation of the policy will be determined.
4	Monitoring and Reporting	The process of measuring actual performance, or how well the policy has been achieved, including format, timing and responsibility for reporting and auditing of the monitoring results.
5	Corrective Action	The action to be implemented and by whom in the case where a performance criterion is not met.

A separate table is provided to address each value (refer to Sections C.1.8.2 to 8.15). Mitigation of some potential impacts, such as the removal of marine habitat through reclamation, will be considered through potential offsetting opportunities rather than construction management measures, and are not included in this CEMP.

C.1.8.2 Land

Aspect Impacts	<ul style="list-style-type: none"> Disturbed dredged or excavated PASS material, or imported contaminated soil/fill could be placed in the reclamation area. Spills or leakage of fuels/oil and other contaminants, hazardous materials or dangerous goods, may cause soil contamination.
Environmental Performance Objectives	<p>To reduce the risk of environmental harm as a result of changes to landforms in relation to :</p> <ul style="list-style-type: none"> Contamination; and Acid Sulfate Soils
Performance Criteria	<ul style="list-style-type: none"> No soil contamination from leaks, spills on site or other hazardous material brought to site. No contaminated fill from external sources brought into site. ASS management procedures and plans developed and implemented as part of subsequent approvals.
Monitoring and Reporting	<ul style="list-style-type: none"> Regular site inspections to check for leaks, spillage and damage to banded/storage/refuelling areas and equipment. Monitor the pH of retained water in the dewatering ponds. Monitor and record sources, condition and movement of fill.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Maintain significant depths of filling over soft Holocene sediments in the reclamation area to prevent heaving and displacement of PASS above sea level.	Construction contractor	During construction of the reclamation area.	Review reclamation management practices if adverse impacts are observed.
As a general precaution (once the reclaimed height is above sea level), provide a 10m wide 'guard layer' of agricultural lime on the seaward edge batters under the fill platform Such a barrier layer would consist of a surface application of agricultural lime (CaCO ³) applied at a minimum rate of 1-2 kg/m ² .	Construction contractor	During construction of the reclamation area.	Review reclamation management practices if adverse impacts are observed.
To reduce the risk of fuel/oil spills undertake regular inspections and maintenance of machinery: <ul style="list-style-type: none"> daily inspection of machinery undertake maintenance of site machinery and vehicles as soon as practicable after the requirement is identified inspection for leaks prior to allowing any external 	Construction contractor	Throughout the construction period.	Any material impacted by spills shall be managed through: <ul style="list-style-type: none"> investigation excavation of impacted material. Disposal of impacted material at a suitable disposal facility, with appropriate EHP approvals and by a licensed waste disposal subcontractor.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<p>vehicles or machinery on site).</p>			
<p>Store hazardous materials, chemicals, oils and fuels in clearly designated areas, as far as practicable from residences, watercourses and other sensitive receptors. Storage areas are to consist of a compacted base and bunding to contain spillages, as per AS/NZS 3833:2007, AS 1940:2004, AS 3780:2008, AS/NZS 4452:1997 and AS/NZS 4681:2000 and any other standards applicable to the time of construction. Storage areas to be roofed to prevent contamination and infiltration of stormwater.</p>	<p>Construction contractor</p>	<p>Install designated storage areas prior to storing hazardous material on site.</p>	<p>Undertake repairs to bunded area to mend cracks and damage in as soon as practicable following detection. Clean up any spilled material promptly.</p>
<p>Maintain storage to quantities to limits specified. Maintain an up-to-date hazardous and potentially hazardous materials register on site.</p>	<p>Construction contractor</p>	<p>Throughout construction period.</p>	<p>Where on site storage exceeds minor storage limits, a permit shall be obtained from the appropriate authority for bulk storage of chemicals, oils and/or petroleum products.</p>

C.1.8.3 Water Resources (stormwater and drainage)

Aspect Impacts	<ul style="list-style-type: none"> Increased turbidity of marine waters during construction of PEP lands due to sediment in stormwater runoff (note that dredge tailwater management is discussed in the DMP, Chapter C2.1) Stormwater contamination may arise due to oil/fuel leaks and spills into Cleveland Bay. Effects on marine life, as well as indirect potential impacts to human health, through the exposure and potential release of contaminants in stormwater to marine waters.
Environmental Performance Objectives	<ul style="list-style-type: none"> No adverse impacts to water and sediment quality of Cleveland Bay. Reduce the load of contaminants into the environment from construction activities. Reduce the dispersion of turbidity from stormwater discharges beyond the development footprint.
Performance Criteria	<ul style="list-style-type: none"> No exceedance of limits set in reactive monitoring programme for suspended sediment concentrations for open waters. Fuel / chemical storage is secure or any spill is adequately contained and cleaned up. No failure of erosion and sediment controls.
Monitoring and Reporting	<ul style="list-style-type: none"> Regular inspections of stormwater runoff areas to check for cleanliness and potential for contaminants to impact on water quality; Regular site inspections to check for leaks, spillage and damage to bunded storage areas; Immediately notify POTL in the event of an uncontained spill; Site specific management actions including erosion and sediment controls, will be developed and implemented by the contractor prior to construction.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Surface drainage from the reclaimed area is to be controlled through appropriate site management (i.e. drainage reports to sediment ponds and drains are collected and prevented from entering the sea by use of low bunds, sand bags or other temporary control measures). The on-site containment will be integrated in the turbidity management/treatment that is required for any discharge water.	Construction contractor and POTL during periods between construction stages.	During construction of the reclamation area.	Temporarily cease releases to prevent outflows and to increase retention times in accordance with the reactive monitoring plan for dredge tailwater (refer to Chapter C2.1)
To reduce the risk of fuel/oil spills, undertake regular inspections and maintenance of machinery: <ul style="list-style-type: none"> daily inspection of machinery undertake maintenance of site machinery and vehicles as soon as practicable, after the requirement is identified inspection for leaks prior to allowing any external vehicles or 	Construction contractor	Throughout construction period.	Any material impacted by spills shall be managed through: <ul style="list-style-type: none"> investigation excavation of impacted material disposal of impacted material at a suitable disposal facility, with appropriate EHP approvals and by a licensed waste disposal

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
machinery on site.			subcontractor.
<p>Store hazardous materials, chemicals, oils and fuels in clearly designated areas, as far as practicable from residences, watercourses and other sensitive receptors.</p> <p>Storage areas are to consist of a compacted base and bunding to contain spillages, as per AS/NZS 3833:2007, AS 1940:2004, AS 3780:2008, AS/NZS 4452:1997 and AS/NZS 4681:2000 and other standard applicable at the time of construction.</p> <p>Storage areas to be roofed to prevent contamination and infiltration of stormwater.</p>	Construction contractor	Install designated storage areas prior to storing hazardous material on site.	<p>Undertake repairs to bunded area to mend cracks and damage as soon as practicable following detection.</p> <p>Clean up any spilled material promptly and test discharged waters prior to release to marine areas.</p>
<p>Reduce the likelihood and impact of contaminant spills by:</p> <ul style="list-style-type: none"> ▪ Developing and implement hazardous material handling procedures ▪ Implement emergency response procedures ▪ Undertake spill response training for staff ▪ Install oil and grit separators for equipment maintenance areas on site ▪ Provide spill control materials including booms and absorbent materials, to control the event of chemical spill in the waterway ▪ Have appropriate equipment onsite and accessible. 	Construction contractor	Develop procedures applicable for each construction area and update for change of work as appropriate.	Review and modify spill clean-up procedures if any adverse impacts are observed.
Reduce contamination of surfaces exposed to runoff generation through source controls.	Construction contractor	Install in each staged construction area prior to staged construction commencement.	Review and modify equipment and controls if any adverse impacts are observed.
Install vehicle wash racks at site entry/exit.	Construction contractor	Prior to construction of reclamation area.	Review and modify equipment and controls if any adverse impacts are observed.
<p>Direct surface stormwater to sediment basins to eliminate off-site migration of sediment.</p> <p>The design and placement of sediment basins to be staged according to construction schedules.</p>	Construction contractor	Install prior to construction of reclamation area.	Review and modify equipment and controls if any adverse impacts are observed.

C.1.8.4 Marine Ecology and Conservation (Reclamation Aspects)

Aspect Impacts	<ul style="list-style-type: none"> Increased turbidity and potential for hydrocarbon or other contaminant spill from on-site facilities, potentially affecting water quality, species or the quality of their habitats. Light spill from construction plant and port facilities may lead to disorientation of marine animals. Emission of waste may increase the risk of entanglement and/or ingestion of marine debris by marine vertebrates. Increase in noise leading to marine fauna temporarily avoiding affected area.
Environmental Performance Objectives	<ul style="list-style-type: none"> To reduce indirect effects on marine megafauna and the marine ecology of benthos. To prevent contamination from construction into the adjacent marine environment.
Performance Criteria	<ul style="list-style-type: none"> No injury or fatality to marine megafauna as a result of PEP construction activities. No reduction in fauna diversity or occurrence evident from light spill. No reduction in abundance in marine megafauna from noise. No permanent loss of benthic habitat beyond the development footprint. Creation of hard substrate inter-tidal and near sub-tidal marine habitat.
Monitoring and Reporting	<ul style="list-style-type: none"> Regular site inspections carried out to monitor the construction area for compliance with light and waste management procedures, and hazardous material handling procedures. Marine performance monitoring of relevant aquatic indicators.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Implement light management procedures to reduce light spill to the marine environment.	Construction contractors	During design phase; implement and check during construction phase.	Review light management procedures.
Implement waste management procedures. Refer Waste Section 1.8.9.	Construction contractors	During construction phase	Review waste management procedures and modify if required so that rubbish does not affect marine animals.
Implement control measures to reduce the likelihood and impact of contaminant spills (refer to Land, Section C.1.8.2, and Water Resources, Section C.1.8.3).	Construction contractors	During construction phase	Review and modify equipment and controls if any adverse impacts are observed.
Implement control measures to reduce the likelihood and impact of turbidity (refer to Water Resources, Section C.1.8.3)	Reclamation area contractors	During construction phase	Review and modify site practices if any adverse impacts are observed (refer to tailwater management elements of the DMP, Chapter C2.1)

C.1.8.5 Terrestrial Ecology

Aspect Impacts	<ul style="list-style-type: none"> ▪ Spread of weeds by site movements and to and from site. ▪ Injury/mortality to fauna resulting from construction activities such as vehicle movements. ▪ Noise emissions (and vibration) e.g. piling leading to behavioural disturbance in fauna. ▪ Light spill from construction plant leading to disturbance to avian habitats.
Environmental Performance Objectives	<ul style="list-style-type: none"> ▪ To reduce the spread of weeds to and from the site. ▪ To avoid injury and death of avifauna from construction activities. ▪ To reduce the level of noise and light spill on adjacent land used by shorebirds.
Performance Criteria	<ul style="list-style-type: none"> ▪ Light spill from project site to bird nesting areas on the spit is avoided or minimised to the extent practicable.
Monitoring and Reporting	<ul style="list-style-type: none"> ▪ Any incidents that affect terrestrial or fauna to be reported to relevant authorities. ▪ Regular site inspections for injured wildlife and use of fauna spotter during where relevant e.g. during piling.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<ul style="list-style-type: none"> ▪ Reduce the spread and introduction of weeds by thoroughly washing down, according to accepted industry standards before moving to the construction site or leaving for the first or last time. ▪ Use a wheel wash whenever vehicles move from unsealed roads to sealed roadways e.g. road between excavation area and off-site. 	Construction contractors	Prior to and during construction.	Review and modify operational practices if there is a breach.
Implement procedures on the handling and reporting of injured fauna.	Construction contractors	Throughout construction period.	Review and modify controls if any adverse impacts are observed.
Implement control measures to manage noise risks to fauna outside of the port (refer to Noise and Vibration, Section C.1.8.7)	Construction contractors	Throughout construction period.	Review and modify equipment and controls if any adverse impacts are observed.
Lighting design and arrangements to reduce light spill from the site to shorebird habitat on the spit at the mouth of Ross River.	Construction contractors	Throughout construction period.	Review and modify equipment and controls if any adverse impacts are observed.

C.1.8.6 Air Quality

Aspect Impacts	<p>Fugitive dust from exposed surfaces during construction may result in:</p> <ul style="list-style-type: none"> ▪ increased risks to human health ▪ nuisance ▪ discolouration of buildings or structures. <p>Fuel combustion emissions from vehicles and equipment</p>
Environmental Performance Objectives	<ul style="list-style-type: none"> ▪ To reduce the particulate load from dust from construction activities ▪ To reduce vehicle emissions ▪ Minimise and address air quality complaints
Performance Criteria	<ul style="list-style-type: none"> ▪ Air quality from the construction area to meet EPP (Air) standards and appropriate ambient air quality guidelines at sensitive receptor locations. ▪ Adaptive management in response to complaints from people affected by dust emissions or in accordance with reactive dust monitoring results. (specific performance thresholds for each PEP Stage to be determined in relation to the proposed work activities prior to any works being undertaken for respective stages)
Monitoring and Reporting	<ul style="list-style-type: none"> ▪ Visual monitoring and observation of weather conditions that result in dust liberation and elevated particle concentrations. ▪ Continuous monitoring and/or air quality monitoring campaigns. ▪ Record and respond to complaints.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<p>To reduce fugitive dust:</p> <ul style="list-style-type: none"> ▪ Erect localised windbreak barriers on activities (to 2.4 m height), particularly to the west of works, if required ▪ Water exposed surfaces at >2 L/m²/min (ensure no pooling) ▪ Sweep and water using a water cart for materials handling, transport and haul routes ▪ Use a wheel wash whenever vehicles move from unsealed roads to sealed roadways e.g. road between excavation area and off-site ▪ Adjust work practices (as required) based on wind observations (e.g. ceasing dust-generating works under extreme windy conditions or when dust is observed to leave the site) ▪ Adjust work practices (as required) based on real time dust monitoring. 	<p>Construction contractor and POTL between stages.</p>	<p>During the construction phase.</p>	<p>Implement corrective measures outlined in Air Quality Reactive Monitoring Program which includes triggers against a staged approach: <i>Investigate, Action and Stop Work</i>:</p> <ul style="list-style-type: none"> ▪ Investigate: designed to identify the issue, the likely reasons and formulate a response should the Action stage be reached. ▪ Action: designed to implement those measures formulated in the Investigate stage and review their effectiveness. ▪ Stop Work: there is a high likelihood that the pollutant criterion may be reached. Works are to stop at this stage until the measured pollutant levels are below the Action level. <p>Amend construction program for modifying or</p>

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<ul style="list-style-type: none"> ▪ Operate a complaints management system ▪ Vehicles to cover loads. 			scheduling works that mobilise particulates depending on ambient conditions that may cause wind re-suspension (eg 20km/hr from the east or north-east).
<p>To reduce fuel combustion emissions:</p> <ul style="list-style-type: none"> ▪ Turn engines off while parked on site ▪ Regularly tune, modify or maintain equipment, plant and machinery to reduce visible smoke and emissions ▪ Implement site speed limits ▪ Reduce haul road lengths ▪ Manage vehicle movement to prevent queuing/idling. 	Construction contractor	During the construction phase.	Review and modify engines if any adverse impacts are observed..
Vacant fill areas to be planted / hydro mulched as soon as possible after reaching final landform	Construction contractor	During the construction phase.	View final landform signoff procedure to include a review of need for stabilising vegetation.
Maintain vacant fill areas between PEP development stages	POTL	Between stages	Increase frequency of inspection of vacant areas and undertake identified maintenance actions.

C.1.8.7 Noise and Vibration

Aspect Impacts	<ul style="list-style-type: none"> Onsite construction equipment, particularly during piling works and rockfill reclamation, causing offsite disturbance of sensitive receivers. Heavy vehicles impacting receivers on Boundary Street and near the boundary of the site. Vibration effects during the construction phase from use of plant and equipment and haulage
Environmental Performance Objectives	<ul style="list-style-type: none"> To reduce noise generated by construction activities and haulage vehicles.
Performance Criteria	<ul style="list-style-type: none"> Limited numbers of complaints related to noise and vibration events during the construction phase. Noise and vibration levels to meet relevant Queensland standards or appropriate noise guidelines at sensitive receptors.
Monitoring and Reporting	<ul style="list-style-type: none"> Noise and/or vibration monitoring will be carried out as required by construction contractor. Information will be recorded in POTL database to identify areas and/or events where noise is creating adverse effects.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Advise residents and commercial operators of planned construction activities including timing and duration of piling and rockfill placement.	POTL and construction contractor.	Preceding noise activities.	Revise notification procedures and times to allow adequate consideration of potential noise impacts by the community.
<p>Piling operations restricted to activities to prescribed daytime work hours, excluding Sundays and Public Holidays.</p> <p>Consideration of alternative piling types, e.g. screw-type piling in place of impact piling if alternative are available and feasible.</p>	Construction contractor	During piling operations.	<p>Review and modify construction practices if effects are anticipated to be prolonged.</p> <p>Monitoring, and adjusting where necessary, elements of piling such as reducing the height and weight of the impact hammer.</p>
<p>Equipment management includes the following:</p> <ul style="list-style-type: none"> Select low-noise plant and equipment Equipment has have high-quality mufflers installed Equipment has been well maintained and fitted with adequately maintained silencers which meet the design specifications Plants known to emit noise strongly in one direction (ie. manifolds on compressors) are to be orientated so that the noise is directed away from noise sensitive areas Machines that are used intermittently are shut down in the intervening periods between works or throttled down to a minimum 	Construction contractor	At all times during construction.	Review and modify construction practices as required.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<ul style="list-style-type: none"> ▪ Silencers and enclosures are kept intact, rotating plant is balanced, loose bolts tightened, frictional noise reduced through lubrication and cutting noise reduced by keeping blades sharp ▪ Equipment not in use is shut down ▪ Only necessary power is used to complete the task ▪ Only necessary equipment is on site ▪ Equipment to be in good working condition. 			
Locate site compounds and noisy plant as far away from noise sensitive receptors as practicable. Orient noisy plant so that noise is directed away from sensitive receptors.	Construction contractor.	During construction.	Review and modify construction practices if adverse effects occur.
If plant is fixed in a stationary location, where sensitive receptor may be affected for one week or longer, installation of an acoustic enclosure constructed in accordance with <i>AS 2436-2010 Guide to noise and vibration control on demolition and maintenance sites</i> will be required.	Construction contractor.	If plant remains stationary, where sensitive receptor may be impacted for at least a week.	Review and modify equipment and construction practices if adverse effects occur.
Operate a complaints management system	Construction contractor.	During construction.	Review and modify construction practices if adverse effects occur.

C.1.8.8 Greenhouse Gases

Aspect Impacts	<ul style="list-style-type: none"> Greenhouse gas emissions will be produced during construction.
Environmental Performance Objectives	<ul style="list-style-type: none"> To identify and reduce unmitigated greenhouse gas emission loads.
Performance Criteria	<ul style="list-style-type: none"> Reduction in calculable greenhouse gas emissions through implementation of planning, design and management actions. Meet applicable Commonwealth and State legislation and standards for greenhouse gas emissions release.
Monitoring and Reporting	<ul style="list-style-type: none"> Monitor energy use and changes to efficiency on site, primarily through the use of monitoring fuel consumption. Monitor key performance indicators to track construction greenhouse gas emissions, detect trends early and implement measures to address any unforeseen increases in emissions.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Increase awareness: <ul style="list-style-type: none"> Include greenhouse gas awareness training as part of site inductions Undertake periodic energy audits to monitor energy use and changes to efficiency on site Keep informed of best practice industry standards, research into new technology and energy efficiency and trial new approaches where appropriate. 	Construction contractor	Prior to commencement of, and during construction.	Review practices and monitor on-going performance.
Develop targets and goals: <ul style="list-style-type: none"> Develop a set of key performance indicators for carbon management for the construction of the port expansion to track performance over time Monitor key performance indicators on a monthly basis to enable construction contractor to monitor construction greenhouse gas emissions, detect trends early and implement corrective actions. 	Construction contractor	Prior to commencement of, and during construction.	
Implement energy efficiency measures: <ul style="list-style-type: none"> Maintain equipment Install energy saving timers, light sensitive switches and energy efficient lighting in and around the buildings Select appliances based on energy efficiency 	Construction contractor	During construction	
Investigate use of renewable energy on site: <ul style="list-style-type: none"> Investigate renewable energy options for construction administration facilities Investigate the feasibility of generating electricity from a renewable source on-site 	Construction contractor	Detailed design phase.	

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
<ul style="list-style-type: none"> ▪ Consider the use of solar panels for rockwall, security and road lighting during construction and powering isolated items such as pumps. 			
<p>Reduce fuel use during construction by a number of measures such as:</p> <ul style="list-style-type: none"> ▪ Reduce transport distances and mobilisation of plant ▪ Plan construction works to avoid double handling of materials ▪ Use fuel efficient vehicles and investigate replacing diesel with a less emission intensive fuel, such as biodiesel or use of hybrid vehicles; Turn off engines when any significant delays occur ▪ Coordinate staff travel arrangements. 	Construction contractor.	During the construction phase.	
<p>Material use and selection:</p> <ul style="list-style-type: none"> ▪ Use materials with high recycled content or lower embodied construction materials ▪ Consider the feasibility of sourcing polyester geotextile manufactured from recycled PET for the reclamation area ▪ Reduce the quantity of construction material required ▪ Re-use dredge spoil wherever feasible as part of footprint design. 	Construction contractor	During the construction phase.	
<ul style="list-style-type: none"> ▪ Purchase carbon offsets through a certified offset provider in Australia 	Construction contractor	During the construction phase	

C.1.8.9 Waste

Aspect Impacts	<ul style="list-style-type: none"> ▪ Incorrect handling and storage of waste materials may result in the introduction of wastes into the marine environment or surrounding lands. ▪ Presence of waste materials may encourage pests and provide breeding habitats for mosquitoes.
Environmental Performance Objectives	<ul style="list-style-type: none"> • Coordinate the handling, storage, recycling and disposal of waste materials during the construction phase. • No litter or waste lost from PEP development footprint into adjacent marine environment.
Performance Criteria	<ul style="list-style-type: none"> ▪ Waste materials are handled, stored and disposed in a safe and secure manner. ▪ Environmental disturbance to the surrounding marine area from construction waste is avoided. ▪ Do not attract pests as a result of wastes generated during construction through implementation of appropriate management measures.
Monitoring and Reporting	<ul style="list-style-type: none"> ▪ Monitor the management (storage, handling) and disposal of waste from the construction area. ▪ Regular site inspections for mosquito breeding areas prior to and during wet season. ▪ Any incidents will be recorded in the contractor database in order to identify areas where waste management is creating adverse impacts.

Implementation Strategies; Management Actions*	Responsibility	Timing	Corrective Actions
Only the minimum required amount of any substance required by construction activities to be brought to site.	Construction contractor	During the construction period.	Review waste management practices and modify if required if any adverse impacts are experienced.
Re-use construction waste onsite (for examples bricks/concrete and timber) where appropriate.	Construction contractor	During the construction period.	
Products that can be recycled to be taken to a licensed recycling facility.	Construction contractor	During the construction period.	
Products that cannot be re-used on or off site or recycled will be disposed appropriately offsite at a licensed facility.	Construction contractor	During the construction period.	
Provide separate stockpiles or bins for different waste streams avoid contamination with other waste streams. Provide waste bins/receptacles to isolate liquid wastes.	Construction contractor	During the construction period.	
Store hazardous and asphaltic wastes in an appropriate bunded and covered area.	Construction contractor	During the construction period.	
Licensed waste contractor to be engaged to regularly remove and dispose of waste at licensed facilities and maintain waste disposal areas.	Construction contractor	During the construction period.	

Implementation Strategies; Management Actions*	Responsibility	Timing	Corrective Actions
Sewage to be removed via a temporary connection to reticulated waste water system if possible.	Construction contractor	Until alternative or permanent connection established.	
Empty drums and storage containers (to be stored in bunded area).	Construction contractor	During the construction period	
Monitor the management (storage, handling) and disposal of waste from the construction area. Regular site inspections for mosquito breeding areas prior to and during wet season.	Construction contractor	Routinely during the construction period.	Review waste management practices and modify where performance objectives are not met.
Regulated waste to be stored, handled and transported in accordance with DERM requirements, and where applicable the Hazardous and Waste requirements listed in C1.1.14.	POTL / Construction contractor	During the construction period	Review waste management practices and modify where performance objectives are not met.

*Management actions listed in order of preference in accordance with the waste hierarchy.

C.1.8.10 Transport and Infrastructure

Aspect Impacts	<ul style="list-style-type: none"> ▪ Traffic congestion at some key road intersections due to construction traffic. ▪ Degradation of pavement due to additional traffic loading on pavements from construction activities.
Environmental Performance Objectives	<ul style="list-style-type: none"> • Reduce disruption to existing road transport infrastructure.
Performance Criteria	<ul style="list-style-type: none"> • Traffic delays from construction at the port do not contribute significantly to peak traffic loads.
Monitoring and Reporting	<ul style="list-style-type: none"> • All heavy vehicle movements to be recorded by contractor and reported to POTL.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Intersection improvements to mitigate against additional traffic impacts from construction related activities.	Construction contractor	Following commencement of construction and to be maintained throughout the construction phase.	Review intersection performance and apply alternative improvements if adverse impacts are experienced.
Pavement rehabilitation and maintenance to cater for the additional loadings from construction related heavy vehicles if required by pavement impact assessment.	Construction contractor	As required based on pavement impact assessment.	Road repairs to be undertaken as soon as practicable.
POTL to consider contractual requirements for contractor to use certain routes (e.g. EAR).	POTL and construction contractor	Pre-construction and construction.	Contractor to be penalised for not meeting obligations.
Construction heavy vehicles to use designated heavy vehicle routes.	Construction Contractor	Throughout construction period.	Review heavy vehicle route or driver training/induction.
Operate a complaints management system	Construction contractor	During construction	

C.1.8.11 Indigenous Cultural Heritage

Aspect Impacts	<ul style="list-style-type: none"> Disturbance or destruction of significant Aboriginal cultural heritage values or artefacts in the marine environment or land.
Environmental Performance Objectives	<ul style="list-style-type: none"> To reduce the potential for disturbance of significant Indigenous values or artefacts.
Performance Criteria	<ul style="list-style-type: none"> No loss or disturbance of significant Indigenous values or artefacts as a result of the PEP construction. No complaints from people likely to be affected by damage to Aboriginal areas or archaeological sites.
Monitoring and Reporting	In accordance with the Cultural Heritage Monitoring Program

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Ongoing consultation with representatives of the Aboriginal parties in accordance with the CHMP.	POTL	Prior to and during construction as stipulated in the CHMP.	Review the CHMP and consultation protocol if there are risks of unexpected adverse effects or complaints are made,
If any Aboriginal cultural heritage sites, materials or values are discovered during development operations work and other activities are to cease pending an inspection by a representative from the Aboriginal Parties.	Construction contractor	During construction.	Follow advice provided on inspection by the representative from the Aboriginal Parties
If human skeletal material is discovered during development works operations will cease immediately within 100m of the remains. The Queensland Police, Cultural Heritage Coordination Unit (DEHP) and an Aboriginal representative will be contacted immediately.	Construction contractor	During construction.	If works do not cease, penalties apply. Follow advice provided by DEHP and the Aboriginal representative regarding established policy and procedures for dealing with human remains.
Personnel and contractors involved in the development project will undertake a cultural heritage induction prior to commencement of development operations.	POTL and construction contractor.	Prior to, and during, construction.	Review the induction package and procedures if adverse impacts are observed.

C.1.8.12 Visual Amenity and Lighting

Aspect Impacts	<ul style="list-style-type: none"> ▪ Scenic amenity could be adversely affected by artificial light associated with the port infrastructure used during night time construction. ▪ Local scenic amenity may be affected by constructional plant, waste and suspended sediment in the marine environment. ▪ Dust emissions on residents and recreational users.
Environmental Performance Objectives	<ul style="list-style-type: none"> • To consider adverse visual effects associated with constructional activities of the PEP.
Performance Criteria	<ul style="list-style-type: none"> • Minimal visual impact on water clarity from construction activities. • Minimal visual impact from dust on surrounding areas. • Minimise light spill outside of POTL controlled areas.
Monitoring and Reporting	<ul style="list-style-type: none"> • Daily site inspections to monitor for water pollution, rubbish and dust associated with the construction. Regular inspection of areas surrounding the port development area, particularly following changed lighting conditions e.g. at the start up of a stage.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Manage lighting and design to reduce light spill from the site in so far as consistent with existing Operational Health and Safety and Land Use codes.	Construction contractor	During construction	Review and modify lighting management practices if any adverse impacts are observed.
<ul style="list-style-type: none"> ▪ Implement control measures to reduce: <ul style="list-style-type: none"> ▪ fugitive dust (refer to Air Quality, Section C.1.8.6) ▪ stormwater releases (refer to Water Resources, Section C.1.8.3) ▪ suspended sediment from dredging (refer to DMP, Chapter C2.1). 	Construction contractor	During construction	Review and modify management practices if any adverse effects are reported
Maintain a high standard of site cleanliness and presentation. Regularly remove and dispose of rubbish. Manage waste in accordance with C1.8.9.	Construction contractor	During construction	Review and modify site house-keeping practices and waste management if any adverse impacts are observed.
Progressive stabilisation of reclaimed land and reducing disturbed and exposed areas (e.g. access road verges).	Construction contractor	During construction	Disturbed land to be established and vegetated as appropriate as soon as practical after reaching final levels.

C.1.8.13 Pest Management

Aspect Impacts	<ul style="list-style-type: none"> • Introduction or spread of pest animals into the construction.
Environmental Performance Objectives	<ul style="list-style-type: none"> • To reduce attraction of the PEP area to pest animals.
Performance Criteria	<ul style="list-style-type: none"> • No increase to the number of pest species on the construction site above background levels in surrounding port
Monitoring and Reporting	<ul style="list-style-type: none"> • Monitor the presence and abundance of pest animal species in the PEP reclamation area. • Regular site inspection for mosquito breeding areas during wet season.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Inspect construction site for likely mosquito breeding locations.	Construction contractors	Beginning of every wet season.	Regularly review the construction site and implement controls if required during the construction phase.
Keep construction work area free of food waste or other attractants to mice and rats.	Construction contractors	Throughout construction period.	Mice and rats will be trapped or poisoned before numbers cause human health concerns.
Keep construction work area free of food waste or other attractants to dogs, cats and foxes.	Construction contractors	Throughout construction period.	Feral dogs, foxes and cats will be trapped and euthanised humanely.
Keep construction work area free of food waste or other attractants to cane toads and birds	Construction contractors	Ongoing, regular inspections	Licensed pest control contractor engaged to control numbers if required.

C.1.8.14 Hazards and Hazardous Materials

Aspect Impacts	<ul style="list-style-type: none"> Potential impacts to human and environmental health from exposure to hazards and hazardous materials.
Environmental Performance Objectives	<ul style="list-style-type: none"> To handle and store hazardous materials in the appropriate manner.
Performance Criteria	<ul style="list-style-type: none"> Hazardous materials to be stored and handled in accordance with relevant standard or manufacturer's instruction.
Monitoring and Reporting	<ul style="list-style-type: none"> Contractor to regularly inspect the MSDS register for currency and completeness. Conduct inspections to monitor construction area for compliance with hazardous material handling and storage procedures.

Implementation Strategies; Management Actions	Responsibility	Timing	Corrective Actions
Use of hazardous materials to be minimised where possible and alternatives implemented if feasible.	Construction contractors	Throughout construction period.	Review of need for hazardous materials to be reviewed.
Hazardous materials to be stored and handled in accordance with relevant standards of manufacturer's instructions.	Construction contractors	Throughout construction period.	Review of handling and storage products to be undertaken.
Material Safety Data Sheets (MSDS) for hazardous materials held on site, to be displayed in a prominent location near the storage and usage sites of hazardous materials.	Construction contractors	Throughout construction period.	Inspection of hazardous material storage and use areas for correct MSDS.
Time delivery of hazardous materials to site in line with programmed use to avoid the need to store significant quantified of hazardous materials on site.	Construction contractors	Throughout construction period.	Review procurement procedures of hazardous materials in accordance with programed use.

(C2.2)1.9 Action Program

C.1.9.1 Continuous improvement

CEMPs are 'living documents' that require review (at least annually) during the construction phase and amended, as necessary, to allow new or changing environmental risks relating to the PEP to be addressed. Feedback systems will be in place for the duration of the Project to enable the CEMP to be updated and responsive to learning from any incidents, complaints and ongoing monitoring results.

This CEMP would be reviewed and updated to reflect knowledge gained during the course of construction and to reflect new knowledge and changed community standards (values). Changes to the CEMP may be developed and implemented in consultation with relevant authorities and stakeholders over time.

Other triggers for CEMP review may include:

- findings and recommendations of contractors EMPs and/ or work procedures
- changes to organisational structure, roles and responsibilities
- changes in environmental legislation and/or policies
- new technologies/innovation relevant to applied methods and controls that provide innovative means of executing work in order to meet performance criteria.

C.1.9.2 Environmental auditing

POTL will monitor performance against the contract held with the construction contractor in accordance with its Environmental Management System (EMS) during the contractor's construction campaign.

In addition, an audit of reclamation activities monitoring is to be carried out periodically by a suitably qualified and experienced person(s), during each phase of construction.

C.1.9.3 Monitoring

Monitoring for each value is detailed at Section (C2.2)1.8. This monitoring will enable:

- early detection of environmental management issues in the Port of Townsville during construction
- where applicable, development of baseline environmental information for the Port from which trends and changes in the environmental quality of the Port over the period of construction can be detected.

C.1.9.4 Records

During construction, records of the ongoing site monitoring shall be maintained for possible audit by regulating authorities. Permanent records for each phase of earthworks activities must be kept on site and updated regularly, to enable audit/review by means of a simple 'check list' or similar.

Records of any testing instrument calibrations (i.e. pH meter) shall also be kept. Calibration will be in accordance with the manufacturer's instructions.

Records would allow auditing and encourage the use of preventative action, as well as corrective action following non-compliance.

Environmental records will be:

- kept as objective evidence of compliance with environmental requirements
- maintained according to POTL's Recordkeeping Procedure.

Environmental records and the EMP will be controlled in accordance with the contractor management system.

C.1.9.5 Staff training

Construction personnel shall attend an induction prior to commencing work at the site. The induction will include the environmental commitments and measures contained in this CEMP. Construction workers

attending the induction will be mentored to support the implementation of commitments by construction staff.

(C2.2)1.10 Community Engagement

This section outlines plans for on-going consultation with the community.

C.1.10.1 General Enquiries, Information and Visitors

POTL has an established Community Enquiry line. General enquires received shall be directed to this line in the first instance.

Contact can also be made via POTL's website. POTL invites public comment via their 'Tell us what you think' page (<http://www.townsville-port.com.au/feedback>). General contact details for POTL are also provided on their website:

- **Telephone:** 07 4781 1500
- **Facsimile:** 07 4781 1525
- **Email:** info@townsville-port.com.au.

C.1.10.2 Complaints Handling

The contractor would manage community complaints and feedback in accordance with the complaints handling procedure. A 'Complaint Lodgement Form' is available on the on POTL website http://www.townsville-port.com.au/complaint_form. The complaints handling procedure operates as follows:

- Complaints received directly at the site will be directed to the 24 hour enquiry line or website form in the first instance.
- Complaints received by the construction contractor must be recorded including investigations undertaken, conclusions formed and actions taken. Notification about the complaint and any associated response must be provided to POTL in a timely fashion.
- The complaint response procedure will include:
 - (a) the time, date name and contact details of the complainant;
 - (b) reasons for the complaint;
 - (c) any investigations undertaken;
 - (d) conclusions formed; and
 - (e) any actions taken.

All outcomes of complaint(s), including the full detail of the complaint and corrective actions undertaken by the construction contractor, shall be communicated to POTL for further review of corrective actions.

Corrective actions shall be communicated to the complainant to close out the issues raised.