Risk Register - EIS: Operation Risks

Project name:	Townsville Ocean Terminal
Project number:	QL00704

Created by:	**Matt Smith**
Date created:	**16 Mar 07**
Revised by:	**Matt Smith**
Date revised:	**14 Nov 07**

Reference	Risk	Potential consequences	Original risk			Proposed risk treatment	Residual Risk			Operation Phase Action plans										
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	EMP Element(s)	Disaster Action Plan	Detailed Design	Stormwater Mgmt Plan	Community Title	AQIS	Port Protection Code	Future Applications	WH&S Plan	TOT Operational	TOT Emergency Plan
4.1	**Climate**																			
CL1	Strong winds caused by tropical cyclones or low pressure systems	Injury or death. Destruction/damage to buildings and infrastructure.	Possible	Major	**High**	Building and infrastructure designed to withstand extreme weather. Design category for cyclone rating and breakwaters and land masses designed for Q100 event. Construction Phase Disaster Action Plan includes early warnings for evacuation of personnel and equipment.	Possible	Major	**High**	**10**	**x**	**x**								
CL2	Flooding caused by storm surge	Destruction/damage to buildings and infrastructure	Possible	Major	**High**	Building and infrastructure designed to withstand extreme weather. Disaster Action Plan. TOT Emergency Plan.	Possible	Minor	**Low**	**10**	**x**	**x**								**x**
CL3	Flooding caused by heavy rainfall	Destruction/damage to buildings and infrastructure	Possible	Major	**High**	Building and infrastructure designed to withstand extreme weather. Disaster Action Plan. TOT Emergency Plan.	Possible	Minor	**Low**	**10**	**x**	**x**								**x**
CL4	Increased sea levels due to climate change	Destruction/damage to buildings and infrastructure	Possible	Major	**High**	Design allowance for water level rise caused by climate change.	Possible	Minor	**Low**			**x**								
CL5	Increased frequency and intensity of cyclones due to climate change	Destruction/damage to buildings and infrastructure	Possible	Major	**High**	Building and infrastructure designed to withstand extreme weather. Disaster Action Plan.	Possible	Major	**High**	**10**	**x**	**x**								
4.2	**Land**																			
LA1	Degradation of water quality due to erosion	Degradation of water quality	Possible	Minor	**Low**	Site fully stabilised and landscaped.	Possible	Minor	**Moderate**	**6**		**x**								
LA3	Degradation of water quality due to existing contaminants in sediment	Degradation of water quality	Possible	Moderate	**Moderate**	Annual monitoring and maintenance dredging.	Possible	Moderate	**Moderate**	**11**										
LA8	Slow consolidation of stockpiled ooze in parkland area	Delay in release of park area of project	Possible	Moderate	**Moderate**	Site fully stabilised and landscaped.	Possible	Minor	**Low**	**6**		**x**								
4.3	**Traffic and Transport**																			
TT4	Degradation of traffic and transport infrastructure	Damage to infrastructure	Possible	Moderate	**Moderate**	Remediation or repair to damaged infrastructure	Possible	Moderate	**Moderate**					**x**						
TT6	Increased operational traffic requires building of bridge	Major cost of contribution to bridge	Possible	Major	**High**	Negotiations to be undertaken with TCC to determine required contribution	Possible	Moderate	**Moderate**											
4.4	**Non-transport infrastructure**																			
IN3	Lighting insufficient for safe operation of Terminal	Infrastructure upgrade required	Rare	Insignificant	**Negligible**	Design loadings calculated and sufficient capacity included in design (lumen levels)	Unlikely	Insignificant	**Negligible**			**x**								
IN4	Unintended discharge of ballast water	Possible issue for investigation	Unlikely	Major	**Moderate**	Emergency Management	Unlikely	Major	**Moderate**	**10**										**x**
IN6	Reduction in water quality caused by stormwater runoff	Degradation of water quality	Unlikely	Moderate	**Low**	Stormwater management plan prepared to ensure water quality objectives are achieved	Unlikely	Minor	**Negligible**	**7**		**x**								
4.5	**Waste**																			
WA2	Excessive material and services resources use during operation	Depletion of natural resources	Possible	Major	**High**	Waste recycling and energy and water saving strategies required by Council (Sustainable Housing Policy)	Possible	Minor	**Low**	**1,8**										
WA3	Emission of liquid wastes to waterways due to poor practices in waste containment, waste transport and stormwater control	Deterioration of water quality and ecological values in aquatic ecosystems	Possible	Moderate	**Moderate**	Stormwater management and waste minimisation management in accordance with EMP	Unlikely	Minor	**Negligible**	**7,8**										
WA4	Emission of solid wastes to land due to poor practices in waste containment, waste transport and stormwater control	Recreational and amenity impacts	Possible	Moderate	**Moderate**	Waste minimisation and management practices for storage and disposal of solid waste in accordance with the project EMP	Unlikely	Minor	**Negligible**	**8**										
WA6	Emission of gaseous and odorous substances to air due to poor practices in TOT Precinct	Human health and odour nuisance impacts	Possible	Moderate	**Moderate**	Air quality control measures during operation of the TOT in accordance with HAZMAT	Possible	Minor	**Low**	**3**									**x**	
4.6	**Water Resources**																			
WR1	Reduction in water quality due to inadequate flushing	Localised eutrophic and/or anoxic conditions causing loss of benthic organisms	Likely	Minor	**Moderate**	Extensive modelling and flushing studies to gain satisfactory water turnover to negate	Unlikely	Minor	**Negligible**	**4**		**x**								
WR2	Reduction in water quality due to inadequate flushing	Localised loss of seagrasses	Likely	Moderate	**High**	Extensive modelling and flushing studies to gain satisfactory water turnover to negate	Unlikely	Moderate	**Low**	**4**		**x**								
WR3	Reduction in water quality due to inadequate flushing	Reductions in food or habitat quality	Likely	Moderate	**High**	Extensive modelling and flushing studies to gain satisfactory water turnover to negate	Rare	Insignificant	**Negligible**	**4**		**x**								
WR4	Reduction in water quality due to inadequate flushing	Localised eutrophic conditions and/or algal blooms causing fish toxicity or population declines in recreational fishing area. Possible human health impacts. Negative public perception and National publicity	Likely	Major	**Extreme**	Extensive modelling and flushing studies to gain satisfactory water turnover to negate	Unlikely	Moderate	**Low**	**4**		**x**								
WR5	Reduction in water quality due to inadequate flushing	Algal blooms almost certain, resulting in reduced amenity, potentially harmful to human contact, toxicity for seagrasses, benthos, fish and protected species, negative public perception on an international scale	Almost Certain	Catastrophic	**Extreme**	Extensive modelling and flushing studies to gain satisfactory water turnover to negate	Unlikely	Moderate	**Low**	**4**		**x**								
4.7	**Coastal Resources**																			

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CE1	Extreme Storm Tide Event - to 100 year ARI	Destruction/damage to buildings and infrastructure	Possible	Minor	**Low**	The 100 year ARI is the "Designated Storm Tide Event" (as defined by EPA). Habitable buildings, evacuation routes, essential infrastructure are therefore located above 100 year ARI level	Possible	Minor	**Low**	**10**	**x**	**x**								
CE2	Extreme Storm Tide Event - greater than 100 year ARI	Destruction/damage to buildings and infrastructure	Rare	Catastrophic	**Moderate**	Incorporate with local disaster mitigation / emergency response plans	Rare	Catastrophic	**Moderate**	**10**	**x**	**x**								
CE3	Extreme Waves - to 100 year ARI	Destruction/damage to buildings and infrastructure	Possible	Minor	**Low**	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Habitable buildings, evacuation routes, essential infrastructure are therefore located above 100 year ARI level	Possible	Moderate	**Moderate**	**10**	**x**	**x**								
CE4	Hydrogeomorphological changes	Modification of habitat and coastal alignment	Rare	Insignificant	**Negligible**	Modelling undertaken to determine potential changes	Rare	Insignificant	**Negligible**			**x**								
CE5	Climate change		Rare	Insignificant	**Negligible**	Design considered latest world climate change data. Developable land levels have been set greater than recommended levels.	Rare	Minor	**Negligible**			**x**								
CE6	Extreme Waves - greater than 100 year ARI	Destruction/damage to buildings and infrastructure	Rare	Catastrophic	**Moderate**	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Incorporate with local disaster mitigation / emergency response plans.	Rare	Catastrophic	**Moderate**	**10**	**x**	**x**								
CE7	Breakwater failure	Destruction/damage to buildings and infrastructure	Rare	Major	**Low**	Breakwaters structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Locate essential infrastructure & habitable buildings back from high impact zone in the event of breakwater failure. Incorporate with local disaster mitigation / emergency response plans.	Rare	Major	**Low**	**10**	**x**	**x**								
CE8	Adjacent shorelines	modification to wave climate & shoreline alignment	Almost Certain	Insignificant	**Moderate**	Extensive modelling and monitoring to predict and detect changes. Minor remediation as required.	Likely	Insignificant	**Low**			**x**								
4.8	**Air**																			
AI1	Emission of gaseous pollutants from existing and future Port of Townsville operations	Health impacts on future residents of Breakwater Cove	Unlikely	Major	**Moderate**	Design of future residences to prevent entry of airborne pollutants as directed by the Port Protection Agreement.	Unlikely	Major	**Moderate**	**3**		**x**								
AI2	Emission of fine particulate matter from existing and future Port of Townsville operations	Amenity impacts on future residents of Breakwater Cove	Unlikely	Moderate	**Low**	Design of future residences to prevent entry of airborne pollutants.	Unlikely	Moderate	**Low**	**3**		**x**								
AI3	Emission of odorous substances from existing and future Port of Townsville operations	Amenity impacts on future residents of Breakwater Cove	Possible	Moderate	**Moderate**	Design of future residences to prevent entry of airborne pollutants.	Possible	Moderate	**Moderate**	**3**		**x**								
AI4	Emissions of air pollutants from operation of the TOT	Health and amenity impacts on future residents of Breakwater Cove	Unlikely	Major	**Moderate**	Design of TOT infrastructure and operational air control measures to prevent release of airborne pollutants as directed by the Port Protection Agreement.	Unlikely	Major	**Moderate**	**3**		**x**							**x**	
4.9	**Visual Amenity and Lighting**																			
VL1	No Risks Identified				**#N/A**				**#N/A**											
4.10	**Noise and Vibration**																			
Operational Noise																				
NV1	Noise from existing and future Port Operations impacting on Breakwater Cove.	Unreasonable noise impact on residences within Breakwater Cove precinct.	Unlikely	Moderate	**Low**	Appropriate design of future residential development within Breakwater Cove Precinct.	Unlikely	Minor	**Negligible**	**2**		**x**								
NV2	Noise from naval and cruise ships impacting on Breakwater Cove residents.	Unreasonable noise impact on Breakwater Cove residences	Unlikely	Moderate	**Low**	Appropriate design of future residential development with Breakwater Cove Precinct; Appropriate design of TOT building facilities.	Unlikely	Minor	**Negligible**	**2**		**x**							**x**	
NV3	Noise from naval and cruise ships impacting on existing receivers	Unreasonable noise impact on existing receivers.	Unlikely	Insignificant	**Negligible**	Acoustic barrier and berm planned.	Unlikely	Insignificant	**Negligible**	**2**										
NV4	Noise from naval and cruise ships impacting on marine animals	Physical and behavioural impacts on mammals	Possible	Major	**High**	No specific short-term mitigation	Possible	Minor	**Low**	**5**										
NV5	Operational road traffic noise impact from TOT on residences along public roads	Unreasonable increase in road traffic noise levels, degradation of existing noise environment	Unlikely	Moderate	**Low**	No specific mitigation. Increase in operational road traffic noise is unlikely to be noticeable.	Unlikely	Minor	**Negligible**											
4.11	**Nature Conservation**																			
NC1	Sediment destabilisation through changes in sediment transport regime (e.g. dredging in adjacent areas)	Seagrass impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP	Possible	Minor	**Low**	**4**										
NC2	Light attenuation through, for example, increased turbidity associated with dredging activities	Seagrass impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Minor	**Low**	**5,4**										
NC3	Nutrient enrichment leading to increased macroalgal growth (e.g. effluent discharge)	Seagrass impacts	Unlikely	Major	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	**5,4**										

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NC4	Contamination from spill (oil, chemicals)	Seagrass impacts	Possible	Major	**High**	Spill contingency procedures contained in project EMP. Controlled via fully bunded site.	Unlikely	Minor	**Negligible**	**9**										
NC5	Contamination from disturbed contaminated sediments	Seagrass impacts	Unlikely	Major	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC6	Noise pollution (impact on organisms relying on seagrass beds)	Seagrass impacts	Almost Certain	Major	**Extreme**	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Moderate	**Moderate**	**5,2**										
NC7	Smothering through garbage and debris accumulation	Seagrass impacts	Unlikely	Major	**Moderate**	Waste control measures contained in project EMP.	Unlikely	Moderate	**Low**	**8**										
NC8	Marine pest incursion	Seagrass impacts	Unlikely	Major	**Moderate**	Control on ballast discharge in accordance with AQIS requirements	Unlikely	Moderate	**Low**						**x**					
NC9	Light attenuation through turbidity	Coral reef impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Minor	**Low**	**5,4**										
NC10	Sediment deposition	Coral reef impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Moderate	**Moderate**	**5,4**										
NC11	Nutrient enrichment leading to increased macroalgal growth	Coral reef impacts	Unlikely	Major	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	**5,4**										
NC12	Contamination and mortality from spill (oil, chemicals)	Coral reef impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,9,4**										
NC13	Contamination from disturbed contaminated sediments	Coral reef impacts	Unlikely	Major	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC14	Smothering through garbage and debris accumulation	Coral reef impacts	Unlikely	Moderate	**Low**	Waste control measures contained in project EMP.	Unlikely	Moderate	**Low**	**8**										
NC15	Marine pest incursion	Coral reef impacts	Unlikely	Moderate	**Low**	Control on ballast discharge in accordance with AQIS requirements	Unlikely	Moderate	**Low**						**x**					
NC16	Sediment deposition / burial	Benthic community impacts	Possible	Minor	**Low**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC17	Nutrient enrichment leading to increased macroalgal growth	Benthic community impacts	Unlikely	Minor	**Negligible**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC18	Contamination and mortality from spill (oil, chemicals)	Benthic community impacts	Possible	Moderate	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,9,4**										
NC19	Contamination from disturbed contaminated sediments	Benthic community impacts	Unlikely	Moderate	**Low**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC20	Reduction in predator populations	Benthic community impacts	Unlikely	Moderate	**Low**	No specific mitigation.	Unlikely	Moderate	**Low**											
NC21	Smothering through garbage and debris accumulation	Benthic community impacts	Unlikely	Moderate	**Low**	Waste control measures contained in project EMP.	Unlikely	Moderate	**Low**	**8**										
NC22	Effects of reduction in water quality	Fish and fisheries impacts	Possible	Moderate	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	**5,4**										
NC23	Impacts on food resources (e.g. benthic communities)	Fish and fisheries impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	**5,9,4**										
NC24	Contamination and mortality from spill (oil, chemicals)	Fish and fisheries impacts	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC25	Noise pollution (impact on organisms relying on seagrass beds)	Fish and fisheries impacts	Almost Certain	Minor	**High**	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Minor	**Low**	**5,2**										
NC26	Disturbance to breeding and nursery habitats	Fish and fisheries impacts	Likely	Moderate	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Moderate	**Moderate**	**5,4**										
NC27	Increased fishing pressure (operation phase)	Fish and fisheries impacts	Likely	Moderate	**High**	Restrictions by Marine park zoning and licensing.	Unlikely	Moderate	**Low**											
NC28	Smothering of habitat through garbage and debris accumulation	Fish and fisheries impacts	Unlikely	Moderate	**Low**	Waste control measures contained in project EMP.	Unlikely	Moderate	**Low**	**8**										
NC29	Hazard to fisheries through accumulated garbage	Fish and fisheries impacts	Unlikely	Major	**Moderate**	Waste control measures contained in project EMP.	Unlikely	Moderate	**Low**	**8**										
NC30	Marine pest incursion	Fish and fisheries impacts	Unlikely	Major	**Moderate**	Control on ballast discharge in accordance with AQIS requirements	Unlikely	Moderate	**Low**						**x**					
NC31	Effects of reduction in water quality	Impacts on Bowling Green Bay	Unlikely	Moderate	**Low**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	**5,4**										
NC32	Contamination and mortality from spill (oil, chemicals)	Impacts on Bowling Green Bay	Unlikely	Major	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	**5,4**										
NC33	Noise pollution	Impacts on marine mammals and reptiles	Almost Certain	Major	**Extreme**	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Moderate	**Moderate**	**2,5**										
NC34	Increased boat strikes (operation phase)	Impacts on marine mammals and reptiles	Likely	Major	**Extreme**	Controls on boat speed and educational signage	Unlikely	Moderate	**Low**	**5**										
NC35	Harmful marine debris	Impacts on marine mammals and reptiles	Likely	Major	**Extreme**	Waste control measures contained in project EMP and informative signage.	Possible	Moderate	**Moderate**	**8**										

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NC36	Impacts on food resources (e.g. seagrass beds)	Impacts on marine mammals and reptiles	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Moderate	**Moderate**	5,4										
NC37	Contamination and mortality from spill (oil, chemicals)	Impacts on marine mammals and reptiles	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Minor	**Negligible**	5,4										
NC38	Contamination / reduction in breeding and nursery habitats	Impacts on marine mammals and reptiles	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Moderate	**Moderate**	5,4										
NC39	Effects of reduction in water quality	Impacts on marine mammals and reptiles	Possible	Moderate	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	5,4										
NC40	Harmful marine debris	Protected bird species	Likely	Major	**Extreme**	Waste control measures contained in project EMP and informative signage.	Possible	Moderate	**Moderate**	8										
NC41	Contamination / reduction of breeding areas	Protected bird species	Possible	Major	**High**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Possible	Moderate	**Moderate**	5,4										
NC42	Impact on food resources	Protected bird species	Possible	Moderate	**Moderate**	Use of silt curtains during dredging and dredge protocols contained in project EMP.	Unlikely	Moderate	**Low**	5,4										
4.12	**Cultural Heritage**																			
	No operational risks identified				**#N/A**				**#N/A**											
4.13	**Social**																			
SO2	Incompatible land uses	Adverse impacts on local residents due to TOT operations	Possible	Major	**High**	Design and construction requirements on dwellings to minimise impacts; appropriate port protection agreements and associated instruments to be put into place	Possible	Moderate	**Moderate**			x				x				
SO3	Increased marine traffic	Impacts on existing recreational uses	Rare	Insignificant	**Negligible**	Controls on boat speed and educational signage.	Rare	Insignificant	**Negligible**	5										
SO4	Increased vehicular traffic	Impacts on existing and future residents	Possible	Moderate	**Moderate**	Provide density plans as part of EIS submission to enable government authorities to plan for service upgrades with maximum lead times	Possible	Moderate	**Moderate**								x			
SO7	Reduced public access to recreational space and facilities post construction	Restrictions on public access to locations beyond the Ocean Terminal (particularly when naval vessel is in port)	Almost Certain	Minor	**High**	Security considerations are paramount and public access will be strictly controlled when naval vessels are in port	Possible	Minor	**Low**			x								
SO8	Increased demand for education services	Education service providers not able to meet the demand arising from additional residents	Unlikely	Moderate	**Low**	Provide density plans as part of EIS submission to enable government authorities to plan for service upgrades with maximum lead times	Unlikely	Moderate	**Low**											
SO9	Increased demand for health services	Health service providers not able to meet the demand arising from cruise ship visitations and increased residential population	Unlikely	Major	**Moderate**	Provide density plans as part of EIS submission to enable government authorities to plan for service upgrades with maximum lead times	Unlikely	Major	**Moderate**											
SO10	Housing affordability barriers in the CBD to be exacerbated	Reinforcement of existing affordability barriers in CBD accommodation	Unlikely	Moderate	**Low**	Appropriate sale of developed product.	Unlikely	Moderate	**Low**											
SO12	Erosion of sense of place	Rapid population growth and demographic change resulting in social disconnectedness	Unlikely	Moderate	**Low**	Provision of high quality community infrastructure to allow integration with existing community and sense of ownership, integration with the Strand precinct.	Unlikely	Minor	**Negligible**											
SO13	Environmental degradation	Degradation of the marine environment in particular post construction	Unlikely	Major	**Moderate**	Adhesion to environmental protocols contained in project EMP. Controls on boat speed and educational signage	Unlikely	Moderate	**Low**											
SO14	Increased impact on Strand	Degradation of the Strand due to increased usage	Unlikely	Moderate	**Low**		Unlikely	Minor	**Negligible**											
4.14	**Health and Safety**																			
HS1	Industrial air emissions from the Port	Health impacts on future residents of Breakwater Cove	Unlikely	Major	**Moderate**	Design of future residences to prevent entry of airborne pollutants. May require control at pollutant source.	Unlikely	Major	**Moderate**	3		x								
HS2	Industrial noise from the Port	Noise nuisance impacts on future residents of Breakwater Cove.	Possible	Moderate	**Moderate**	The Port has an obligation to control air emissions from Port sources	Possible	Moderate	**Moderate**	2		x								
HS3	Public health and safety	Impacts on public H&S post construction	Unlikely	Major	**Moderate**	TOT operator to implement security measures including fencing, security staff and security cameras. WH&S Plan	Unlikely	Major	**Moderate**	10								x		
HS4	Operational health and safety	Health and Safety impacts on TOT operational staff	Unlikely	Major	**Moderate**	TOT operator to have a WH&S Plan in place	Unlikely	Major	**Moderate**	10								x		
HS5	Fire/explosion from TOT facility	dangerous goods release leading to environmental impacts, loss of property, injury or death.	Unlikely	Major	**Moderate**	TOT operator to prepare an Emergency Plan to detail emergency response and/or evacuation procedures. TOT operator to prepare an Operational Management Plan outlining prevention and management strategies for fire and explosion.	Unlikely	Major	**Moderate**										x	x
HS6	Fire/explosion from major hazard facilities within Port limits	dangerous goods release leading to environmental impacts, loss of property, injury or death.	Unlikely	Major	**Moderate**	Operators of Major Hazard Facilities comply with obligations under the Dangerous Goods Safety Management Act 2001.	Unlikely	Major	**Moderate**											

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			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	EMP Element(s)	Disaster Action Plan	Detailed Design	Stormwater Mgmt Plan	Community Title	AQIS	Port Protection Code	Future Applications	WH&S Plan	TOT Operational	TOT Emergency Plan
HS7	Explosion at Loading/Unloading Berths from Ammonium Nitrate and Class 1 explosives	dangerous goods release leading to environmental impacts, loss of property, injury or death.	Unlikely	Catastrophic	**High**	Port of Townsville complies with Australian Standard AS3846 for Handling and Transportation of Dangerous Cargoes in Port Areas	Rare	Catastrophic	**Moderate**												
HS8	Vessel collision within Port limits	Injury or death. Pollutant discharge leading to environmental impacts.	Unlikely	Major	**Moderate**	We understand the Port has emergency response plans and protocols to prevent vessel collisions	Unlikely	Moderate	**Low**										x	x
HS9	Loading/unloading incident at the TOT	Injury or death. Pollutant discharge leading to environmental impacts.	Possible	Moderate	**Moderate**	TOT operator to prepare an Emergency Plan to detail emergency response and/or evacuation procedures. TOT operator to prepare an Operational Management Plan outlining operational procedures.	Possible	Minor	**Low**										x	x
4.15	**Economy**																				
EC3	Potential impacts on property market	Increase in property values	Possible	Moderate	**Moderate**	Economic impacts are likely to be positive - high quality product.	Unlikely	Minor	**Negligible**												
EC4	Potential impact on future port activities	Increased environmental compliance costs to port users as a result of community complaints, specifically arising from residents of Breakwater Cove	Unlikely	Moderate	**Low**	Implementation of Port Protection Code	Unlikely	Moderate	**Low**							x				
EC6	Potential residential complaints about port activities	Regulatory or legislative changes impacting on port operating conditions	Unlikely	Moderate	**Low**	Implementation of Port Protection Code	Unlikely	Moderate	**Low**							x				
	Other																				
CM7	Parklands Settlement	Destruction of Property (landscape element)	Almost Certain	Minor	**High**	No Specific Mitigation / Make Good	Almost Certain	Minor	**High**			x								
CM8	Green Topped Breakwaters	Destruction of Property	Possible	Moderate	**Moderate**	No Specific Mitigation / Make Good	Possible	Moderate	**Moderate**			x								
CM9	Green Topped Seawall	Destruction of Property (landscape element)	Possible	Minor	**Low**	No Specific Mitigation other than relocate during event and Make Good	Possible	Minor	**Low**			x								

Extreme	7	Extreme	0
High	29	High	3
Moderate	40	Moderate	31
Low	24	Low	45
Negligible	6	Negligible	27
	106		106