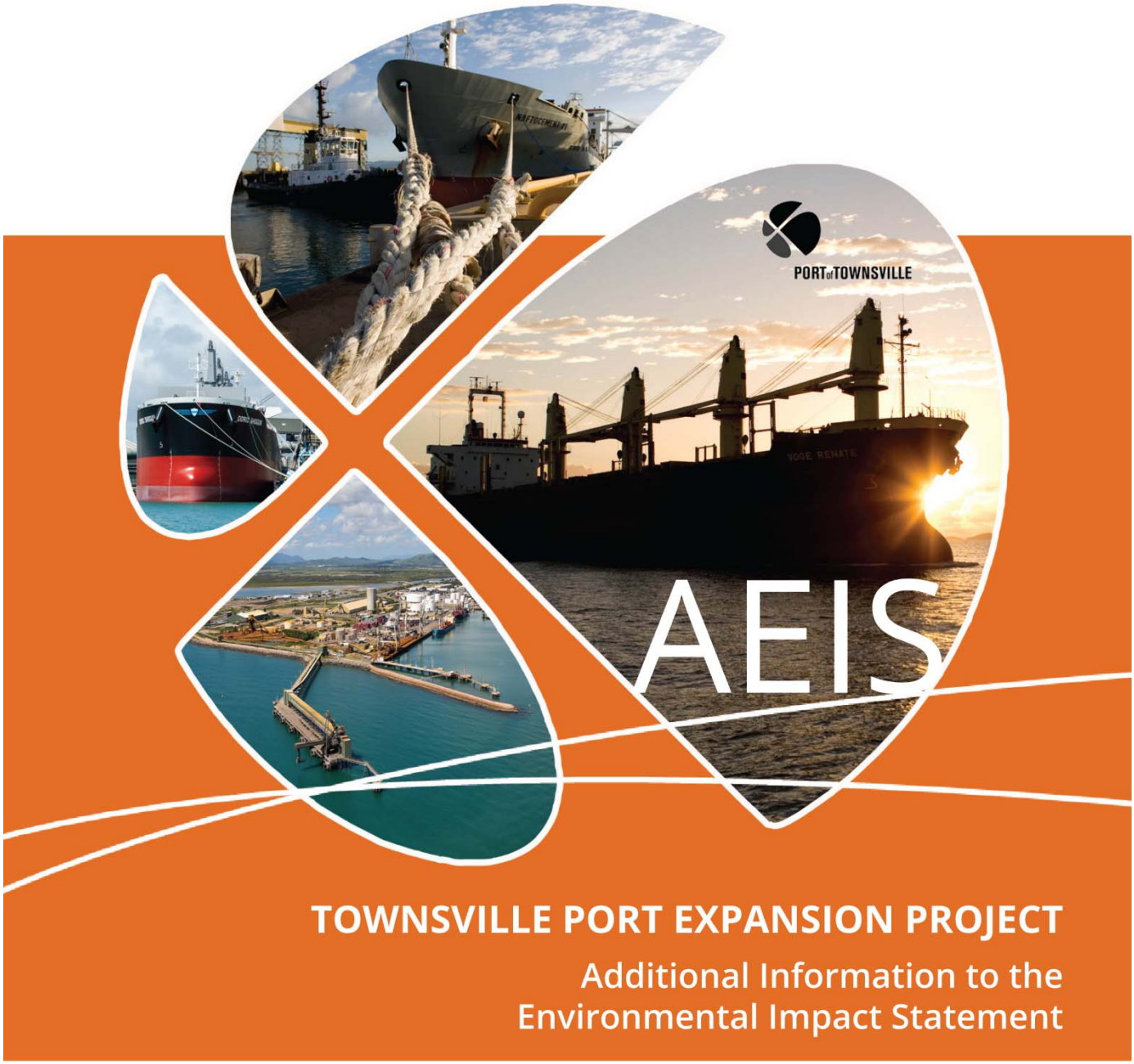

TOWNSVILLE PORT EXPANSION PROJECT

Additional Information to the Environmental Impact Statement

TOWNSVILLE PORT EXPANSION PROJECT

SECTION 3

Land

AECOM BMT WBM

3.0 Land

3.1 Introduction

Land values of the Project area and surrounds are discussed in Chapter B.1 (Land) of the Environmental Impact Statement (EIS) for the Port of Townsville Limited (POTL) Port Expansion Project (PEP). The PEP is expected to support and facilitate the expansion of existing port land uses and provide opportunity for further growth of Townsville's trading capabilities. It is not expected to significantly impact upon the values of surrounding land.

Soils beneath the Project area are sub-tidal marine sediments and are broadly characterised as a soil profile composed of two strata being, Holocene sediments of approximately 1 m to 1.5 m on the seabed in the outer harbour and reclamation areas and in the order of 0.5 m to 1.0 m in the Platypus Channel and Sea Channel (sediments were typically soft/loose) and Pleistocene deposits comprised of harder sandy clays and sands.

Limited testing of the sediments confirmed the presence of potential acidity in the Holocene sediments from the dredge and reclamation areas. These sediments display characteristics typical of potential acid sulfate soils (PASS) (i.e. generally dark grey, saturated clays and silts). These sediments also generally contained calcareous materials which provide suitable neutralising capacity in excess of acid generating potential. Pleistocene deposits were considered to have a low potential to be PASS.

This section provides information to address submissions received in response to the EIS relevant to land values. More specifically, key matters raised from the submission process include:

- consideration of the State government planning reforms
- adequate consultation with Department of Justice and Attorney-General
- consideration of the Townsville State Development Area (TSDA) Opportunity Strategy
- sources of quarry materials and permit requirements
- adequacy of data to assess the extent of PASS
- release of acidity from offshore PASS disposal and re-suspension
- management of PASS in the reclamation area
- emissions from anoxic sediments.

3.2 Response to Submissions

3.2.1 Consideration of State government planning reforms

The Department of Infrastructure, Local Government and Planning advised the need to consider State Planning Policy (SPP), State Assessment and Referral Agency (SARA) and changes to the State Planning Regulatory Provisions concerning coastal management.

The Department of Environment and Heritage Protection also suggested that clarification be sought on which SPP applies to the EIS. Since the EIS, several changes to the development assessment process in Queensland have occurred. Changes include the formation of SARA, a single State referral agency for assessable development matters (through the State Development Assessment Provisions) under the *Sustainable Planning Act 2009*; and the adoption of the SPP which outlines provisions for the assessment of development in regards to matters of State interest. Both of these tools provide provisions include those pertaining to coastal management.

State government planning reforms and relevance to the PEP are further discussed in Section 1.0 of the AEIS. Changes to the SPP and coastal management provisions do not affect the PEP at this stage; however, they will need to be considered as part of any assessable development triggered under the *Sustainable Planning Act 2009*.

3.2.2 Consultation with the Department of Justice and Attorney-General

The Department of Justice and Attorney-General raised the need to consult with the department where there is likely to be workplace, health or safety requirements for handling Schedule 15 chemicals under the *Work Health and Safety Regulation 2011*.

Detailed requirements for the design or operation of the PEP will be completed in the detailed design and approval stages for the Project. The Project is to be designed in accordance with the relevant standards and industry practice procedures applicable at the time. Specific hazardous chemical installations are unlikely to be relevant to the PEP and are expected to be dealt with under specific-development approvals for future activities, separate to the PEP.

Workplace practices involving hazardous materials are administered by the Department of Justice and Attorney-General and will be the responsibility of the construction contractors in accordance with any legislative requirements that may apply at the time.

3.2.3 Consideration of Townsville State Development Area Opportunities Strategy

Three submissions raised the need to consider the TSDA Opportunities Strategy and draft proposed amendments to the Development Scheme for the TSDA.

POTL acknowledges the strategic role that the TSDA plays in the ability of the Port of Townsville to meet increased trade demands and recognises the need to consider the TSDA Opportunities Strategy in any expansion of operations. The PEP is consistent with the strategic direction of the revised TSDA Development Scheme. It is anticipated that the future industry within the TSDA will be closely aligned with the Port as potential customers / users of port facilities.

3.2.4 Sources of quarry materials and permit requirements

The Department of Agriculture and Fisheries highlighted the potential need for a Sales Permit to be obtained for quarry material on land reserved to the State government. A number of options are available to the Project for sourcing rock material, including the purpose planned Granitevale Quarry. POTL will ensure that all relevant permits and approvals are obtained prior to commencing construction activities.

The Department of Natural Resources and Mines requested assessment of the impact of potential depletion of extractive resources in the local area. POTL is in the final stages of obtaining development approval for the Granitevale Quarry to supply armour rock and material for the Project. POTL will supplement with material from other quarries where required, but is not anticipating to have a significant impact upon the availability of quarry materials in the region.

3.2.5 Adequacy of data to assess the extent of PASS

Six submissions raised the adequacy of available data to assess the extent of PASS. It is acknowledged that the Golders (2012) Desktop Report was a review of limited available PASS analysis and the need for further PASS investigation prior to dredging was recommended. Whilst the amount of PASS analysis on samples was limited, the available geotechnical information was substantial and suitable to provide a high level of confidence of the interface between younger Holocene sediments and older, stiffer Pleistocene deposits. The approximate in-situ volumes of Holocene and Pleistocene materials to be dredged and used for reclamation, based on the revised design, are summarised in Table 3.1 to Table 3.4.

The limited PASS analysis conducted to date for this Project and historical results from other PASS investigations in and around the port, provide clear evidence that the Holocene sediments are PASS, regardless of available neutralising capacity. Therefore, the need for PASS mitigation and/or management measures will apply to these materials. Pleistocene deposits are expected to have a low potential to be PASS and limited testing on these soils conducted to date has confirmed these expectations. Additional detailed testing of Holocene and Pleistocene deposits will be included in the sediment Sampling and Analysis Plan.

The assessment below is based on the anticipated typical Holocene layer thicknesses described above. It is possible that a larger volume of Holocene sediments are encountered when dredging commences. A broad review of geotechnical data indicates that this could be about 26% of the total dredged volume, in the order of 2.96 million m^3. The reclamation area has been sized on this basis to allow for potentially larger volume to be managed if required.

Table 3.1 Stage 1 – Channel Widening and B12 Basin and Pocket

	Insitu Volume of Material by Type (m^3)		TOTAL
	Holocene	Pleistocene	
Removal of soft sediments under reclamation perimeter structures	260,000	0	260,000
Channel Widening	600,000	3,300,000	3,900,000
B12 Basin & Pocket	200,000	1,200,000	1,400,000
TOTAL	**1,060,000**	**4,500,000**	**5,560,000**

Table 3.2 Stage 2 - Outer Harbour B14 Basin, B15 Basin and B16 Basin

	Insitu Volume of Material by Type (m^3)		TOTAL
	Holocene	Pleistocene	
Removal of soft sediments under reclamation perimeter structures	180,000	0	180,000
B14 Basin	190,000	1,000,000	1,190,000
B15 Basin	140,000	700,000	840,000
B16 Basin	240,000	1,300,000	1,540,000
TOTAL	**750,000**	**3,000,000**	**3,750,000**

Table 3.3 Stage 3 – Channel Deepening and Berth Pockets B17 and B18

	Insitu Volume of Material by Type (m^3)		TOTAL
	Holocene	Pleistocene	
Channel Deepening	190,000	1,800,000	1,990,000
B17 & B18 Berth Pockets	40.000	40,000	80,000
TOTAL	**230,000**	**1,840,000**	**2,070,000**

Table 3.4 Total All Stages (1,2 & 3)

	Insitu Volume of Material by Type (m^3)		TOTAL
	Holocene	Pleistocene	
Stage1	1,060,000	4,500,000	5,560,000
Stage 2	750,000	3,000,000	3,750,000
Stage 3	230,000	1,840,000	2,070,000
TOTAL	**2,040,000**	**9,340,000**	**11,380,000**

3.2.6 Release of acidity from offshore disposal and/or re-suspension of PASS

Six submissions raised the generation and release of acidity arising from offshore disposal and/or re-suspension of PASS. Four submissions specifically referred to soil contact with "100% oxygenated water" and the resulting formation of low pH conditions. Offshore disposal of any material is no longer proposed. All dredged materials including PASS material will be placed within a contained reclamation area at the Port. The comments below address the matter in the context of the proposed reclamation area.

Once left undisturbed and submerged in an anoxic environment, pyrite (in acid sulfate soil) is chemically inert. Pyrite oxidizes in the presence of oxygen and hydrogen to form sulfuric acid. There are a number of variables affecting the oxidation of pyrite, and the reactions are complex, although the rate at which pyrite is oxidised tends to be closely linked with pH, with oxidation increasing as pH decreases, and is usually only limited by the rate of supply of oxygen.

When PASS is excavated and allowed to dry, an almost infinite supply of atmospheric oxygen at relatively high concentrations (21 %) is available. The oxygen is delivered to the soil via advection and diffusion. Under this scenario there is a high potential to generate acid.

When PASS is saturated, the available supply of oxygen is significantly lower (typically 9 ppm). In still water, the oxygen is delivered to the soil surface via diffusion at a very slow rate and the risk of acid generation is low. In dynamic, open water bodies (such as Cleveland Bay), the oxygen is principally delivered via advection to suspended soil particles (either through natural processes or dredging activities) and oxygen delivery via diffusion to bottom sediments is negligible. The risk of acid generation is variable and dependent upon the rate and duration of suspension.

Seawater contains the major buffering constituents - bicarbonate and carbonate in solution. When acid is generated the neutralising reaction occurs instantaneously. In an open marine environment, the available buffering capacity is immense and surrounds the suspended soil particles. Therefore, any acid generated by this process is immediately neutralised and does not pose a risk to the surrounding environment.

In open marine environments (dredge areas), the alkaline and relatively stable pH of seawater results in a slow rate of pyrite oxidation and the greatest risk of acid generation is associated with suspended or resuspended sediments. At the reclamation area, the majority of the dredged spoil will settle to the floor of the reclamation area and return to an anoxic, reducing state. The risk of pyrite oxidation during dredging and transportation to the reclamation area will be mitigated by maintaining the spoil in a saturated state and limiting the time period between dredging and placement at the reclamation area.

As further evidence of the above processes and potential impact on the floor of Cleveland Bay is covered with Holocene PASS soils, this will be similar to those dredged by PEP. Cleveland Bay is naturally turbid with wind driven re-suspension of fine seabed sediment over a significant broad scale area. There is no evidence from historical water quality measurements that indicate acidification has resulted from these natural re-suspension processes.

3.2.7 Management of PASS in the reclamation area

Four submissions raised the management of PASS in the reclamation area. Response details are provided below. Further clarification was requested from one submission regarding the removal and placement of soft Holocene material within the reclamation area. The soft Holocene sediments are to be removed from under revetment footprints only and not the entire reclamation area footprint. The soft sediments need to be removed in these areas to provide a firm and stable foundation for the bunds to contain reclamation material. The revetments will provide lateral containment for the placement of dredged Holocene and Pleistocene materials and prevent release into the surrounding area. As discussed in Section B.1.4.1 and B.1.5.1 of the EIS, a detailed Acid Sulfate Soils Management

Plan will be developed during the pre-construction planning of the Project and will be implemented during construction of the PEP.

Submissions also raised the potential for PASS materials to be placed above LAT in the reclamation area and the need for treatment of such materials. One of these submissions also raised the process of discharging and settling spoil into the reclamation area could redistribute fine and coarse materials and create acid generating hotspots not reflective of the current net acidity results. In response, the proposed volume of dredged Holocene (PASS) sediments to be placed in the reclamation area at various stages under the revised design is approximately 2 million m^3 (insitu). This is equivalent to a thickness of about 0.7 m across the reclamation area and can easily be accommodated below LAT within this area volumetrically. This is the preferred method of managing PASS as it requires minimum treatment effort.

Dredging placement of these materials can be managed and topographically surveyed to confirm the placement below LAT. Where placement below LAT is confirmed then there is a low risk of future acid generation and additional management/monitoring is not required. If confirmed that the placement of Holocene sediments below LAT cannot be accommodated, then such materials will be characterised at a sampling frequency of not greater than 1 per 1000 m^3 to confirm the potential PASS risk. Dependent upon the level of indicated risk, management measures will be implemented which may range from groundwater monitoring to re-excavation and lime treatment of these materials to ensure that hotspots are avoided. Whilst this method of treatment is also effective in managing PASS, due to high labour and cost associated with this approach, it is not preferred. POTL has managed and treated PASS during a number of dredge campaigns and has a high degree of experience in management of this issue. Should PASS be identified in Pleistocene deposits during future testing conducted as part of the detailed sediment Sampling and Analysis Plan, then additional treatment and management measures will be developed.

The potential for PASS materials within the reclamation area to generate and discharge acid and metals to surface waters was also raised in submissions. In response, keeping dredged PASS saturated and placement below LAT in the reclamation area should result in a low potential for acid generation and subsequent metals mobilisation. As part of management measures, the pH and dissolved oxygen of waters within the reclamation areas and tailwaters will be monitored. Where a decline in these parameters is observed, water treatment measures will be implemented.

An Acid Sulfate Soils Management Plan will be developed 3 months prior to construction. This will be undertaken in consultation with the Department of Environment and Heritage Protection to quantify the PASS risks and provide clear management and outcomes.

3.2.8 Emissions from anoxic sediments

NQ Dry Tropics commented that consideration should be given to emissions (such as methane release) that may arise as a result of disruption of anoxic organic sediments.

Methane (CH_4) is a significant “greenhouse” gas and it has long been documented that atmospheric concentrations have been increasing steadily over time (e.g. Blake and Rowland, 1988). Methane releases from paddy soils or thawing permafrost are considered to be a significant terrestrial sources to the atmosphere (e.g. Shakhova *et al*., 2010); whereas contributions from oceanic sediments are comparably insignificant to the atmospheric methane budget (Cicerone and Oremland; 1988). This is mainly due to minimal methane production in shallow marine sediments and/or subsequent oxidation in the overlying water column (Whiticar, 1999). Nonetheless, methane production is predominant in deeper marine sediments and it is possible that this greenhouse gas could be emitted from dredge spoils from Cleveland Bay.

Methane production, aka methanogenesis, occurs through fermentation of organic substrates or reduction of carbon dioxide (CO_2), both of which are biologically mediated by bacteria. The stoichiometry of these two reactions is as follows:

Acetate fermentation: $CH_3COO^- + H^+ \rightarrow CH_{4(aq)} + CO_2$

CO_2 reduction: $CO_{2(aq)} + 4H_{2(aq)} \rightarrow CH_{4(aq)} + 2H_2O$

In organic-rich marine sediments, methanogenesis is severely inhibited by the presence of sulfate. Sulfate is the third most abundant ion in seawater and the labile organic carbon in marine sediments is typically consumed by sulfate reduction as opposed to acetate fermentation. As such, the dominant methanogenic pathway in marine sediments is CO_2 reduction by hydrogen (H_2). However, this reaction cannot occur in the presence of sulfate as the sulfate reducing bacteria (SRB) out-compete the CO_2 reducing bacteria (methanogens) for the H_2. For this reason, methane is rarely observed in shallow portions of the marine sediment column (Whiticar, 1999).

The presence or absence of methane in dredge spoils from Cleveland Bay will depend on whether methanogenesis is occurring within the dredging horizon. As discussed above, this will depend on the balance between the rates of sulfate supply vs. sulfate reduction in the pore waters of Cleveland Bay sediments. If found to be emitted from stockpiled dredge spoils, the quantity will be very minor in scale relative to greenhouse gas emissions from the combustion engines used to power the dredging equipment.

3.3 Revised Environmental Impact Assessment

3.3.1 Legislation and policy

3.3.1.1 Contaminated land

Provisions for contaminated land assessment development have been revised under the *Sustainable Planning Act 2009*. Under the *Sustainable Planning Act 2009*, a compliance assessment is required for any material change where all or part of the premises are listed on the State Contaminated Land Register or Environmental Management Register. This requirement may affect future tenants and their operations if development is proposed on land identified on these registers.

Under the *Sustainable Planning Act 2009*, the Department of Infrastructure, Local Government and Planning is now the concurrence referral agency for any contaminated land referrals with new relevant assessment criteria contained in the SPP, State Development Assessment Provisions (SDAP) and *Queensland auditor handbook for contaminated land module 5; Contaminated Land investigation documents, auditor certification and compliance assessment; Part D*. Changes to contaminated land assessment processes are largely administrative and are not expected to significantly impact upon the PEP. Future development of the extended reclamation area is expected to be affected by the changes and will be addressed in separate approvals to be submitted by the relevant proponent at the time.

Amendments to the Commonwealth National Environment Protection (Assessment of Site Contamination) Measure (NEPM) were registered by the Ministerial Standing Council on Environment and Water on 15 May 2013 with the existing NEPM being repealed on 17 May 2013. The changes related to new content and greater detail in the technical guidelines regarding site assessments. The types of assessment that are likely to apply to the PEP under the NEPM largely remain the same and will not change the effects on the PEP.

There are no other Commonwealth or State legislative or policy changes, which are likely to significantly affect the PEP contaminated land assessments or approvals.

3.3.1.2 Acid sulfate soils

There are no legislation or policy changes since submission of the EIS relevant to the assessment of PASS. It is noted that the *Queensland Acid Sulfate Soils Technical Manual – Soil Management Guidelines V4.0* has been released since submission of the EIS. Mitigation measures proposed in the Construction and Operational Environmental Management Plans have considered these guidelines.

3.3.1.3 Land Use and Tenure

The legislative and policy implications affecting strategic and statutory land use directions of the two governments are summarised in the following discussion.

Great Barrier Reef Region Strategic Assessment

The Commonwealth government *Great Barrier Reef (GBR) Region Strategic Assessment Report 2014* has provided a framework for the revised assessment of the values and protective needs of the Great Barrier Reef. This included a complementary assessment by the State of Queensland for State coastal waters. This assessment identified the need to protect the Great Barrier Reef while allowing sustainable port development to proceed in clearly defined priority areas. The Queensland Ports Strategy identifies the Port of Townsville as one of the Priority Port Development Areas for further port development. The PEP is consistent with this policy approach of the Queensland government.

Other outcomes from the strategic assessment of the GBR to date, do not significantly impact upon the EIS requirements of the PEP.

Detailed Development Assessment Provisions

There is a range of detailed land use and environmental based assessment provisions that have been introduced since the writing of the PEP EIS. Most notably is the integration of various SPPs into a single SPP, which clearly identifies specific matters of State interest and further detailed code assessment provisions for assessable development and referral requirements through Queensland's SDAP.

The SDAP assessment criteria are contained in separate Modules, which are grouped according to state interest categories contained within the SPP. Specific Modules that are likely to be applicable to subsequent approval stages for the PEP under the current legislative framework are summarised in Table 3.5.

Table 3.5 Summary of State Development Assessment Provisions Likely to be Applicable to PEP Development

SDAP Module	Likely Applicability to Revised PEP
Module 4: Environmentally relevant activities	Applicable. The PEP will constitute an environmentally relevant activity (ERA) for dredging and potential screening of dredged material as well as other potential ERAs and a development application for these activities will apply.
Module 5: Fisheries resources	Unlikley Applicable. Marine plant impacts form a key component of the fisheries resources assessment criteria. A permit will apply for the removal of any marine plants if present at the time of construction.
Module 10: Coastal protection	Applicable. Tidal work development associated with the PEP is a referral matter under this Module.
Module 13: Major hazard facilities	Possible. The Port of Townsville is not classed as a major hazard facility, however if any major hazard activites are proposed on Port land, this Module and a referral to SARA is required.
Module 14: Maritime safety	Applicable. Tidal works associated with the PEP are assessable development and are required to be referred to SARA. The PEP will form part of the Townsville Port overall operations and will be designed in accordance with all relevant maritime safety standards and practices in mind.
Module 18: State transport infrastructure protection	Applicable. The primary road and rail corridors to be used are specifically intended to service the Port therefore the PEP is consistent with the intent of the State transport infrastructure.
Module 19: State transport network functionality	Applicable. The PEP is consistent with the intended function of the State transport network consisting of road and rail infrastructure that services the Port.

The PEP is generally consistent with the purpose and the outcomes of the applicable codes. The proposed development will be the subject of more detailed assessment during the detailed design stage. This may include assessable development under State legislation.

Local Land Use Planning Changes

Recent significant local changes have included the adoption of the Townsville City Council's (TCC) new planning scheme – *Townsville City Plan 2014* (City Plan) (TCC, 2014). The City Plan recognises and complements the Port's presence and its intended expansion. While development on Strategic Port Land is not directly affected by the City Plan, the PEP (which is identified in the Port of Townsville Land Use Plan (Port of Townsville Limited, 2013), however, yet to be included as Strategic Port Land) is consistent with the strategic intent of the City Plan.

3.3.2 Design refinement

The project design has been revised as described in Section 2.0 of the AEIS. The revised design is not anticipated to change the impacts on social values described in the Section B.1 (Land) of the EIS.

3.3.3 Supporting studies

No additional studies were undertaken relevant to land values.

3.3.4 Revised assessment

3.3.4.1 Impact assessment

Land Uses

Impacts on land values associated with the revised design are expected to be similar to those identified in Section B.1 (Land) of the EIS with the exception of the channel length reduction. The reduction of the proposed extension to the Sea Channel will reduce potential land use impacts previously associated with encroachment into zoned Marine Park areas.

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.

This is not only reflected in the policy changes in terms of anticipated fewer potential adverse environmental effects but also in terms of a recognition of the port's current and anticipated future role in helping to facilitate other land uses in the region to support economic development, in particular those proposed within the TSDA, supporting a staged demand driven approach encompassed in the PEP

Potential Acid Sulfate Soils

Impacts on land values associated with PASS are similar to those identified in Section B.1 (Land) of the EIS. Additional planning will be required to ensure that these potential impacts are appropriately managed through an Acid Sulfate Soils Management Plan.

The potential impacts associated with the generation and release of acidity from offshore disposal and/or re-suspension of PASS are no longer relevant, as offshore disposal of dredge spoil material is no longer proposed. All dredged materials including PASS material will be placed with a contained reclamation area at the Port.

3.3.4.2 Mitigation measures

Mitigation measures to manage the impact of the Project on land values are outlined in Section B.1.5 of the EIS. No additional measures are considered necessary as a result of the revised design; however minor updates have been made in recognition of submissions and statutory changes.

3.3.5 Summary

The following table provides a summary of the mitigation measures proposed to reduce impacts of the Project on land values.

Table 3.6 Summary of Impact of the PEP on land values

Element	Primary Impacting Process	Updated Risk Rating			Mitigation Measures	Mitigated Risk Rating
		Magnitude	Likelihood of impact	Risk Rating		
Restrictions to recreational fishing in Cleveland Bay	Construction / Operation	Minor	Possible	Low	Provide ongoing awareness of current entry restrictions and POTL plans for maritime activity well in advance of undertaking any works, through POTL's website, newspaper advertisements and temporary signage at boat ramps in Ross Creek and Ross River as may be required.	Negligible
Restriction to boating navigation to and from Ross Creek and Ross River	Construction / Operation	Minor	Possible	Low	Provide ongoing awareness to boating community regarding stages for the PEP and potential effects on recreational and other boating into Cleveland Bay from Ross River and Ross Creek. Inform Townsville boating organisations, including the Townsville Motor Boat and Yacht Club and the Coast Guard, of PEP activity through regular information correspondence. Liaise with Maritime Safety Queensland for any construction activities that may require a Notice to Mariners.	Negligible
Inadequate planning for infrastructure and integration with other providers (e.g. Ergon Energy)	Operation	High	Unlikely	Medium	Review of the Port's strategic trunk infrastructure needs and liaison with TCC to identify water and sewer needs, required capacity, integration requirements, cost, staging and potential funding. Continued engagement with Council (i.e. through informal discussions and negotiations as well as formal submissions during any stakeholder consultation stages) in relation to the finalisation of the Priority Infrastructure Plan as part of the preparation of the new planning scheme and any subsequent amendments to ensure that the Port's needs are reflected accurately and accounted for. Undertake early consultation with Ergon to ensure that adequate electricity planning and augmentation can occur in advance of PEP being ready to 'come online'.	Low
Loss of amenity and increased safety risk to residences and other uses main access routes and identified haulage route due to increase transport and traffic	Construction / Operation	Moderate	Likely	Medium	Impact assessments (Road Impact Assessment, Traffic Operations Assessment) six months prior to construction. Road Safety Audit six months prior to construction. Update the Port Community Forum as required for any transport and safety issues.	Medium
Incompatibility with future land uses along Boundary Street due to inappropriate location of conflicting land uses	Operation	Minor	Possible	Low	Continue engagement with TCC to ensure compatible land uses are established and maintained along Boundary Street.	Low
Loss of amenity at residences and other land uses along the existing rail corridor to the Port in South Townsville and incompatibility with future land use along the alignment of the existing rail yards	Operation	Moderate	Possible	Medium	Work closely with Queensland Rail to identify appropriate trigger points and plan for the development of rail along the Eastern Access Corrdior if it is not already developed prior to the PEP. This will provide sufficient capacity for the PEP rail requirements and will provide an opportunity to address existing port rail efficiency, capacity and amenity matters.	Low

Element	Primary Impacting Process	Updated Risk Rating			Mitigation Measures	Mitigated Risk Rating
		Magnitude	Likelihood of impact	Risk Rating		
Acid sulfate soil oxidation and release associated with transport and placement of dredge material in reclamation	Construction	Moderate	Possible	Medium	Keep dredged materials wet and saturated during transport to reclamation area. Holding times outlined in the Queensland Acid Sulfate Soils Technical Manual will be complied with noting that material will be wet. Sampling of Pleistocene soils in dredge areas to confirm PASS status/management requirements. Placement of PASS dredge spoil in reclamation are below LAT. Survey to confirm top of placed PASS. Where PASS is placed above LAT, sample at 1 per 1000m^3 to confirmed the need for further management measures. Develop an Acid Sulfate Soils Management Plan in consultation with DEHP for management and monitoring of the reclamation area. Include appropriate triggers and protocols eg monitor water quality (pH and DO, minimum) of standing water within the reclamation area and tailwaters prior to discharge. Treat waters, if required.	Low

3.4 Conclusion

The revised PEP is not expected to significantly impact upon land values and surrounding 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. POTL has managed and treated PASS during a number of dredge campaigns and has a high degree of experience in management of PASS to minimise potential environmental impacts. The implementation of mitigation measures described above and in the construction and operational EMPs, show the overall impact to land, including PASS, is considered to remain low.