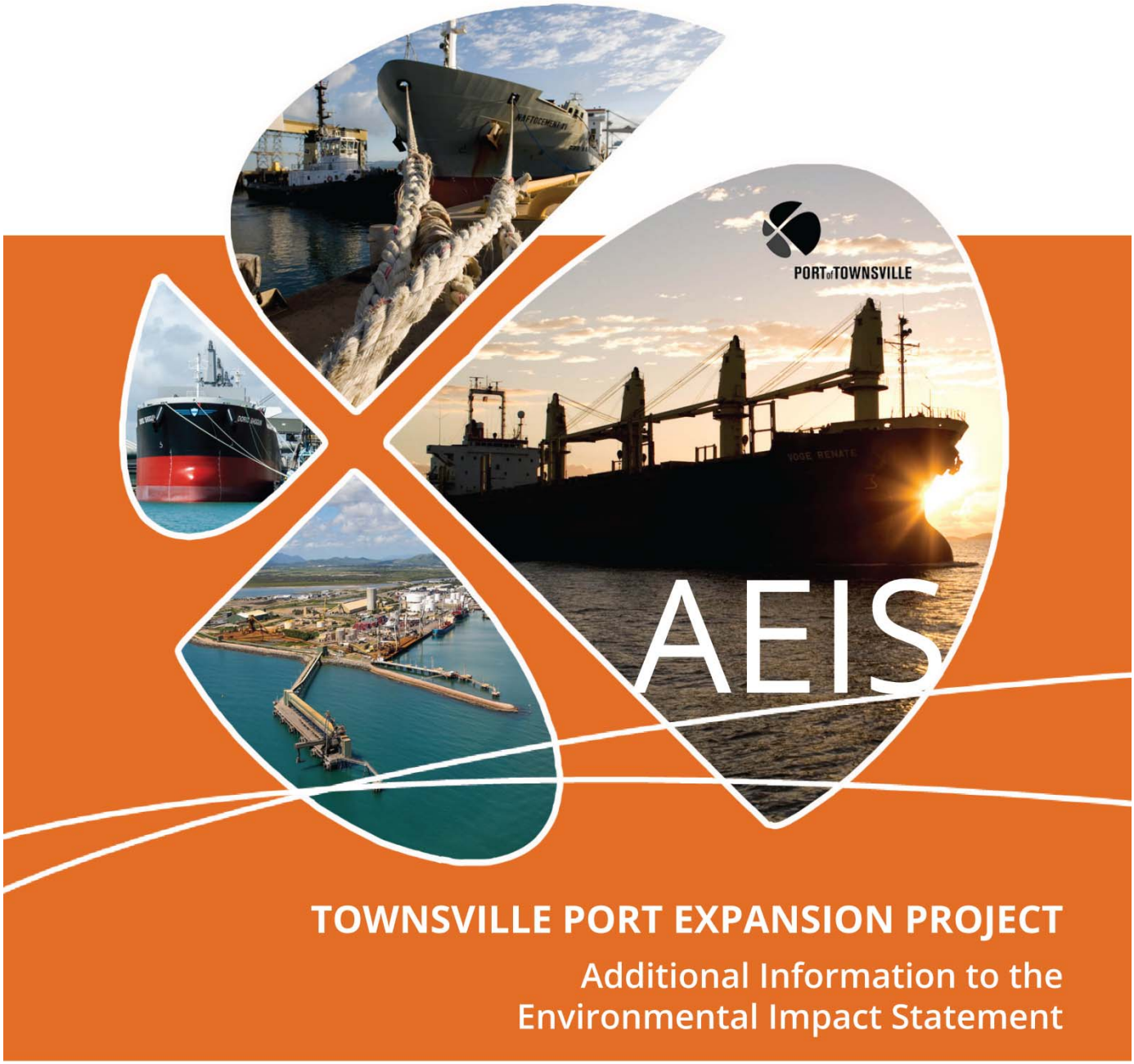


# TOWNSVILLE PORT EXPANSION PROJECT

## Additional Information to the Environmental Impact Statement

TOWNSVILLE PORT EXPANSION PROJECT

**SECTION 29**

**Summary**

AECOM BMT WBM

# 29.0 Summary

## 29.1 Introduction

The Port of Townsville is a long-established seaport that is significant to both the history and development of Townsville and wider North Queensland region. The Port was established in 1864 and is also recognised by the Queensland Government as one of the four Priority Port Development Areas along Queensland's coastline under the *Sustainable Ports Development Act 2015*.

The Port Expansion Project (PEP) was originally conceived through a Master Planning process, which was completed in 2007. The Master Planning process recognised the driver for the Expansion Project being the predicted steady increase in trade over the coming decades, necessitating an increase in port capacity. Since that time, the Project has undergone an comprehensive engineering design review process that has considered environmental, social and economic factors (including historic dredge campaigns) to culminate in the harbour and channel designs described in the Environmental Impact Statement (EIS) that was approved for release by the Coordinator-General in May 2013 for public submissions (hereafter referred to as the"PEP EIS design").

The PEP EIS design sought to achieve additional port capacity through the deepening of the channel to a navigational design depth of -13.7m LAT (which necessitated some capital works extending into the boundaries of the Great Barrier Reef Marine Park), the construction of six additional berths and the reclamation of approximately 100 ha of adjoining port land.

It was recognised in the design that the dredging of the channel was required independently of the construction of any additional berths or land reclamation as it will itself provide a capacity increase for the Port to accommodate larger and wider ships (with a deeper draft). The land reclamation area for the PEP design was made intentionally larger than what was required for Port operations to reduce the volume of capital dredge material that needed to be placed at sea in the approved Dredge Material Placement Area (DMPA) in Cleveland Bay..

The PEP EIS was informed by the technical studies undertaken in accordance with the Queensland State Government Terms of Reference and the Australian Commonwealth Government Guidelines, as well as the Port's extensive experience in undertaking dredge campaigns since its establishment in 1864.

Following public consultation of the EIS for the Project undertaken in May 2013, a total of 435 submissions were received by the Commonwealth and State governments. These submissions comprised 23 from government departments, 39 from non-government organisations, 157 from private submitters and 216 online-facilitated submissions, either fully or partially based on a form letter. 40 submissions were duplicates submitted to both State and Commonwealth Governments by the same respondent.

The key issues identified across these submissions included the following:

- Project need
- Project options and alternatives including the dredger methodology and dredged material disposal options
- Environmental and socio-economic impacts from the Project including:
  - impacts to local ecosystems and the resilience of marine habitats in the GBR World Heritage Area (WHA) including cumulative impacts to the Great Barrier Reef;
  - impacts to amenity of Townsville and Magnetic Island and associated tourism activities; and
  - the adequacy of environmental offsets proposed.

The Additional Information to the Environmental Impact Statement (AEIS) (this report) has been prepared in response to the Coordinator-General's request to provide further clarification of specific issues raised in submissions received following the public notification period of the EIS, as well as also responding to significant changes in Commonwealth and State Policy and Legislation.

This AEIS provides a summary of the submissions, the proponent's response, and an outline of amendments to the submitted EIS in response to the submissions and legislative change. The AEIS forms part of the overall environmental impact assessment documentation for the Project that will need to be considered by the Coordinator General under the State Development Act, however it does not seek to duplicate or replace the EIS but rather to complement the existing assessment.

Unlike a traditional supplementary report to an EIS, this AEIS describes how the design of the PEP has been refined in response to Government policies on dredging and material disposal in the Great Barrier Reef World Heritage Area as well as responding to the submissions received on the EIS. As outlined later in this summary, this included additional fieldwork, data collection and re-analysis of the environmental and socio-economic impacts of the Project. It also includes updated management plans for consideration in the final decision on the Project by the State and Commonwealth decision makers.

## 29.2 Design refinement

A comprehensive assessment of project alternatives was undertaken during the development of the Master Plan and brought forward into the PEP. The PEP EIS design was found to provide the best balance of environmental impacts, economic efficiency and safety. Alternative design options assessed tended to fragment and duplicate port facilities being disconnected from existing land and sea access infrastructure, and required a major new approach channel to be dredged, in addition to the existing port channel. Also, these options did not provide opportunities for beneficial re-use of the capital dredge material produced from the excavation of the harbour basin and berths.

Following the development of the EIS, significant changes were made to environmental legislation and Government policy as it pertained to the Great Barrier Reef World Heritage Area. The drivers for these changes are broadly summarised below.

- A visit to Australia by a United Nations Educational, Scientific and Cultural Organization (UNESCO) committee and preparation of a report expressing concern about the health of the Great Barrier Reef World Heritage Area.
- A review of environmental factors affecting the Great Barrier Reef World Heritage Area and preparation of a Strategic Assessment by the Commonwealth and Queensland Governments.
- Release of the Great Barrier Reef Outlook Report 2014.
- Release of the Queensland Ports Strategy by the Queensland Government as a blueprint for managing and improving the efficiency and environmental management of the State's port network over the next 10 years. The strategy includes a commitment to concentrate port development to selected long-established major port areas (including the Port of Townsville) within or adjoining the Great Barrier Reef World Heritage Area.
- The Commonwealth Minister for the Environment created regulations under the Great Barrier Reef Marine Park Act to put an end to the sea disposal of capital dredge material in the Great Barrier Reef Marine Park.
- Release of complimentary Queensland legislation in late 2015 with the *Sustainable Ports Development Act 2015*. The act prohibits the sea-based disposal of capital dredge material into the Great Barrier Reef World Heritage Area and mandates the beneficial reuse of port-related capital dredge material such as for land reclamation, or placement on land where it is environmentally safe to do so.

The *Sustainable Ports Development Act 2015* also prevents approval being granted for capital dredging areas that are in the Great Barrier Reef World Heritage Area but outside the Great Barrier Reef Marine Park unless it is for a priority port and in accordance with that port's Master Plan, or if the development is the subject of an EIS process started before the act came into effect. The Project meets both of these criteria in that the Port of Townsville is identified as a priority port under the Act and the PEP is the subject of an eligible EIS process.

The Project has undergone a design refinement process in direct response to the changes that have occurred in government policy and legislation since the EIS was completed and has also sought to respond to the submissions received during the consultation period. This design refinement process resulted in following key design outcomes:

- Avoiding sea disposal by relocating all capital dredge material within the PEP reclamation area for beneficial re-use, noting this has resulted in an expanded reclamation footprint from that proposed in the PEP EIS Design.
- Avoiding direct impact on the Great Barrier Reef Marine Park (General Use Zone) by widening the channel design and only partially deepening the channel.
- Modifying the dredging methodology to reduce the bulking factor of the dredged material which will reduce the size of the reclamation area needed to handle material during dewatering and consolidation. This methodology will also reduce water quality impacts during capital dredging by using mechanical dredge plant that does not overflow the dredge material during operation

Berth 12 is an outer harbour berth at the Port that was approved under Commonwealth and State legislation in (2011 and 2012) but is not yet constructed. The design refinement process for PEP has incorporated Berth 12 as it forms a critical component of the outer harbour swing basin. Previously, the EIS had assumed that the approved Berth 12 project will be constructed ahead of the PEP, however the introduction of the *Sustainable Ports Development Act 2015* has affected the Berth 12 approval (by precluding placement of capital dredge material at sea) leading to its inclusion in the revised design.

The design refinement process also included examination of in situ volumes of dredged material for each stage of the works considering different dredging and reclamation methodologies. Other critical elements included optimising the ultimate location of the rail loop within the PEP AEIS footprint, and locating any temporary breakwaters or revetments as footings to minimise the cost of installing this infrastructure when it is required.

A summary of the updates to the PEP EIS design as a result of the design refinement process is provided in Table 29.1 below. The AEIS design addresses key matters raised by respondents and is consistent with Commonwealth and State Government policy and legislation changes since the EIS. Specific consideration and response to EIS submissions are provided in the relevant sections of this AEIS.

Table 29.1 Key outcomes of the AEIS design refinement process

| Project Aspect | EIS Design | AEIS Design Refinement | Outcome |
|---|---|---|---|
| Reclamation size | 100 ha | 152 ha | Increased by 52 ha to accommodate all capital material onshore |
| Capital dredge material placement at sea | 5.6 million $m^3$ | No placement of capital dredge material at sea | Reduced by 5.6 million $m^3$ |
| Dredge Material Placement Area | Area 1,140 ha | No placement of capital dredge material at sea | No impact from placement of capital dredged material in the Dredge Material Placement Area |
| GBRMP* | Dredging in Stage D extending into the GBRMP* General Use Zone (extension of channel) | No dredging required within the GBRMP* General Use Zone | No direct impacts to benthic environments in the GBRMP* General Use Zone |
| Beneficial reuse volume (reclamation) | 4.3 million $m^3$ | 11.4 million $m^3$ | Increased by 7.1 million $m^3$ to accommodate all capital dredge material onshore |
| Dredging duration | Approximately 4 years | Approximately 10.5 years | Increased by 6.5 years, change in dredging methodology to minimise the reclamation footprint size |
| Channel length | 16.6 km | 14.9 km | Channel length reduced by approximately 1.7 km |
| Channel width | 92 m (including some minor strategic widening) | Platypus Channel - tapers from 180 to 135 m<br>Sea Channel - tapers from 135 to 120 m | Increased channel width to accommodate longer and beamier vessels and improvement to vessel navigational safety |
| Channel navigation design depth | -13.7 m LAT | -12.8 m LAT | Reduced channel navigation design depth by 0.9 m to minimise impact in the GBRMP* General Use Zone |
| Number of berths for PEP | 6 | 6 | No change in number, locations have been refined |
| Harbour basin area | 56.1 ha | 51.4 ha | Reduced by approximately 4.7 ha to minimise the reclamation footprint size |
| Revetment wall (excluding breakwaters) | 3.5 km | 4.0 km | Increased by approximately 0.5 km to accommodate the reclamation increase |
| Project Impacts | Expanded reclamation footprint at an increased project cost.<br>Reduction of total number of berths in the proposed outer harbour to seven.<br>Shallower channel.<br>Berth infrastructure program delayed.<br>Modified dredge methodology and increased dredge duration.<br>Further investigations required and undertaken as part of the AEIS. | | |

*Great Barrier Reef Marine Park

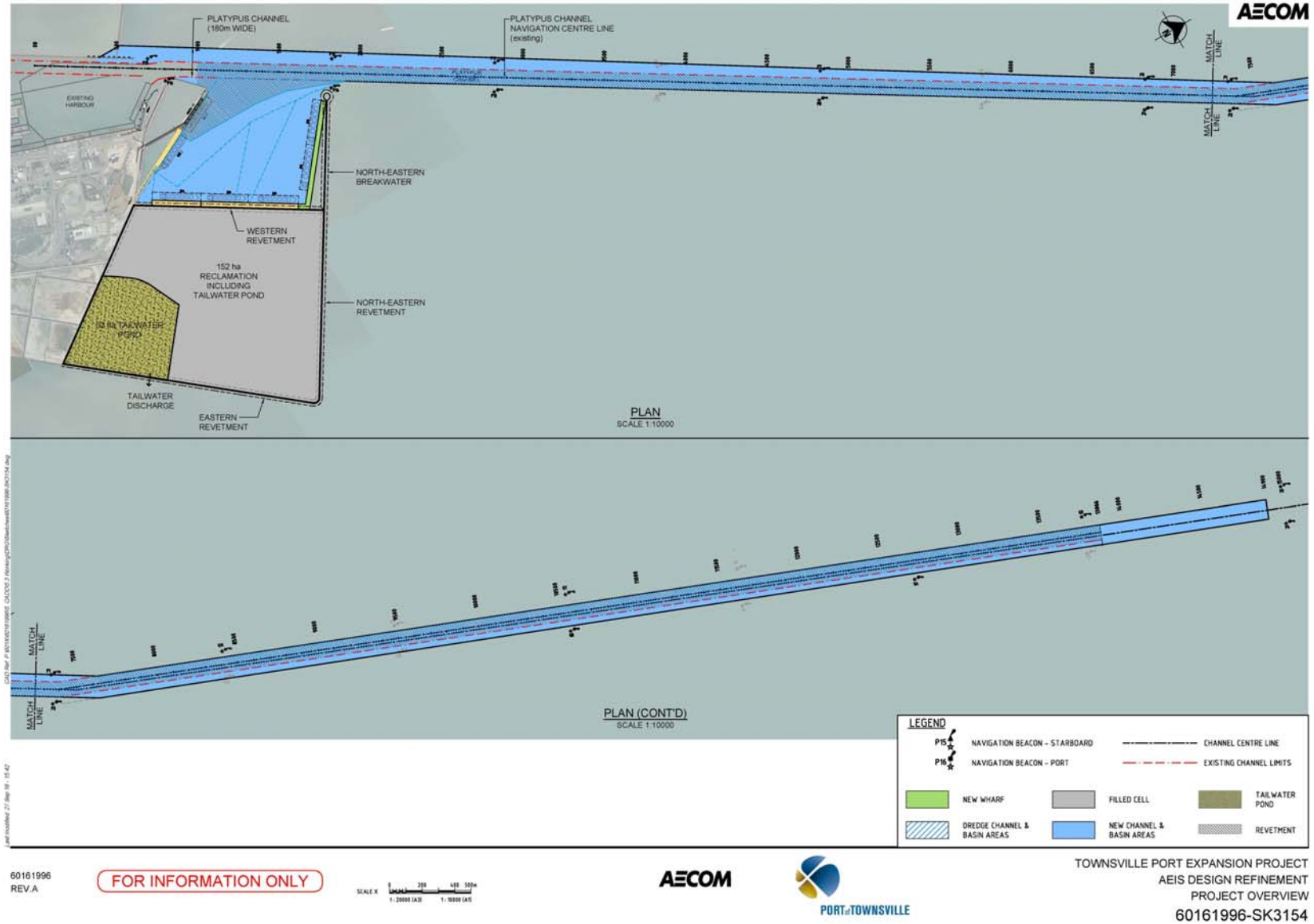


Figure 29.1 Port Expansion Project – AEIS Design Refinement Project Overview

## 29.3 Additional Environmental Impact Statement Studies

A range of additional studies, data collection activities and assessments have been undertaken as part of the AEIS. The following summarises the findings of the revised impact assessments in terms of the marine, land, socio-economic and other environments.

### 29.3.1 Marine environment

The following section summarises the findings of the revised impacts assessments in terms of coastal processes, sediment quality, water quality and marine ecology sections of the AEIS.

#### 29.3.1.1 Coastal Processes

The expanded footprint of the reclamation area will not cause significant additional impacts beyond those identified in the EIS. The changes to hydrodynamics and sediment transport caused by the construction of the reclamation and breakwaters are minor and there may be slight benefits at The Strand due to a potential reduction in siltation.

The proposed widening of the channel is not expected to cause additional coastal processes impacts because it will not have a significant impact on wave transmission or reflection. The reduction in the proposed depth of the final channel design has reduced the length of the required channel and therefore reduced impacts at the northern end of the Sea Channel and avoids direct impacts on the Great Barrier Reef Marine Park – General Use Zone. Due to the widened channel, maintenance dredging volumes are predicted to increase by 17% over the existing case for the Interim development stage (e.g. Stage 1) and by 14% over the existing case for the Ultimate development (e.g. Stage 2 once the breakwater and full reclamation is in place which will act to shield a part of the Platypus channel from longshore sedimentation).

The likely changes in the longshore sand transport regime at The Strand are not changed by the revised PEP. There will be increased sheltering of the Ross River mouth from northerly waves due to the expanded reclamation, however exposure to prevailing north easterly waves will not be significantly changed. The existing state of shoreline progradation at the Ross River mouth will be maintained under the developed case, including avifauna habitat areas.

The revised assessment presented in this AEIS addresses the EIS submissions and finds that the design refinement does not represent a significant increase in impacts to coastal processes and hydrodynamics compared with the EIS.

#### 29.3.1.2 Marine sediment quality

Maintenance dredging of port areas has been undertaken in Cleveland Bay for over 100 years in order to maintain navigable shipping channels, berths and vessel swing basins. Capital dredging works have also been required from time to time as a result of expansion to Port of Townsville infrastructure. Therefore, marine sediments in Cleveland Bay, particularly in the vicinity of port infrastructure and the main shipping channel have a long history of regular disturbance from dredging activities.

All sediment quality testing to date (including additional samples obtained as part of the AEIS) has indicated that the dredged material is very likely to be suitable for placement in the confined subtidal reclamation proposed for the revised design.

Consistent with the commitments made in the EIS, further more detailed testing of sediments will be undertaken at a later stage of the Project to inform design and detailed sediment management measures. Any contaminated sediments that are identified through this sampling process will be treated appropriately in accordance with relevant regulations and guidelines.

As such, the revised PEP is not expected to significantly impact upon marine sediment quality values on site or within the surrounding area and with the implementation of mitigation measures the overall impact to marine sediment quality is considered low.

#### 29.3.1.3 Marine water quality

Marine water quality is an important environmental asset in the Study Area and surrounds due to the presence of a number of ecological receptors that are sensitive to altered water quality conditions. These sensitive receptors include seagrass meadows, which are located throughout Cleveland Bay, as well as reef communities (including coral) at Middle Reef and Magnetic Island.

A number of submissions were received in response to the EIS that are relevant to marine water quality. The design refinement has focused on avoiding sea disposal of dredged material with anticipated benefits to marine water quality in Cleveland Bay. To assess the potential impacts to marine water quality and ecologically sensitive areas from the revised design dredging works, ‘zones of impact’ were developed. The ‘zones of impact’ were established using both outputs of the hydrodynamic and water quality numerical models and through the development and application of site-specific threshold values.

The site specific threshold values were derived using a 12 month continuous water quality data set that was collected from various locations in Cleveland Bay in 2014 in conjunction with documented tolerance limits and standards for

seagrass and corals published in scientific literature (including those used in the 1993 POTL capital dredging reactive monitoring program (which was developed by a consortium of consultants and university scientists).

The zones of impact approach, which are recommended in the GBRMPA Modelling Guidelines and are generally based on environmental assessment guidelines for dredging produced by the WA EPA (2011) include the following:

- Zone of Influence - extent of detectable plume, but no predicted ecological impacts.
- Zone of Low Impact - water quality may be pushed beyond natural variation potentially resulting in sub-lethal impacts to ecological receptors with a nominal recovery time of approximately 6 months.
- Zone of Moderate Impact - water quality likely to be pushed beyond natural variation potentially resulting in sub-lethal impacts to ecological receptors and/or mortality with a nominal recovery time up to 24 months.
- Zone of High Impact - water quality would most likely be pushed beyond natural variation (excluding extreme weather events) potentially resulting in mortality of ecological receptors with recovery greater than 24 months.

It is very important to note that the recovery times outlined for the various zones should be considered as indicative only, noting that recovery timeframes for particular marine ecosystems are dependent on a range of site specific factors that are problematic to accurately predict. Instead, the zones and their 'recovery timeframe's represent a means for comparing the likelihood that significant, detectable impact to sensitive receptors could occur, and are based on the assumption that recovery timeframes are dependent on the magnitude of impact.

The revised numerical modelling assessment that has been undertaken to generate the zones of impact provides a more sophisticated and robust assessment than is required by the State Government Terms of Reference and complies with the recommended approach in the GBRMPA Hydrodynamic Modelling Guidelines. The modelling also takes into account the prospective effects of offshore currents as well as the effect of extreme weather events such as cyclones on dredged material resuspension. The hydrodynamic model used for the assessment is fully 3D and calibrated and validated using the 12 months of locally collected wave, current and water quality data. The model has previously been peer reviewed by AIMS as well as an independent peer review as part of the EIS. As such, it addresses concerns about the suitability of past modelling approaches.

Similar to the findings of the EIS, the main impacting process from the Project will be from the capital dredging of the Platypus and Sea Channels proposed during Stage 1 (channel widening) and Stage 3 (channel deepening) of the PEP by a small-sized trailer suction hopper dredge (TSHD). While a mechanical dredger is likely to be used for a large component of the dredging, the TSHD contributes a greater proportion of turbid plumes due to the nature of its operation which involves overflowing dredge sediments from its hopper and associated turbidity generated from the operation of the dredge head at the seabed and propeller wash.

It is predicted that during channel widening and deepening under a Worst Case scenario, zones of moderate impact are predicted to remain localised near to the channel bend where the Platypus Channel and the Sea Channel connect. Under this Worst Case scenario zones of low impact would extend to waters adjacent to the north-eastern coast of Magnetic Island, where sensitive ecological receptors are known to occur.

However, during the Expected Case scenario, all zones of impact would be limited to the channels and adjacent areas where sensitive ecological receptors are not known to occur.

While the unmitigated risk rating is low, these zones of impact can be further mitigated through a range of mitigation measures, including the implementation of a Reactive Monitoring Program (RMP) to monitor key impact thresholds as a trigger for corrective actions. These management measures seek to minimise impacts to marine water quality as far as practicable, and will be implemented through the revised Dredge Management Plan.

#### 29.3.1.4 Marine ecology

Despite significant changes to Townsville's coastal zone as a result of urban and port development, Cleveland Bay continues to support a broad range of significant marine ecological values and functions.

A number of submissions were received in response to the EIS relevant to marine ecology, relating to a variety of matters including the adequacy of reef surveys at Cockle Bay, and marine ecology baseline surveys as well as the potential impacts on the Outstanding Universal Value (OUV) of the GBRWHA, turtles and megafauna. The resilience of marine ecosystems and their ability to recover from expected impacts associated with the Project was also raised in submissions.

Further field surveys were undertaken as part of the AEIS to address submissions, and to support a revised impact assessment which considered the design refinement.

Key findings from the revised impact assessment with respect to marine ecology are as follows:

- The revised design in the outer harbour will not create additional impacting processes to those reported in the EIS. While the reclamation area for the revised design is larger than reported in the EIS, the impact risk levels remain the same as reported previously and do not introduce additional risks to important marine habitat areas such as seagrass.

- The revised dredge plume modelling simulated that under a Worst Case scenario, zones of low impact would extend to waters adjacent to the north-eastern coast of Magnetic Island and potentially impact upon coastal environments which support sensitive ecological receptors (corals and seagrass meadows). However, these effects are considered to present a low residual risk to these receptors along Magnetic Island and elsewhere in Cleveland Bay.
- Additional or cumulative risks to marine megafauna reported in the EIS do not increase or otherwise change materially under the revised design, noting a range of mitigation measures are proposed to limit impacts on marine megafauna including exclusion zones during pile driving, turtle exclusion devices on the dredge and similar measures.

Additional mitigation measures that will be applied to the dredging and placement activities include:

- Avoidance of late spring and summer months for TSHD dredging
- Development and implementation of a Reactive Monitoring Program.

Commitments to environmental offsets in the EIS for the unavoidable loss of marine habitat associated with the PEP reclamation (World Heritage listing as well as providing feeding habitat for coastal dolphins) are maintained in the AEIS.

### 29.3.2 Land and freshwater environment

The following section summarises the findings of the revised impacts assessments in terms of land and land use, terrestrial ecology and water resources sections of the AEIS.

#### 29.3.2.1 Land management and land use

Policy and legislative reforms that have come into place since the preparation of the EIS have strengthened the Port's position as an important strategic land use asset and as a preferred location for port expansion works. The revised design is considered to be consistent with legislative and policy changes since the EIS assessment.

In response to a number of submissions and based on the revised design, volumes of potential acid sulfate soils (PASS) were recalculated and the potential impact and management reconsidered. POTL has managed and treated PASS during a number of dredge campaigns and has a high degree of experience in management of PASS within reclamation areas to minimise potential environmental impacts. In this context, placement in reclamation represents a better environmental outcome for the management of highly saline and/or acidic soils compared to alternatives to place dredge material on land above high water mark.

With the implementation of appropriate mitigation measures described in the Construction Environmental Management Plan, and the Operational Environmental Management Plan the overall impact to land, including PASS, is considered to remain low.

#### 29.3.2.2 Terrestrial ecology

The existing port provides opportunistic habitat for a number of shorebirds, with various species observed breeding on the existing artificial revetments, during operation of the port industries. Better quality, largely undisturbed habitat is present to the south and outside of the Project area in the form of the Ross River sandspit and mouth, which was the subject of a number of submissions.

The Project will result in the temporary partial loss of opportunistic (revetment) habitat as the existing revetment is removed and reclamation area extended; however, this extension will include the construction of a longer revetment area, which may be utilised by frequenting species in the future.

Construction activities are limited to the area to the north of the existing reclamation area so that the marine precinct and surrounding area will remain unchanged. The coastal processes assessment has illustrated that the shoreline progradation at the Ross River mouth will be maintained under the developed case, thereby continuing to provide habitat opportunities for avifauna.

The PEP is not expected to significantly impact upon terrestrial ecological values on the Project site or in surrounding areas. With the implementation of proposed mitigation measures, the overall impact to terrestrial ecology is considered to remain low.

#### 29.3.2.3 Water resources

The Project area lies in marine waters offshore from the existing reclamation area near the vicinity of the mouth of Ross River and Ross Creek. Existing groundwater monitoring on the constructed eastern reclamation area adjacent to the Project area indicates water levels are tidal influenced and the quality is saline. Water discharges from the PEP such as tail water during construction and stormwater during operation are therefore predominantly limited to the marine environment.

In response to submissions and based on the revised design, an update of the flood modelling was undertaken using the revised Developed Case Model to consider the potential impact of the PEP on flooding, including the scenario of a developed Townsville State Development Area.

The resultant impact of the PEP on the extent and intensity of storm surges is consistent with that identified in the EIS. There is no measurable change in the impact of the PEP on the extent or duration of a 50 year or 100 year flood event on the Townsville region as a result of the revised design, nor does it change the expected impact of the PEP on the 100 year surge event.

The PEP is expected to have a low impact on surface water and groundwater resources on site or within the surrounding area. Whilst the PEP reclamation footprint has been revised through the design refinement process, this has not altered the outcome of the assessment presented in the EIS. With the implementation of mitigation measures, the potential for impact to water resources associated with the PEP will be able to be managed.

### 29.3.3 Socio-economic environment

The following section summarises the findings of the revised impacts assessments in terms of the socio-economic environment comprising the social environment, air quality, noise and vibration, waste, cultural heritage, economic development, scenic amenity, and transport and infrastructure sections of the AEIS.

### 29.3.4 Social environment

The PEP represents a major expansion of port land area and infrastructure adjacent to the CBD of Townsville. The port has played a significant role in the economic development of Townsville and has influenced its social characteristics in the process, both adjacent to the immediate port area and more broadly across the city as a whole. Social values relevant to the Project area and surrounds are discussed in EIS.

A number of socio-economic factors were considered in the AEIS, in response to submissions and changes to Commonwealth and State policy and legislation and to consider the design refinement. The PEP is not expected to result in significant adverse social impacts during its construction or operation. The social values that characterise the Local, District and Regional Study Areas are not expected to materially change as a result of the revised design.

Whilst temporary impacts are predicted through changes in water quality as a result of the dredging campaign, and air and noise quality from land reclamation activities, these are expected to comply with relevant standards. Although the land reclamation generates visual impacts that are considered to be 'high' for the adjacent local areas, this would be considered low at broader scales and consistent with its immediate surroundings, that is, the port environs. The EIS also identified the potential for temporary impacts on amenity values, mostly related to the construction phase of the project. This has been reflected in a number of the submissions received through the EIS process and addressed in the AEIS.

The PEP will continue to provide a range of positive social benefits at a regional, district and local levelThe positive economic impacts of the PEP are expected to provide a number of secondary benefits to the community, including Magnetic Island. In the short term the PEP will provide opportunities for new trades to utilise the Port, including larger cruise ships which are currently restricted from visiting Townsville. In the longer term the Project continues to support the development of Northern Australia as one of Queensland's priority ports.

Mitigation measures proposed in the EIS remain appropriate, as well as relevant, to current environmental protection requirements and the revised design. The Port is committed to ongoing community engagement with Townville and Magnetic Island residents and businesses to facilitate a mutual understanding, and to proactively identify any social impacts as a result of the PEP, should they arise.

#### 29.3.4.1 Air Quality

The Port of Townsville is bounded by Cleveland Bay to the north and east and a combination of commercial and residential land immediately to the south and west. The nearest residences are located adjacent to the port's southern boundary, along Archer Street, South Townsville. The potential air quality impacts associated with the construction of the PEP were assessed with predicted concentrations of particulates at indicative sensitive receptor locations estimated using the CALPUFF model.

The magnitude of dust emissions from the revised PEP construction activities was considered to have been reduced compared to the original design assessed in Chapter B9 of the EIS. Better project definition regarding timing of construction activities means that some activities that were modelled in the EIS as concurrent, no longer occur concurrently, thereby resulting in a reduction in total dust emissions during the construction stage. It was also confirmed by DEHP (March 2014) that impacts from future port tenant operational activities would be dealt with in future development applications for those specific activities.

Concentrations of $PM_{10}$ and TSP predicted to fall below criteria for all averaging periods, at all indicative sensitive receptors. Dust deposition rates also predicted to fall below the relevant criterion for dustfall, at all indicative sensitive receptors. While dust impacts during construction are temporary, under the unmitigated scenario the risk of increased dust emissions leading to degradation of air quality amenity at sensitive receptors is considered

'moderate'. With the implementation of the proposed reactive monitoring programme and management plan the risk is able to be reduced to 'low'.

Concentrations of $NO_2$, $SO_2$, CO, and $PM_{2.5}$ from shipping emissions were also considered in the AEIS and predicted to be below the relevant criteria for both the short and long-term averaging periods, at all indicative sensitive receptors. The overall risk to health and well-being from shipping emissions is considered low.

Key mitigation recommended in the Construction Environmental Management Plan for air quality includes:

- All activities being undertaken with the objective of preventing visible emissions of dust beyond the site boundary.
- Implementation of a Conceptual Reactive Monitoring Program based on a set of air quality triggers for corrective action.

The mitigation measures, including the reactive monitoring program, outlined in the AEIS are considered appropriate to effectively manage air quality impacts. Trigger levels for the reactive monitoring programme were not provided in the EIS, however, draft dust monitoring trigger values have since been developed and are provided in the AEIS.

#### 29.3.4.2 Noise and vibration

The Project area supports the existing port facilities with the nearest sensitive receptor being identified approximately 1.4 km from the Project boundary. The existing ambient environment at the Project boundary is characterised by traffic and port activity noise.

The revised modelling undertaken as part of the AEIS predicts that the changes made as part of the design refinement are not envisaged to substantially alter the outcome of the Noise and Vibration assessment in the EIS.

The mitigation measures outlined in the EIS are considered adequate to effectively manage noise impacts. These measures include application of POTL's established complaints handling procedure which will be updated to accommodate the PEP. Information regarding noise issues and enquiries will be made available on the POTL website.

#### 29.3.4.3 Waste

The construction and operation of the PEP will generate a variety of waste that requires appropriate storage, handling and disposal management to reduce impact to the environment, community and port users.

POTL manages waste in the common areas of the Port under its existing Environmental Management System. Future port tenants are required to implement appropriate waste measures for their operations, including negotiating individual trade waste agreements with licenced contractors, arranging the removal of regulated waste to a licensed receiving facility and for adhering to the relevant regulatory requirements regarding the disposal of quarantine wastes. Port tenants and ship operators must also adhere to existing POTL procedures, which require the collection of shipping waste to be organised by the shipping agent and handled in accordance with the Australian Maritime Safety Authority regulations.

The types of hazardous materials that will be used during the construction of the PEP will be typical of a large infrastructure project. Whilst detailed information on hazardous materials is not available at the current project stage, all hazardous materials to be used during construction of the PEP will be identified prior to commencement, and appropriate storage facilities will be established (where required) in accordance with regulatory requirements.

Ballast water discharge from vessels is managed by individual ship operators under the controls of the Commonwealth Department of Agriculture and Water Resources. All international vessels operating in Australian waters, including the Great Barrier Reef Marine Park, must manage their ballast water in accordance with commonwealth requirements. These vessels must exchange ballast water for clean water from the deep ocean prior to entering Australian waters. All discharge activities at berth must be undertaken in accordance with commonwealth requirements and regulations.

With the implementation of these and other measures, as outlined in the Section 14 of the AEIS and management plans in Appendix B of the AEIS, the potential impact to the environment from waste are able to be appropriately managed and the mitigated risk considered low.

#### 29.3.4.4 Cultural heritage

The mitigation measures outlined in the AEIS, including those specified in POTL's registered Cultural Heritage Management Plan (CHMP), are considered adequate to effectively manage the potential for discovering items of Indigenous cultural heritage values and would maintain the unmitigated risks during construction works and operations at low.

The PEP is expected to also have a negligible impact upon non-Indigenous cultural heritage values on site or within the surrounding area. With the implementation of similar discovery control measures, the potential for discovering items of heritage values during construction works will also be appropriately managed through the Construction Environmental Management Plan.

#### 29.3.4.5 Economic environment

The port has played a significant role in the economic development of Townsville and North Queensland since its establishment in 1864 and is recognised by the Queensland Government as one of the four Priority Port Development Areas along Queensland's coastline.

The proposed expansion to the Port of Townsville is required to accommodate medium and long-term future growth in trade volume over a planning horizon to 2040 and beyond, and also to ensure that the port remains attractive to shippers as the global fleet increases in size. Additional berths, land reclamation and modifications to improve accessibility for vessels will allow for increased shipping movements and remove the current constraints on growth.

While a summary review of the berth utilisation figures may indicate that the port has plenty of capacity available, this is not the case. Optimum berth utilisation for any particular berth depends upon a number of factors. It is expected that multi-cargo ports such as Townsville are not able to achieve utilisations as high as those achieved in contemporary single cargo ports and in many instances over the last five years some berths at the port have been over their optimum capacity.

An economic disruption model that describes the impacts of channel restrictions on economic activity was developed to simulate the potential impacts of the channel being restricted. By implication, economic impacts of restricting future trades can be estimated. In summary, economic impact of three short-term vessel disruption or access restriction scenarios ranged from $779M to $1,429M. This result suggests that future trades that may be foregone as a result of a lack of sufficient capacity in the port land-based and channel infrastructure could be at least of this magnitude.

In response to the matters raised in submissions about the need to avoid dredging in the Marine Park the design refinement has investigated alternatives to the proposed deepening of the channels, which would provide an equivalent increase in channel capacity. In lieu of deepening the existing channels to a navigational design depth of -13.7 m LAT as proposed in the EIS, the design refinement of a widened channel will allow the Post Panamax vessels with a 43m beam access to Townsville. It is anticipated that Post Panamax vessels up to 100,000 DWT will have access to Townsville under the revised design. This compares favourably against the typical Panamax vessels which currently visit Townsville Port being in the 60,000 to 70,000 DWT size range. This avoids directly impacting on the Great Barrier Reef Marine Park – General Use Zone.

To assess the potential impacts that the PEP could have on tourism operators on Magnetic Island, an assessment was carried out focusing on the tourism operators who utilise the foreshore and fringing reefs as the basis of their operations. The assessment of the TSHD utilised similar international studies to assign an approximate economic impact to the 16.5-week TSHD dredging campaign in Stage 1 (potentially impacting 1,328 dives). It was conservatively found that a total monetised impact to tourism operators was approximately $26,559.

In relation to the potential greater economic impacts of the PEP on the Great Barrier Reef OUV, the expected direct and cumulative impacts are described in the marine ecology and cumulative impacts sections. Of relevance, the long term impacts are expected to be loss of soft sediment sub-tidal habitat at the site of the expanded reclamation, and changes to visual amenity. Both of these whilst being permanent impacts, are highly localised in scale and therefore by definition do not impact the wider Great Barrier Reef World Heritage Area economic values.

Overall, assuming that the proposed mitigation and reactive monitoring measures discussed in Section 6 of the AEIS are implemented, broad scale impacts to the greater Great Barrier Reef OUV are assessed to be negligible (refer section 25.0 and 26.0 of the AEIS). This result is consistent with the observed impacts from the previous major capital dredging campaign in 1993 that also featured a defensible and intense short and long term environmental monitoring program.

#### 29.3.4.6 Scenic amenity

The Project will affect the views of several near and distant receptors in the Townsville/Magnetic Island locality. The AEIS confirmed that impacts of moderate significance would continue to be generated at the local level. Scenic amenity impacts on the wider GBRWHA are of lesser significance due to visual containment. These impacts arise principally as a result of cumulative and perceptual aspects.

The implementation of mitigation measures to manage impacts on visual values as identified in the EIS would assist in integrating the port infrastructure into its landscape context at a local level but would not change the overall risk level.

#### 29.3.4.7 Transport and infrastructure

The PEP will result in an increase in traffic associated with the transportation of plant, equipment, products, wastes, personnel and rock armour and core material from local quarries during construction. The design refinement has resulted in revised staging for the PEP, impacting a number of transport and traffic assumptions/details that were based on the original EIS staging.

The design refinement expands the reclamation area by approximately 50 ha to the north-east to avoid sea disposal of dredged material. Transportation of materials to the site has increased from those presented in the EIS by approximately 17% due to construction of a larger reclamation area.

The types of impacts associated with the revised refinement are expected to be consistent with those originally identified in the EIS, however the number and rate of vehicle movements has increased as a result of the larger reclamation. Average numbers of heavy vehicles hauling armour rock from quarry sources has increased during Stage 1 and Stage 2, for a limited period during placement of revetments and the breakwater. Whilst the average number of traffic movement is higher at these times (by 4-6 vehicle movements per hour), the duration that material is being hauled at this intensity has reduced since the EIS. During the remainder of the Project construction, average heavy vehicle movements are either similar or less than predicted in the EIS.

Haulage routes have been refined since the EIS. The EIS utilised data that was captured prior to the completion of the Townsville Port Access Road and a number of route options were still being considered to haul armour rock. With the Townsville Port Access Road now functional it is proposed that heavy vehicle construction traffic will avoid the use of Boundary Street for bulk materials haulage where possible. This will significantly decrease the potential traffic impact on Boundary Street compared to the EIS.

Mitigation measures to further reduce the impact of the PEP, in regards to transport and infrastructure, are contained with the AEIS and outlined in the updated Construction Environmental Management Plan and Operational Environmental Management Plan updated through the AEIS.

### 29.3.5 Operational port requirements

The primary function of POTL, under the *Transport Infrastructure Act 1994*, is to establish, manage and operate effective and efficient facilities and services within the port relating to port infrastructure, while maintaining appropriate levels of safety and security at the Port of Townsville.

The Regional Harbour Master (Townsville) has jurisdiction over the safe movement of all shipping within the pilotage area under the *Transport Operations (Marine Safety) Act 1994*. Collectively, POTL and the Regional Harbour Master have responsibility for managing the safe and efficient operation of the port. All vessel movements are coordinated through Townsville Vessel Traffic Service (VTS) and the Port Procedures Information for Shipping – Townsville must be complied with by all ship owners, ship masters, ships, other persons or matters in the Port of Townsville.

The following section summarises the findings of the revised impacts assessments in the AEIS in terms of port operations comprising port operations, health and safety and security, property and infrastructure, and emergency management sections of the AEIS.

#### 29.3.5.1 Port operations

The progressive development of the PEP will occur in response to trade demand. POTL, as the port authority, will be responsible for the development of the PEP in terms of the dredging and land reclamation activities. The Australian Maritime Safety Authority (AMSA), GBRMPA and Maritime Safety Queensland are responsible for determining permitted shipping activities within the GBRMP, compliance monitoring and enforcement of penalties for non-compliance with regards to environmental and safety management. Other modifications to the Project include dredging activities, such as staging and timing.

The impacts on vessel safety and operational efficiency of the port identified in the EIS remain relevant and the mitigation measures still apply. Prior to the development of each stage of the Project, navigation arrangements, lighting and illumination requirements will be reviewed and revised by POTL in consultation with the Regional Harbour Master as necessary to maintain efficiency and safety for shipping and port operations.

Port tenants will be responsible for the management of their own infrastructure and handling facilities. Associated approvals will be independently undertaken by port tenants at the appropriate time.

The incremental development of the PEP over several decades is not expected to significantly impact upon port operations and with the implementation of mitigation measures as described in the Construction Environmental Management Plan, Operational Environmental Management Plan, Maritime Operation Management Plan, Vessel Management Plan and Dredge Management Plan, the overall impact to port operations is considered low.

#### 29.3.5.2 Health and safety

The design, construction and operation of the PEP will be undertaken in accordance with regulatory requirements at the time of each stage to minimise health and safety risks to personnel, property and the broader community. Measures to manage the Project's health and safety risks during construction and operations are covered by an extensive regulatory framework extending beyond the health and safety legislation.

Tenants and port operators are responsible for developing and implementing safety management plans to manage their own operations, including spills, within their tenancies, in accordance with regulatory requirements and POTL management systems. POTL have developed procedures and guidelines for safety management at the port,

including for the management of spills and POTL undertakes regular reviews of their own operations to ensure compliance. This includes safe handling, storage, use and disposal of hazardous materials and response to spills.

POTL has undertaken a number of reclamation projects in the past and is well placed to manage health and safety associated with the Project. POTL currently manages health and safety risks through their management systems. With the implementation of mitigation measures through these mechanisms, the Construction Environmental Management Plan and the Operational Environmental Management Plan, the PEP is not expected to significantly impact upon existing procedures and framework or responses to safety issues.

#### 29.3.5.3 Security, property and infrastructure

The Port of Townsville is recognised as essential infrastructure which, if destroyed, degraded or rendered unavailable for a short or extended period, would significantly impact on social and economic values. The nature of maritime business and infrastructure associated with the port falls within statutory requirements that provide safeguards against unlawful interference with maritime transport and establishes security levels for the Port of Townsville and its projects and infrastructure.

POTL currently manages security risks associated with essential infrastructure through its maritime security and emergency management plans in accordance with regulatory requirements. Security risks associated with the PEP will be appropriately managed through the implementation of mitigation measures and the incorporation of the Project into existing plans.

#### 29.3.5.4 Emergency management

Emergency management and response requirements associated with the PEP include extreme climatic events, natural hazards and hazards resulting from human actions.

Emergency management planning for the PEP is consistent with current POTL procedures and plans and adheres to relevant regulatory requirements. Emergency management for all current and future POTL operations is delivered through the POTL Emergency Response Procedures, Safety Management System, Environmental Management Systems, POTL's Security Plan and through the management of critical infrastructure and in support of the POTL Emergency Management Committee and Local Disaster Management Group.

With the implementation of mitigation measures through these mechanisms, the PEP is not expected to significantly impact upon existing procedures and framework and emergency response services locally or regionally.

### 29.3.6 Climate change and natural disaster

Tropical cyclones occur in Townsville leading to flooding events and beach erosion. Storm surges often occur during the passing of cyclones causing flooding to low-lying coastal and the potential for severe wave action acting on coastal structures.

A number of submissions questioned whether the potential impacts of climate change were adequately considered in planning the design and operational capacity of the PEP, specifically in terms of flood levels and management of natural disasters.

The PEP design refinement has considered all relevant legislation, policies and design guidelines relating to climate change and natural disaster. Climate change resilience will continue to form a key design consideration during the detailed design. The Port of Townsville has successfully operated for over 150 years and is experienced in managing construction and operation of a port in tropical North Queensland.

The project flood model has been revised in response to the design refinement process and has considered future development of the Townsville State Development Area. The study adheres to the same methodology as the EIS and confirmed that the PEP will not result in any significant change in the extent and / or severity of upstream catchment flooding given the project is effectively located offshore from the mouth of the Ross River and Ross Creek.

Through continued consideration of climate change and natural disaster risks during the PEP detailed design phase and by implementing mitigation measures and contingency plans, the PEP is expected to be able to achieve and maintain an appropriate level of climate change protection and infrastructure resilience.

### 29.3.7 Greenhouse gas

Emissions generated by the PEP will contribute to existing concentrations of greenhouse gases in the atmosphere such as carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$). This has secondary consequences through its contribution to climate change impacts.

The design refinement has resulted in revised greenhouse gas of approximately 290,500t/$CO_2$-e, which is a 22% increase greenhouse gas emissions since the EIS. This is due to all dredge material being placed on land requiring more trips by onsite machinery to deliver dredged material to the reclamation area.

Onsite machinery has increased substantially by 137% due to increases in land reclamation from 100 ha to approximately 150 ha. Capital dredging emissions have increased by approximately 9%as capital dredging works are taking place over a longer period of time, requiring more energy consumption from dredgers.

Project emissions from embodied energy now comprise 5% less than the EIS, and emissions from transportation of material now comprises 17% less of the total compared with the EIS; primarily as the material quantities remained mostly the same whilst other emissions increased thereby changing the proportion of emission sources.

A number of actions to reduce greenhouse gas emissions associated with the PEP are contained within the Construction EMP.

## 29.4 Cumulative Impacts

A number of submitters sought more information on how project impacts would compare to impacts on Outstanding Universal Value (OUV) resulting from other stressors (such as cyclones, bleaching, and catchment runoff) impacting the study area and Great Barrier Reef in general, and what consideration should be given to the timing of the project with respect to other stressors impacting sensitive ecological receptors.

In response to submissions, the cumulative impact assessment was revised to be consistent with the GBRMPA *Framework for Understanding Cumulative Impacts Supporting Environmental Decisions and Informing Resilience-Based Management of the Great Barrier Reef World Heritage Area*.

The cumulative impacts assessment has identified the key other stressors acting on sensitive ecological receptors, assessed their relative roles and impacts and investigated the relative timing of different stressors.

The key results from this revised Cumulative Impact Assessment are as follows:

- Research suggests that the near-shore environment of the GBR, including Cleveland Bay has featured relatively high turbidity over geological timescales (pre European settlement). The availability of large relic sediment stores in the study area resulting in frequent periods of elevated turbidity as local winds and tidal currents routinely re-suspend these 'old' sediments.
- Post European settlement has seen significant development of the GBR catchment. This has resulted in increased loads of fine sediments entering the GBR lagoon. The majority of these sediments are thought to fall out of the water column and be deposited near river mouths. Ongoing sediment transport can transport some of these away from river mouths although these volumes are thought to be small by comparison to the existing sediment stores.
- The near-shore environment of the GBR, including the sensitive ecological receptors in the study area, are routinely impacted by stressors, including cyclones, CoTS outbreaks and bleaching events.
- The impacts predicted by the PEP are generally considerably less than impacts occurring from other stressors.
- The timing of capital dredging using a TSHD should consider major events such as bleaching or cyclones that impact the study area and occurred over the previous wet seasons.

The main recommendation from this revised Cumulative Impact Assessment is consideration should be given to the state (and relative resilience) of sensitive ecological receptors in the study area prior to capital dredging being undertaken. The risk management actions outlined in the Dredge Management Plan (Appendix B1) should be undertaken prior to capital dredging being undertaken. In particular trigger levels for managing the impacts of dredging need to be cognisant of the bio-condition of sensitive ecological receptors at the time of dredging activities.

## 29.5 Outstanding Universal Values

The GBR was declared a World Heritage Area in 1981, internationally recognised by the World Heritage Committee for its Outstanding Universal Values (OUV). It is listed for all four natural criteria (vii), (viii), (ix) and (x) as follows:

- Criterion vii - Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance
- Criterion viii - Be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features
- Criterion ix - Be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals
- Criterion x - Contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

UNESCO undertook a reactive monitoring mission in 2012 at the request of the World Heritage Committee at its 35th session in Paris. The mission assessed the state of conservation of the GBRWHA and the resulting report concluded that while the overall OUV has likely been maintained, the environmental quality of parts of the Great Barrier Reef ecosystem have declined since the time of inscription in 1981.

In response to the UNESCO mission, a comprehensive Strategic Assessment of the GBR WHA and adjacent coastal zone was undertaken by the Australian and Queensland Governments between 2012 and 2014. The assessments were carried out under Part 10 of the EPBC Act and form part of the Australian Government's response to the World Heritage Committee's concerns about development impacts on the Great Barrier Reef World Heritage Area.

In response to the threats posed to the Great Barrier Reef World Heritage Area, the Australian Government and Queensland State Government have drafted the *Reef 2050 Long-Term Sustainability Plan*. The Plan outlines measures for identifying, protecting, conserving, presenting and transmitting of the Reef's OUV for future generations.

Since the EIS was released there has been substantial further guidance provided about the OUV of the Great Barrier Reef including finalisation of EPBC Act referral guidelines published by the Australian Government, Department of the Environment. These guidelines have been used in the re-assessment of the Project and in responding to submitters' issues and concerns.

Submitters sought information on how the Project may impact OUV of the GBRWHA. This assessment has found with respect to impacts on the Attributes of the WHA that the proposed project is:

- not likely to significantly detract from the present natural beauty of the property (Criterion vii)
- is not likely to have an adverse impact on key interrelated and interdependent elements and their natural relationships (Criterion viii)
- significant impacts to the area's ecosystems and biodiversity are not expected but there will be highly localised impacts on soft sediment habitat (permanently removed by reclamation) and temporary impacts on other key receptors through changes to water quality as a result of dredging (particularly seagrass and coral communities). These impacts on water quality will be monitored as part of both reactive and long term ecosystem monitoring outlined by the Project EIS and in accordance with mitigation and monitoring commitments set out in the Dredge Management Plan. Environmental offsets are also proposed to address residual impacts from the proposal on ecosystems and biodiversity. (Criterion ix)
- the Project will not remove or have flow on effects on habitats required to maintain the diversity of fauna and flora in the WHA (Criterion x).
- While there will be permanent benthic habitat loss as a result of the reclamation area, the area of temporary benthic habitat loss from capital dredging will be reduced by 1,140 ha (area of DMPA) compared to the EIS as a result of the revised design in the AEIS (which no longer includes marine placement of capital dredge material at the DMPA) (Criterion ix).

In relation to retaining the Integrity of the WHA, the project is:

- not expected to cause additional loss to any whole OUV element (Wholeness Criterion)
- while there will be a reduction in the size of the WHA property by 0.0004%, with the proposed mitigation and offsetting the Project is not expected to reduce the WHA's outstanding value (Intactness Criterion)
- some adverse effects are predicted, namely turbidity and sedimentation impacts to seagrass which are expected to be minor, temporary and localised as a result of the proposed dredging and temporary (sub-lethal) impacts to some coral communities on the north east coast of Magnetic Island are possible. Preventing these impacts will be a major focus of the reactive monitoring program with the implementation of corrective mitigation measures by the dredge if ecological trigger limits are reached.

Coupled with the cumulative impacts assessment findings and this section's assessment of compliance with the Strategic Assessment and the 2050 Plan, the revised PEP is considered to be consistent with policy frameworks at the Commonwealth and State level, most notably the Project:

- is in a priority port development area (Actions WQA6 and EBA10).
- has taken into account national and international requirements and guidelines for the disposal of dredged material and has maximised the placement of material in the reclamation, removing the need for sea placement and therefore removing the impact of re-suspension of placed material (WQA7).
- includes a dredge management strategy that prioritises beneficial re-use of dredged material and includes a range of measures (reactive monitoring program, timing of the works) to minimise impacts on Reef water quality and ecosystem health (Action WQA8)).
- includes commitments to environmental research, monitoring and on ground actions as part of the environmental offset proposal that support protection, restoration and management of coastal ecosystems that contribute to reef health and resilience (Action EHA3).

## 29.6 Offsets

Offsets proposed in the EIS to counteract potential residual impacts of the PEP on Matters of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) were re-assessed in the AEIS to consider additional field studies and baseline information, , the design refinement and legislation and policy changes.

The AEIS found that impacts associated with the design refinement are expected to be less than identified in the EIS and with the implementation of proposed mitigation measures that the PEP is not expected to have a significant residual impact on any MNES or MSES.

In this circumstance, environmental offsets proposed for the PEP are not strictly required to be implemented within the meaning and scope of Commonwealth and Queensland offset policies. POTL however, have committed to implementing the offset initiatives outlined in AEIS if the Project is approved on the basis that:

1) The offset proposal will contribute to the PEP delivering positive conservation outcomes and a net environmental benefit, recognising the current condition and low resilience of the GBRWHA;

2) This forms part of a contingency offsets plan. That is offsets that are to be implemented as a contingency measure if unexpected impacts occur during project construction or operational phases. In this context, the proactive implementation of offsets under the PEP as outlined in the EIS and this chapter of the AEIS provides a 'banked' offset for future use should it ever be required and improved understanding and resilience for Cleveland Bay.

Based on the response to submissions, the key offset initiative from the EIS that are proposed to be carried forward in the AEIS for consideration as part of the Final EIS as follows:

- In partnership with the Queensland Department of Agriculture, Fisheries, Forestry (DAFF), instigating and supporting a proposal to provide additional legislative protection to an area of 1,240 ha of intertidal and subtidal benthic habitat in Cleveland Bay through a proposed amendment to the Cleveland Bay Fish Habitat Area under the *Fisheries Act 1994* (including over 620 ha of habitat outside of the marine park in the Port Exclusion Area).
- Contribution of a one off administrative grant to the Queensland Government to accommodate the expansion of the FHA as well as funding for the management and enforcement of the expanded FHA (with a total funding commitment of $150,000).
- Committing funding to on-ground actions and research to improve water quality entering the GBR lagoon in the region (through the NQ Dry Tropics Sustainable Agriculture Program and other projects that are recognised under the Reef Water Quality Protection Plan 2013).
- Committing funding to the establishment and operation of a long term ecosystem health monitoring program for Cleveland Bay and core funding for associated surveys of seagrass, corals, and megafauna.

As outlined in the EIS, the offset funding commitments for the above actions remains at a total of $6.15 million.

If the Project is approved, it is expected the Port will discuss with regulators, confirm the offsets package or modify accordingly to achieve best outcomes and develop a legally binding offset agreement with the relevant regulatory agencies to clarify the offset commitments set out above as well as develop a timetable and implementation plan for delivery.

This will include consideration of appropriate staging of offset commitments given the long term focus of the proposed Project over a 20+ year horizon. This may include the 'banking' of offset investment made in the short term to ensure such actions and activities are included for consideration as part of future stages of the work.

Where required, the offset agreement will also include any additional requirements or commitments imposed as part of any conditions of approval for the Project.

## 29.7 Environmental Management Plans and Strategies

Numerous technical investigations have been undertaken based on the revised design and the revised impact assessments documented in Sections 3.0 to 27.0 of the AEIS. Mitigation and management measures identified in the EIS have also been reviewed and revised where appropriate to address identified risks accordingly.

An environmental risk management approach underpins the Project to apply an environmental safety net. This approach ensures that environmental risks are able to be effectively managed throughout the construction and operation of the PEP.

The first tier of risk management (Tier 1) focuses on the impact assessment investigations. This includes collecting relevant baseline data, and configuring and applying a set of numerical or computer models in order to estimate the potential impacts and environmental risks. The risks identified as requiring management became the focus of a set of mitigation (or environmental safety) actions which are documented in the EIS.

A design refinement process was subsequently undertaken in response to submissions and changes to Commonwealth and State policy and legislation, and to further reduce the potential environmental risks related to impacts to the Great Barrier Reef Marine Park and World Heritage Area. This resulted in revising the proposed dredge methodology and increasing the proposed reclamation area to capture all dredge material, thereby avoiding placement of capital dredge material at sea.

Further impact assessment studies were undertaken to consider the design refinement, and reconsider Tier 1 mitigation measures. The residual project risks were then assessed by evaluating the potential impacts following the application of these Tier 1 mitigation actions. The scale of residual risks determines the requirement for Commonwealth or State environmental offsets. No significant residual impacts were predicted for Matters of National Environmental Significance, or Matters of State Environmental Significance.

The condition of sensitive ecological receptors in the marine environment generally wax and wane over time primarily as a result of regional and global drivers such as extreme wet seasons, cyclones, and disease outbreaks, or bleaching events. Recognising the long lead-times for implementing large infrastructure projects, knowledge of ecological processes is anticipated to continue to develop over time. Further detailed information will also become available as a result of geotechnical investigation and as the detailed design progresses.

In order to manage the risk posed by changing environmental conditions and stakeholder expectations, a second Tier or environmental risk management measures has been proposed. This involves a re-assessment of the environmental risks immediately prior to major dredging operations, a reactive monitoring program to monitor impacts during the dredging operation, and an oversight governance arrangement, including an Oversight Committee, Technical Advisory Committee, and a Dredging Implementation Committee. These management measures are described in the Dredge Management Plan.

The Construction Environmental Management Plan and Operational Environmental Management Plan similarly manage key environmental risks associated with the non-marine related impacts.

This tiered approach to environmental safety represents current best-practice environmental management and provides a high level of certainty that the environmental risks can continue to be identified and appropriately managed.

The revised PEP management plans include:

- Dredge Management Plan.
- Construction Environmental Management Plan
- Operational Environmental Management Plan

The Environmental Management Plan (Overview), Vessel Traffic Management Plan Construction and the Maritime Operations Management Plan have not been revised and are provided in Part C of the EIS. Vessel masters will be required to meet specific Vessel Traffic Management Plans for each stage of the Project.

The revised plans are contained in Appendix B of the AEIS. In assessing the final EIS, these documents replace the previous plans that were presented in the EIS documentation.

## 29.8 Conclusion

The Port of Townsville is a long-established seaport that is significant to the history and development of Townsville and the wider North Queensland region. The Port was established in 1864 and is also recognised by the Queensland Government as one of the four Priority Port Development Areas along Queensland's coastline.

In order for the Port to continue to service its customers effectively, the Port must remain internationally competitive and able to accommodate expected medium to long term changes to vessel sizes and shipping requirements. To accommodate larger and wider vessels, there is a requirement to enlarge the existing channel.

The PEP EIS design (as part of the EIS released for comment in 2013) proposed to achieve future expansion through the deepening of the existing channel which would have resulted in the existing channel extending into the Great Barrier Reef Marine Park - General Use Zone, and included disposal of capital dredge material offshore, as well as partial reuse of dredge material in the reclamation.

A design refinement process initiated as part of the AEIS process has considered submissions received during the consultation period as well as significant changes that have occurred in government policy and legislation since the EIS was completed, prohibiting capital dredge material placement offshore.

The potential impacts from the Project have been assessed in this AEIS.

The key findings of the revised impact assessment in the AEIS are that the impacts associated with the Project are expected to be similar to or less than that identified in EIS. This has been achieved through:

- Avoiding at-sea disposal of dredge material by relocating all capital dredge material within the reclamation for beneficial re-use.. This change to the design also avoids temporary impacts from capital dredge placement on approximately 1,140 ha of benthic environment within the offshore Dredge Material Placement Area but will result in an expanded outer harbour reclamation footprint
- Avoiding direct impact on the seabed within the Great Barrier Reef Marine Park - General Use Zone by widening the channel design and only partially deepening the channel.
- Modifying the dredging methodology to reduce the bulking factor for dredged material in order to reduce the size of the reclamation area required to manage material during dewatering and consolidation. This change to the dredge methodology will also help to minimise turbidity impacts during capital dredging and during the release of dredge tailwater from the reclamation.
- Developing additional mitigation measures to manage Matters of National Environmental Significance and Matters of State Environmental Significance as outlined in the revised environmental management plans including:
    - Implementation of a reactive monitoring program that will trigger corrective actions by the dredge if water quality trigger points are exceeded.
    - Timing of the capital dredging using TSHD within preferred ecological windows including, taking into account periods of low resilience.

The AEIS found that impacts associated with the design refinement to MNES or MSES are expected to be less than identified in the EIS and with the implementation of proposed mitigation measures that the PEP is not expected to have a significant residual impact on any MNES or MSES.

While significant residual impacts are not expected, POTL remain committed to implementing the environment offset initiatives outlined in AEIS if the Project is approved. The offset proposal will contribute to the PEP delivering positive conservation outcomes and a net environmental benefit, recognising the current condition and low resilience of the GBRWHA.

With the application of the proposed environmental risk based approach and effective implementation of the proposed mitigation measures, it is considered that the potential impacts associated with the construction and operation of the PEP can be appropriately managed.

Taken together, the EIS and the AEIS comprehensively describe the baseline conditions and potential impacts from the project as well as documenting the refinement to the design to achieve consistency with Government policy and legislation as it pertains to the Great Barrier Reef World Heritage Area If approved, the Project will play an important role in facilitating economic development and greater regional prosperity in a manner that is consistent with the Sustainable Ports Development Act.