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Draft : Environmental Impact Statement

Chapter B17 Hazard and Risk

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B17.1 Introduction

The purpose of this chapter is to assess key health and safety risks associated with the Cairns Shipping Development Project (the project) on the public (particularly cruise ship visitors) and workforce during both construction and operational phases. Potential environmental risks are addressed in other chapters. Safety risks associated with movement of cruise ships and navigational hazards are detailed in **Chapter C4, Maritime Operations Management Plan** and **Chapter C3, Vessel Transport Management Plan**.

This chapter aims to understand the potential impact and likelihood of hazards and risks associated with the project and to then identify appropriate mitigation measures in order to prevent and manage issues should they occur. This chapter firstly outlines the methodology and legislative and organisational framework relevant to hazard and risk assessment and its management.

Ports North currently safely manages operational hazards and risks through its operational management practices, protocols and plans. Therefore it is the expectation that current practices, protocols and plans will be built on if necessary to manage any newly identified operational hazards and risks generated by the project.

This chapter details hazards and risks within Port Limits and which the Port of Cairns has operational jurisdiction; it does not address any hazards or risks that are the responsibility of cruise ship operators nor other operational vessels. Any hazards and risks that may reasonably be anticipated to occur beyond the Port Limits (e.g. within the Great Barrier Reef Marine Park Authority (GBRMPA) boundary) are addressed in **Chapter B18, Cumulative Impacts Assessment**. For example, the potential for increased risk of shipping incidents and the potential impact on the Great Barrier Reef is addressed in the aforementioned chapter.

The study addresses the following specific risk areas:

- Hazardous goods storage and movement
- Working over water
- Moving vehicles
- Contaminated and acid sulphate soils (ASS)
- Biological and animal hazards e.g. crocodiles, biting insects
- Natural hazards e.g. cyclones, fire
- Unexploded ordnances
- Security incidents.

Identified critical health and safety risk receptors are:

- Any residents within close proximity to the Cairns Cruise Liner Terminal (CCLT) and the shipping channel
- Recreation and commercial boats that utilise Trinity Inlet and the shipping channel
- Construction workers and contractors
- Port of Cairns and cruise ship company staff
- Visitors to the CCLT, including passengers.

B17.2 Methodology

The hazard and risk assessment has been undertaken with reference to *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines* (Standards Australia 2009) and involved the following key steps:

- Identification: This step identifies the hazards and risks, areas of impact, potential events and their causes and potential consequences
- Analysis: This involves developing an understanding of the risks, including likelihood and significance of consequences. The following tables were used during the analysis:
 - **Table B17.2a** was used to identify the significance of the risk
 - **Table B17.2b** was used to identify the duration of impact
 - **Table B17.2c** was used to determine the likelihood of impact
- Evaluation: Information from the risk analysis was combined to assess the overall level of risk as per **Table B17.2d**. This helps to determine which hazards and risks need treatment or management. It also prioritises treatment
- Treatment: This involves identification of treatment options and planning for implementation.

Table B17.2a Impact Significance/Consequence

Impact Significance / Consequence	Description
Very High	Death or serious injury to the public.
High	Member of the public or site workers/staff suffers irreversible disability or serious injuries requiring long-term hospitalisation.
Moderate	Injury requiring hospitalisation or resulting in a temporary disability.
Minor	Moderate level of injury requiring offsite medical treatment.
Negligible	No injury to the public. Minor injury to workers that requires on-site treatment but does not result in lost time.
Beneficial	Results in a positive health benefit for the public or workers/staff.

Table B17.2b Duration of Impact

Relative Duration of Impacts	
Temporary	Days to Months
Short Term	Up to one year
Medium Term	From one to five Years
Long Term	From five to 50 Years
Permanent / Irreversible	In Excess of 50 Years

Table B17.2c Likelihood of Impact

Likelihood	Significance			
	Negligible	Minor	Moderate	High
Highly Unlikely/ Rare	Negligible	Negligible	Low	Medium
Unlikely	Negligible	Low	Low	Medium
Possible	Negligible	Low	Medium	Medium
Likely	Negligible	Medium	Medium	High
Almost Certain	Low	Medium	High	Extreme

Table B17.2d Risk Rating Legend

Extreme Risk	An issue requiring change in project scope; almost certain to result in a 'significant' impact on a Matter of National or State Environmental Significance
High Risk	An issue requiring further detailed investigation and planning to manage and reduce risk; likely to result in a 'significant' impact on a Matter of National or State Environmental Significance
Medium Risk	An issue requiring project specific controls and procedures to manage
Low Risk	Manageable by standard mitigation and similar operating procedures
Negligible Risk	No additional management required

B17.3 Legislative Framework and Standards

B17.3.1 Commonwealth and State Legislation

The following Commonwealth and Queensland legislation are relevant to the identification, assessment and management of project hazards and risks:

- *Electrical Safety Act 2002* (Qld). The aim of this act is to eliminate death, injury and destruction that can be caused by electricity. Accordingly, the act establishes a legislative framework to prevent people and property being harmed by electricity. It does this by imposing duties on those who may affect the electrical safety of others and establishing benchmarks for industry. The requirements of the act will apply to all electrical work carried out as part of the project
- *Disaster Management Act 2003* (Qld). This act established disaster management groups for state disaster districts and local government areas and sets up requirements for disaster management plans and guidelines. The act also makes provisions for declaring a disaster situation and establishing and managing the State Emergency Service
- *Environmental Protection Act 1994* (Qld). This Act provides for the protection of Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, and in a way that maintains the ecological processes on which life depends (i.e. ecologically sustainable development). The act also establishes a regulatory framework for contaminated land and Environmental Relevant Activities (ERA), of which fuel storage is one. The project will require an amendment to an existing approved Environmental Relevant Activity (ERA) to include IFO storage
- *Explosives Act 1999* (Qld). This act regulates the use of explosives. This act does not apply to the project as no explosives will be used
- *Fire and Rescue Services Act 1990* (Qld). This act provides for the protection of people, property and the environment from fire and other emergencies. The project must regard the provisions of the act that relate to fire risk reduction and safety

- *Maritime Transport and Offshore Facilities Securities Act 2003* (Cth). This act implements the International Ship and Port Facility Security Code, which was developed by the International Maritime Organisation (IMO) in 2002. The aim of the act is to establish safeguards against unlawful interference with maritime transport or offshore facilities. It establishes a regulatory framework centred around the development of security plans for ships, other maritime transport operations and offshore facilities. The Port of Cairns is a regulated port under the act and has an approved security plan in place
- *Navigation Act 2012* (Cth). This act is the primary means for the Australian Government to regulate international ship and seafarer safety, actions of seafarers in Australian waters and marine pollution
- *Occupational Health and Safety (Maritime Industry) Act 1993* (Cth). The objective of this act is to secure the health and safety at work of maritime industry employees. It applies to people employed on ships as well as manufacturers, suppliers and importers of plant or substances used or handled on ships. Although not directly relevant to the project, it requires operators of ships who will use the port to take all reasonable steps to protect the health and safety of workers
- *Public Safety Preservation Act* (Qld). This act provides for the protection of members of the public in terrorist, chemical, biological, radiological or other emergencies that create or may create harm to people, property or the environment. It is not directly relevant to the project, though the powers vested in the act may be used by authorities during an emergency situation
- *Transport Infrastructure Act 1994* (Qld). The overall objective of this act is to provide a regime that allows for, and encourages effective integrated planning and efficient management of transport infrastructure. It relates to both terrestrial and marine transport infrastructure. The act establishes functions and powers of port authorities, including the requirement for port authorities to keep appropriate levels of safety and security in the provision and operation of the facilities and services. Under the act, approvals may also be required to transport oversized loads during construction
- *Transport Operations (Marine Safety) Act 1994* (Qld). The primary objective of the act is to regulate the maritime industry to ensure marine safety. The objectives of the act are achieved mainly by imposing general safety obligations to ensure seaworthiness and other aspects of marine safety. The act applies to all ships connected with Queensland, ships in pilotage area or port, as well as all ships on interstate or overseas voyages while they are in Queensland waters. The general safety obligations therefore apply to all ships visiting the port, as well as those ships owned and operated by Ports North
- *Transport Security (Counter-Terrorism) Act 2008* (Qld). This act provides a regulatory framework to reduce the risk of terrorist acts on surface transport
- *Work Health and Safety Act 2011* (Qld). This act sets out requirements and obligations for health and safety risk minimisation at workplaces. It includes provisions for the protection of workers and other persons against harm from risks arising from work, workplaces, or from particular types of substances or plant. The act also establishes a duty of care, which obligates Ports North (and its subcontractors) to ensure, as far as reasonably practicable, the health and safety of its workers as well as other persons put at risk from work carried out. It also includes provisions for flammable and dangerous goods relevant to fuel storage and distribution.

B17.3.2 Plans, Standards, Policies and Strategies

The following plans, policies and strategies have also been referenced during the hazard and risk assessment:

- *Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances*, which contains a framework enabling effective response to marine pollution incidents
- The *CairnsPlan* – the Cairns Regional Council (CRC) Planning Scheme, which maps areas of flood inundation (Q100), bushfire hazard and hillslopes. **Chapter B1, Land** further outlines the relevance of the Cairns Plan
- The *Queensland Coastal Contingency Action Plan* (QCCAP). The action plan, supported by Maritime Safety Queensland (MSQ), supports Australia's national arrangements for oil and chemical spills under the Inter-Governmental Agreement on Australia's National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances. QCCAP also links to Queensland's revised disaster management arrangements and supports Queensland's recently revised State Disaster Management Plan. The project will have procedures and protocols set in place to meet the objectives on the QCCAP in future phases of the project delivery
- The *Queensland Counter-Terrorism Strategy 2014-16*, which provides guidance in the key areas of focus for counter-terrorism activities during 2014-16

- The Queensland *State Planning Policy*, which outlines state interests in making or amending a planning scheme for emissions and hazardous activities as well as natural hazards such as flood, bushfire, landslide and coastal hazards.
- The *International Ship and Port Facility Security Code* (IMO, 2004). The code provides an international framework involving cooperation between governments, agencies, and the shipping and port industries to identify and assess threats affecting ships and port facilities. Under the code, Australia's responses to maritime security incidents is undertaken through its law enforcement agencies and under existing arrangements for responding to terrorist incidents generally (e.g. through the National Counter-Terrorism Plan). The *Maritime Transport and Offshore Facilities Security Act 2003* (Cth) gives effect to Australian implementation and interpretation of the code
- The *Cairns District Disaster Management Plan* (Cairns District Disaster Management Group, 2011). The plan was prepared by the Queensland Police and the Cairns District Disaster Management Group, under the Queensland Government, to facilitate the implementation of effective and efficient disaster management strategies and arrangements. The plan includes a hazards analysis to identify the most serious events in terms of probability of occurrence and severity of consequence
- The *Local Disaster Management Plan for the Cairns Region* (CRC, 2011)
- AS/NZS ISO 31000:2009 Risk management Principles and guidelines (Standards Australia/Standards New Zealand 2009)
- AS 3846:2005 The handling and transport of dangerous cargoes in port areas (Standards Australia, 2005a)
- AS/NZS 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers (Standards Australia, 2007)
- HB 76:2010 Handbook – Dangerous goods – initial emergency response guide.

B17.4 Hazard and Risk Management Responsibilities

B17.4.1 Port's North Commitments to Managing Hazard and Risk

Ports North is committed to providing the highest standard of safety for the workplace and has implemented a Health and Safety Policy across its entire operations. This is presented in **Appendix D10**.

Ports North also has processes in place to identify, assess and manage risks to its operations in order to minimise the impact of unplanned events. This approach is articulated in its Risk Management Policy and Risk Management Framework which also provides for structured risk assessments to be undertaken and the development of risk treatment plans.

The Ports North Audit and Risk Committee oversees the implementation of the Risk Management and Internal Control Policy and Risk Management Framework and a strong internal control environment to protect Ports North's interests. Safety and Environmental Management Frameworks, Financial Risks Policy, Fraud Control and Corruption Policy and Security and Emergency Plans address the associated specific risks.

Ports North has established an Incident Management System (IMS) involving an integrated suite of emergency response, disaster management and business continuity plans. The Incident Management Systems reflects the management and operational control mechanisms that are able to be engaged to respond to an incident and ensure the hazard or risk are appropriately responded to.

Details of emergency response management, crisis management and business continuity are provided in **Section B17.6.8**.

B17.5 Risk Assessment

B17.5.1 Construction Risks

Table B17.5.2a provides a qualitative assessment of potential health and safety hazards to site personnel and the general public during the dredging and disposal activities and land-based construction. Mitigation measures are also provided in the table. The sections below describe the potential construction risks that are relevant to the project.

B17.5.1.1 Slips, Trips or Falls

Slips, trips and falls are a common source of workplace injury. Slips, trips or falls could occur at the wharf or on dredging vessels during construction and dredging. Construction workers as well as the general public utilizing the wharf area could be subject to this risk. Higher risk areas include wet or oily floors, uneven ground, sloping surfaces and cluttered areas. The risk of slips, trips and falls during construction can be reduced through effective site housekeeping, appropriate work wear (e.g. shoes with non-slip soles) and work process planning.

B17.5.1.2 Working Over Water

During dredging and construction activities at the wharf, personnel will be working over and near water. The key hazards associated with working over and near water are the possibility of falling into the water resulting in drowning, or risk of electrocution when using electrical equipment near water. Appropriate management measures for the risks associated with working over water include fall protection, appropriate Personal Protective Equipment (PPE) (e.g. life jackets or buoyancy aids), rescue equipment, provision of a safe power supply and staff training.

B17.5.1.3 Construction Dust

Workers at the land-based construction site may encounter wind-blown particles (e.g. from operating machinery, exposure of surfaces), with risk of eye injury or respiratory irritation. This risk can be managed through the use of appropriate PPE (e.g. eye protection, masks), worksite management (e.g. dust suppression) and work planning to avoid high-wind conditions.

B17.5.1.4 Construction Noise

Workers may encounter noisy plant and equipment, particularly from piling or dredging activities. Excessive noise may result in short or long term hearing loss. Health risks arising from construction noise can be mitigated through the use of appropriate PPE (e.g. ear plugs) and where necessary, muffling of excessively noisy machinery or equipment.

B17.5.1.5 Working in Confined Spaces

Working on the dredge vessel or land-based construction site may require entry to confined spaces. Examples of confined spaces include tanks, pits, pipes, containers, shafts and trenches. The risks associated with working in confined spaces include lack of oxygen resulting in suffocation or loss of consciousness due to airborne contaminants. Risk assessment, training and work procedures can effectively manage the risks associated with entry to confined spaces.

B17.5.1.6 Vehicle/Equipment Accident

There is a risk that the public or on-site workers may be adversely impacted by construction vehicles and/or moving equipment during either construction or operation of the project. This includes both land-based construction and operational equipment within the Port of Cairns and vehicles and marine machinery (e.g. dredging equipment). The additional movement of vehicles on public roads will be limited (refer to the **Chapter B14, Transport**). The public or onsite worker may also encounter dredging equipment through their use of Trinity Inlet and Bay from recreational and commercial vessels. It should be noted however, that maintenance dredging has occurred regularly within the inlet over a long period of time and no incidences of interference have been recorded to date. During construction, it is possible that the public will be in close proximity to the land-based construction area through their use of the CCLT which is publically accessible. Although unlikely, it is possible the public could also attempt to board dredging equipment.

Workers at the land-based construction site or on the dredge vessel will be working with moving equipment and parts. Injury arising from machinery or equipment (e.g. trapped or crushed limbs, lacerations) is common in a construction setting and can have minor or major consequences. These risks can be mitigated through worker training, job safety analysis, appropriate PPE and the use of appropriate tools for the job.

B17.5.1.7 Hazardous Substances

A hazardous material is one that poses a hazard to human health when improperly handled, stored or disposed of. The hazard may arise from acute or chronic toxicity or carcinogenicity of the substance or its corrosive or flammable nature.

Hazardous or flammable materials that may be generated by construction include:

- Lubricants, paints or sealants
- Construction waste
- Refuelling of equipment.

The use and volumes of such substances are likely to be minimal during both construction and operation of the project.

B17.5.1.8 Fire

Construction activities that pose a fire risk include welding works, grinding or heat generating machinery. Fire risk may be exacerbated in the presence of flammable substances such as fuels and oils that are likely to be used in small quantities during construction as described above. Appropriate management measures for fire risk during construction include appropriate storage of flammable substances and worker training for 'hot works'. The likelihood of a bushfire occurring is considered to be Highly Unlikely due to the lack of bush land or vegetated areas in proximity to the site.

B17.5.1.9 Exposure

Weather conditions during outdoor construction work can pose a hazard to worker safety such as sun exposure, dehydration, heatstroke or heat stress. This is particularly relevant in summer conditions where daytime temperatures in the Cairns region regularly exceed 30 degrees Celsius with high humidity. Work planning (e.g. regular breaks), use of PPE (e.g. sunscreen, hats, long sleeves) and worker awareness training are relevant management measures to reduce the risk of negative health effects from exposure.

B17.5.1.10 Natural Hazard

Natural hazards including cyclone or storm surge could cause direct or indirect harm to workers on the dredge vessel and the wharf. Monitoring of weather conditions and forecasts to avoid working in high risk conditions is the key risk avoidance measure for natural hazards. An emergency management plan and response procedure for the construction period will also help to safeguard worker safety in the event that avoidance is not possible.

B17.5.1.11 Wildlife

Trinity Inlet is known to contain hazardous wildlife, particularly crocodiles and marine stingers. While workers will be based on elevated land (wharf structure) or vessels, there is a small possibility that hazardous wildlife could be encountered during loading/offloading of equipment if it does not occur in a safe location or if workers should enter the water for any reason planned or unplanned.

B17.5.1.12 Disease

Disease risks during construction are largely linked to disease vectors such as mosquitoes which are addressed separately below.

B17.5.1.13 Security Incidents

Security incidents that may arise during construction include protests, terrorism, vandalism or unauthorised access to construction sites. These incidents may result in property damage and direct or indirect harm to workers or the public within the affected area. Security measures during construction are likely to be similar to those implemented as standard during wharf operation, and may include sign-in procedures for authorised personnel, identification, lock-up procedures for high risk areas, presence of security personnel after-hours, and if necessary, the involvement of police to manage more serious incidents.

B17.5.1.14 Unexploded Ordnances

There are no known Unexploded Ordnances (UXOs) within the area proposed to be dredged or the dredge material placement area. The site was occupied by the military in WWII, however, and it is possible, but unlikely, that UXOs may be encountered during dredging activities. Surveys such as a magnetic survey over the dredge zones prior to works starting will aim to mitigate this risk.

B17.5.1.15 Acid Sulphate Soils (ASS)

If not handled correctly, ASS or the chemicals used to treat it can cause harm to humans through breathing in of chemicals or burns from physical encounters. Exposure to ASS during the installation of land-side infrastructure is unlikely given the minimal exposure of potential (P)ASS. ASS should not be physically encountered during dredging works, as soils are proposed to be kept 'in water' and should not oxidise or release acid.

B17.5.1.16 Biting Insects

Cairns has a tropical climate with high rainfall which contributes to ideal breeding conditions for mosquitoes and biting midges. Biting insects can cause minor irritation from stings or bites but mosquitoes can also be vectors of serious disease including Dengue fever, Ross River fever and malaria. These diseases are not endemic to Cairns but outbreaks can occur. Exposure of workers to biting insects can be managed through the use of repellants and PPE and worksite management to reduce areas of standing water that can serve as mosquito breeding areas.

B17.5.2 Operational Risks

Table B17.5.2a provides a qualitative assessment of potential health and safety hazards to the Port of Cairns and cruise ship staff, passengers and the general public during operation.

Table B17.5.2a: Construction Hazards and Risks

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Slips, trips or falls at the wharf	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Work Procedures (JSAs) • Staff training and supervision • Use of Personal Protective Equipment (PPE) such as hard hats, safety glasses, vests, etc. • Drug and Alcohol Policy. 	Possible	Moderate	Medium
Working over water (either during pile installation or aboard dredging equipment)	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Work Procedures (JSAs) • Staff training and supervision • Use of Personal Protective Equipment (PPE) and on-board safety equipment • Drug and Alcohol Policy. 	Possible	Moderate	Medium
Construction Dust – public and workers at the land-based construction site may encounter wind-blown particles (e.g. from operating machinery, exposure of surfaces)	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Work Procedures (JSAs) • Staff training and supervision • Stop work procedures during adverse wind conditions • Dust suppression techniques • EMP. 	Unlikely	Minor	Low
Construction Noise – public and workers may encounter noisy plant and equipment, particularly from piling or dredging machinery	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Work Procedures (JSAs) • Staff training and supervision • Use of PPE, including ear plugs if required • Use of licenced operators • Compliance with noise regulations • EMP. 	Unlikely	Minor	Low

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Working in confined spaces on-board dredging/piling equipment	<ul style="list-style-type: none"> • Training for working in confined spaces • Work Procedures (JSAs) • Use of licenced operators • Emergency procedures and training. 	Unlikely	High	Medium
Vehicle accident or contact by moving vehicle or equipment	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Traffic Management Plans • Work Procedures • Exclusion zones around areas of operation • Use of Personal Protective Equipment (PPE) such as hard hats, safety glasses, vests, etc. • Speed restrictions. 	Unlikely	High	Medium
Spill and subsequent inhalation or contact with hazardous substances e.g. oils, lubricants, paints etc.	<ul style="list-style-type: none"> • HAZOP studies • MSDS sheets at site • Health and Safety Management Plan • Staff and contractor training. 	Unlikely	Moderate	Low
Fire originating from welding works, heat generating machinery, spark originating from welding and grinding	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Hot works permits. 	Possible	High	Medium
Workers caught in moving machinery, particularly on piling rigs and dredges	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Work Procedures (JSAs) • Staff training and supervision • Use of PPE and on-board safety equipment • Drug and Alcohol policy. 	Unlikely	High	Medium
Exposure to sun (dehydration, sunburn or heatstroke)	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan. 	Possible	Minor	Low
Natural hazard (e.g. cyclone, storm surge) cause direct or indirect (through damage to machinery/equipment) harm	<ul style="list-style-type: none"> • Emergency Management Plan, including evacuation procedures • Monitoring and early warning of hazardous events. 	Highly Unlikely	High	Medium

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Interactions with wildlife (e.g. crocodiles, snakes)	<ul style="list-style-type: none"> • Health and Safety Policy • Health and Safety Management Plan. 	Highly unlikely	High	Medium
Introduction of disease, including human, other animal and plant disease.	<ul style="list-style-type: none"> • Security Management Plan • Port Procedures (TMR 2014), which includes quarantine arrangements • Ports North Pandemic Plan. 	Highly Unlikely	High	Medium
Security incidents (e.g. protests, terrorism, unauthorised access to construction sites – land and water)	<ul style="list-style-type: none"> • Security Management Plan • Emergency Management Plan • Provision of security fencing/site delineation and security personnel. 	Possible	Moderate	Medium
Contact with Unexploded Ordinance (UXO) in Trinity Inlet and Bay, causing death or harm	<ul style="list-style-type: none"> • Magnetometer (or similar) survey undertaken prior to construction to identify UXOs in dredging area as per Chapter B13, Cultural Heritage. 	Highly Unlikely	High	Medium
Exposure and handling of acid sulphate soils	<ul style="list-style-type: none"> • Acid sulphate soil management plan, including testing and safe treatment • Staff and contractor training 	Unlikely	Minor	Low
Biting insects e.g. midges, mosquitoes	<ul style="list-style-type: none"> • Minimise creation of stagnant or ponding water • Regular monitoring for breeding sites • Liaison with health authorities to provide updates during Dengue outbreaks. 	Unlikely	Moderate	Low
Electrical hazards	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan and Safe Work Method Statements • Tag and testing all equipment as part of Site Safety Management Plan and Safe Work Method statements • Use of dial before you dig for locating underground services. 	Highly Unlikely	High	Medium
Safe use of plant, equipment and power tools	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan and Safe Work Method Statements • Tag and testing all equipment as part of Site Safety Management Plan and Safe Work Method statements. • Contractor Site Safety Management Plan 	Unlikely	High	Medium
Safe operation of floating plant	<ul style="list-style-type: none"> • Use of licenced operators • Port of Cairns Operational Management Plans. 	Unlikely	Moderate	Low
Refuelling of plant	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan and Safe Work Method Statements • Use of licenced operators. 	Highly Unlikely	High	Medium

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Working at heights (piling rigs)	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan and Safe Work Method Statements • Use of licenced operators. 	Unlikely	High	Medium
Site demarcation/fencing (for public safety)	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan. 	Highly Unlikely	High	Medium
Working adjacent to railways	<ul style="list-style-type: none"> • Contractor Site Safety Management Plan and Safe Work Method Statements • Review of design and site plans with Queensland Rail prior to establishing site. 	Highly Unlikely	High	Medium

Table B17.5.2b: Operational Hazards and Risks

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Significant fuel, sewage or other chemical spill during cruise ship loading/unloading	<ul style="list-style-type: none"> • HAZOP studies • MSDS sheets at site • Health and Safety Management Plan • Existing Ports North Emergency Management Plans. 	Unlikely	High	Medium
Fire associated with nearby buildings	<ul style="list-style-type: none"> • Application of safety in design principles • Emergency Management Plan • Work Instructions • Provision of fire-fighting equipment and hydrants (see Chapter A4, Project Description) • QFRS response. 	Unlikely	Very High	High
Fire associated with cruise ships	<ul style="list-style-type: none"> • Ships are responsible for their own fire-fighting systems and emergency management plans • Ships to leave berth in case of fires, wherever possible • Auxiliary fire-fighting capability available from Port tugs. 	Unlikely	Very High	High
Natural hazard (e.g. cyclone, storm surge or flood) cause direct or indirect (through damage to wharf structure or other infrastructure) harm	<ul style="list-style-type: none"> • Disaster Response Plan • Cruise ships redirected/remain at sea should an event be predicted. 	Unlikely	High	Medium

Element	Mitigation and Management	Likelihood Rating	Significance Rating	Residual Risk Level
Slips, trips or falls at the wharf whilst passengers/ crew embarking and disembarking	<ul style="list-style-type: none"> • Health and Safety Policy • Health and Safety Management Plan. 	Unlikely	High	Medium
Vehicle accident or contact by moving vehicle or equipment	<ul style="list-style-type: none"> • Application of safety in design principles • Health and Safety Policy • Health and Safety Management Plan • Traffic Management Plans – refer to Chapter B14, Transport. 	Unlikely	High	Medium
Fire originating from refuelling operations, pipeline/storage incident	<ul style="list-style-type: none"> • Application of safety in design principles • Design of infrastructure to meet Australian Standards • Emergency Management Plan • Staff/crew training. 	Unlikely	Very High	High
Introduction of disease, including human, other animal and plant disease.	Managed through the Australian Customs and Border Protection Service.	Unlikely	High	Medium

B17.6 Hazards and Risk Mitigation and Management Strategies

Tables B17.5.2a and B17.5.2b outline several plans that will be applied to the project to mitigate or manage the risks associated with health and safety. This section provides more information on each.

B17.6.1 Safety in Design

Health and safety risks that manifest in the design phase are not considered as part of the scope of this chapter; however, there is potential that hazards may be generated due to the design process, and that these may result in impacts during construction, operation or decommissioning. Where design is occurring for the project (e.g. design of berthing structures or fuel storage and lines, and traffic management), a safety in design process will be followed in accordance with the Australian Safety and Compensation Council's *Guidance on the Principles of Safe Design for Work* (2006).

Design should include:

- Civil and structural engineering design in line with Australian and other standards to mitigate potential impacts from natural hazards, security threats and health and safety
- Locating storage tanks away from other potential hazards or in a dedicated fuel storage facility
- Leak detection, overfill prevention, failure detection and alert systems in-built to the new IFO
- Provisions to allow emergency shutdown during bunkering and sewerage pumping
- Provision of safety signage in line with Australian and other standards
- Provision of new fire-fighting infrastructure. This is designed to adequately provide for the risk of fires at the wharves, including fires at the terminal and fuel fires associated with bunkering or fuel storage. Design includes fire hydrant pillars along the face of wharves 1 to 3 (as detailed in **Chapter A4, Project Description**); and will also include other fire safety systems as required.

Hazard and risk management at each of the fuel farm facilities is under the management of each of the operators and the respective development approvals maintained for each facility; with any new storage tanks at the fuel farm designed, built and managed in compliance with the relevant legislation, guidelines and standards and existing management procedures.

B17.6.2 Health and Safety Management Plans and Policy

Health and Safety Management Plans will be implemented for all project phases in line with the Ports North Health and Safety Policy (Appendix D10), and all contractors will be required to meet the high standards specified by Ports North. Plans will reference and integrate measures from the appropriate Australian standards as per the *Guide to Standards for Occupational Health and Safety* (SAI Global 2013).

B17.6.3 Traffic Management Plan

A Traffic Management Plan will be implemented for construction, operations and decommissioning to reduce risks associated with road transport. The plan will be prepared in line with the *Code of Practice for Traffic Management for Construction or Maintenance Work* (Workplace Health and Safety 2008) and be submitted for review and approval by CRC and the Department of Transport and Main Roads, where required.

Traffic management measures during operations will be considered during design. This is further discussed in **Chapter B14, Transport**.

B17.6.4 Vessel Traffic Management Plan

The Vessel Traffic Management Plan contains mitigation and management measures designed to reduce impacts from the dredging campaign. Management of health and safety aspects related to the dredging campaign are also within the scope of the plan. The plan is provided in **Chapter C3, Vessel Transport Management Plan**.

B17.6.5 Maritime Operations Management Plan

A Maritime Operations Management Plan has been prepared to reduce the potential for negative impacts on the environment, vessel safety and operational efficiency with the changes in maritime operational activities (operational shipping) as a result of the project. The Maritime Operations Management Plan is contained in **Chapter C4, Maritime Operations Management Plan**.

B17.6.6 Acid Sulfate Soils Management Plan

During construction and decommissioning, an Acid Sulfate Soils (ASS) Management Plan will be in place to treat any ASS that is identified. Due to the minimal excavations that are required for the landside component of the project, the risk that ASS will cause damage to property or the environment is low and can be managed using standard construction and geotechnical management measures.

B17.6.7 Security Management Plan

As mentioned in **Section B17.3.1**, the Port of Cairns is a Regulated Port under the *Maritime Transport and Offshore Facilities Securities Act 2003* (Cth) and has an approved security plan in place. This will be in place for all phases of the project.

B17.6.8 Emergency Management Planning

'Emergency Response' typically addresses the first three – 10 hours of an incident. In addressing incident control, it is focused on ensuring the safety of people, containing damage to the environment and limiting damage to business assets. Once the incident is controlled and the situation made safe, the emergency phase ends and recovery processes can commence.

The current Emergency Management Plan forms part of the Ports North Critical Infrastructure Protection program and details the arrangements for control and coordination of the response to and the recovery from an emergency involving vessels or port facilities. It provides timely and coordinated responses to emergencies and procedures to assist in restoring operations to normal.

The Operational Emergency Management Plan also references Port's North Seaport Risk Register which details the risks and locations that are covered in the plan. The following risks are assessed in the risk register:

- Security – evacuation, bomb threat, maritime fire or explosion, land fire or explosion, inadequate emergency response (RP)
- Assets infrastructure – Wharf 10, Reef Fleet Terminal, workshops, CCLT, city administration office, impact (RP), ship grounding or collision (RP)
- Environment – fuel and oil spill, vessel collision or grounding
- Natural events – tsunami, cyclone.

Within the Emergency Management Plan, emergency procedures are detailed for oil spills, fires or explosions, collisions or groundings, cyclones and tsunamis. A Quick Response Emergency Action Plan Guide has also been developed as part of the Emergency Management Plan. The guide is designed as a flip page book that can be carried in all vehicles/vessels and covers the following events:

- Oil, fuel or other chemical spill
- Land-based/maritime fire or explosion
- Vessel collision
- Vessel sinking
- Unlawful seizure of a vessel/vehicle
- Suspicious item
- Cyclone warnings
- Tsunami warnings
- Bomb threats
- Injured persons
- Media inquiries.

Ports North also has in place a CCLT Workplace Emergency Manual. This outlines the emergency procedures in place to facilitate safe, orderly and timely evacuation if necessary.

The current Emergency Management Plan as well as associated plans and procedures will be updated to reflect hazards and risks associated with the project prior to the commencement of operations.

B17.6.9 Magnetometer Survey

Possible UXOs within Trinity Inlet and Bay have been identified as a risk to the construction and operational capacity of the port and in order to reduce this risk and the associated likelihood of impacts a magnetometer survey will be undertaken by Port North, refer **Chapter B13, Cultural Heritage**.

B17.6.10 Environmental Management Plan

An Environmental Management Plan for construction, operations and decommissioning will be prepared based on the plan supplied in **Chapter C1, Environmental Management Plan (Construction and Operation)**. The Environmental Management Plan will contain management and mitigation measures to minimise the impact upon the environment. It will include measures to reduce the impact of noise and vibration, manage ASS, UXO and minimise the risk of fuel, oil or other chemical spills.

B17.6.11 Work Procedures

Work procedures will be implemented by Ports North and contractors during all phases of the project to enable safe and efficient work practices. Each work procedure will cover a different activity (e.g. trenching, fuel bunkering, and providing) and with implementation being the responsibility of which ever business undertakes the activity.

B17.6.12 Port Procedures and Information for Shipping

This document outlines the standard procedures to be followed in the pilotage area of the port. It contains information and guidelines to assist ship's masters, owners, and agents of vessels arriving at and traversing the area. It also provides details of the services and the regulations and procedures to be observed (TMR 2014). Although they are not directly prepared by Ports North, part of the purpose of the procedures is to reduce risks associated with operations within the port, and Ports North is required to comply with the procedures.

The document outlines procedures for:

- Quarantine and customs
- Dangerous goods
- Vessel security reporting
- Communications (e.g. VHF)
- Compulsory pilotage, port navigation and movement restrictions
- Work permits (e.g. for hot works, diving operations and bulk liquids)
- Dangerous cargo
- Safety procedures, including requirements for fire response and wharf evacuation
- Emergency plan responsibilities
- Marine incidents
- Environmental incident reporting requirements
- Security requirements for notification prior to entering the port, security zoning and reporting.

B17.7 Summary

As outlined above, the Construction Hazards and Risks identified have a Low to Medium residual risk rating whilst the Operational Hazards and Risks that are identified as being High are existing risks and not additional risks introduced by the delivery of the project. Those existing High risk activities are well established and actively managed by Ports North as part of existing management and operational practices, protocols and plans.