



Appendix D

Updated Risk Register

Risk Assessment

1.1 Introduction

This semi-quantitative risk assessment methodology was selected for the Project because it enables assessment (on a relatively consistent basis) of risks associated with social, environmental, and economic issues and events. Complex systems involving feedback mechanisms and multi-faceted inter-relationships were incorporated into the interactive risk assessment process through the use of a team of subject matter specialists, considered experts in their respective fields. In general terms, the method is a cyclical process based on the ISO/Australia and New Zealand Standard for Risk Management (ISO 31000:2009) framework, as presented in Figure D-1.

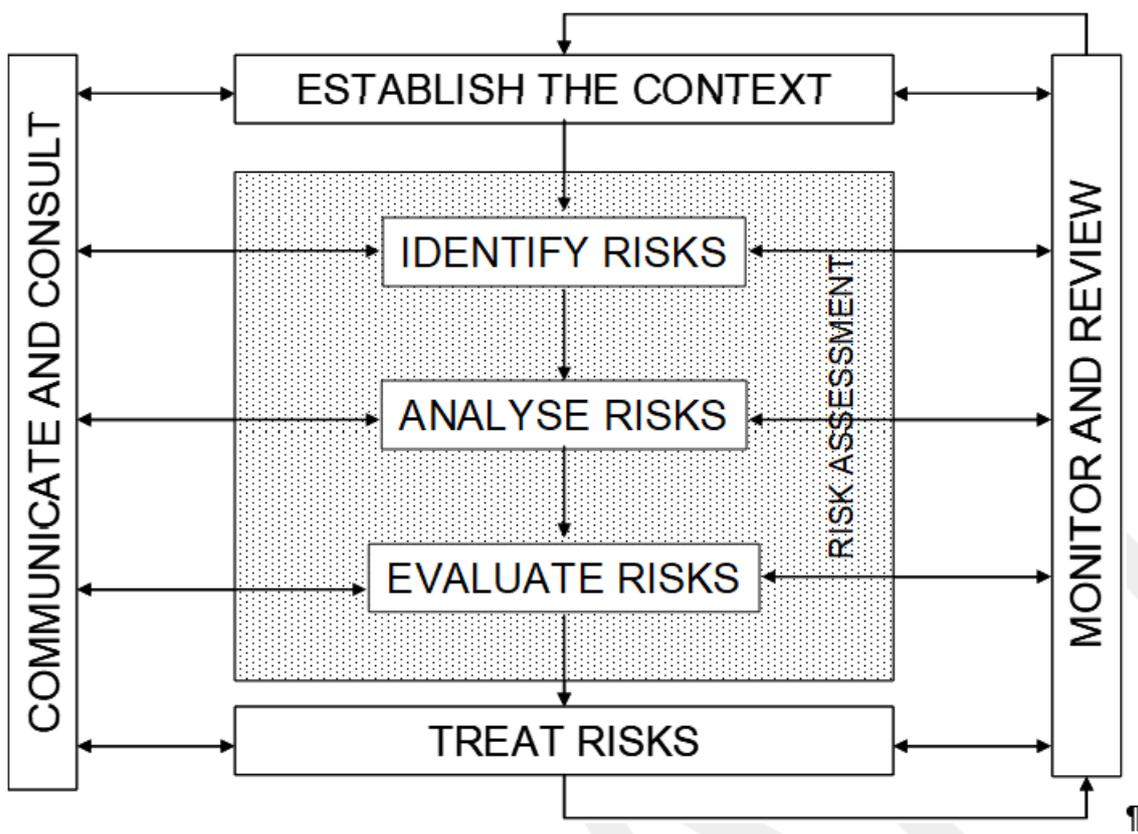


Figure D-1 Overview of ISO 31000 risk assessment and management program

1.2 Risk Quotient

Risk is identified as a condition resulting from the likelihood of an event occurring and the magnitude of its consequences. Both likelihood and consequence can be measured in several ways using different techniques, depending on the aims of the risk assessment and the nature of the risk issue. For the purposes of this study, risks were assessed in quantitative terms and a “risk” was defined by a risk “quotient”, which is:

$$\text{Risk Quotient} = \text{Likelihood} \times \text{Consequence}$$

Likelihood and consequence criteria are presented in Tables D-1 and D-2 respectively. Descriptors for environmental, social, economic and public health and safety consequence criteria are presented in Table D-3. The resulting risk matrix that determines the risk quotient is presented in Table D-4.

Table D-1 Likelihood criteria

Likelihood	Almost Certain	Several incidents of a similar nature has occurred here.
	Likely	A previous incident of a similar nature has occurred here.
	Possible	Could have occurred already without intervention.
	Unlikely	Recorded recently elsewhere.
	Very Unlikely	It has happened elsewhere.

Table D-2 Consequence criteria

Consequence	Extreme	As per consequence descriptor table.
	Major	As per consequence descriptor table.
	Moderate	As per consequence descriptor table.
	Minor	As per consequence descriptor table.
	Negligible	As per consequence descriptor table.

Table D-3 Consequence descriptors

CONSEQUENCE LEVEL		Negligible	Minor	Moderate	Major	Extreme
PROPERTY / INFRASTRUCTURE	Cost to repair / replace (and lost revenues)	Approximate range from \$0 to \$0.1 million.	Approximate range from \$0.1 to \$1 million.	Approximate range from \$1 to \$10 million.	Approximate range from \$10 to \$100 million.	Approximate range \$100 million to more than \$1 billion.
ENVIRONMENTAL	Ecosystem Function (need to consider resilience and resistance)	Alteration or disturbance to ecosystem within natural variability. Ecosystem interactions may have changed but it is unlikely that there would be any detectable change outside natural variation / occurrence.	Measurable changes to the ecosystem components without a major change in function (no loss of components or introduction of new species that affects ecosystem function). Recovery in less than 1 year.	Measurable changes to the ecosystem components without a major change in function (no loss of components or introduction of new species that affects ecosystem function). Recovery in 1 to 2 years following completion of Project construction.	Measurable changes to the ecosystem components with a major change in function. Recovery (ie within historic natural variability) in 3 to 10 years following completion of Project construction.	Long term and possibly irreversible damage to one or more ecosystem function. Recovery, if at all, greater than 10 years following completion of Project construction.
ENVIRONMENTAL	Habitat, communities and / or assemblages	Alteration or disturbance to habitat within natural variability. Less than 1% of the area of habitat affected or removed.	1 to 5% of the area of habitat affected in a major way or removed. Reestablishment in less than 1 year (relative to component seasonality) following completion of Project construction.	5 to 30% of the area of habitat affected in a major way or removed. Reestablishment in 1 to 2 years following completion of Project construction.	30 to 90% of the area of habitat affected in a major way or removed. Reestablishment in 3 to 10 years following completion of Project construction.	Greater than 90% of the area of habitat affected in a major way or removed. Reestablishment, if at all, greater than 10 years following completion of Project construction.
ENVIRONMENTAL	Species and / or groups of species (including protected species)	Population size or behaviour may have changed but it is unlikely that there would be any detectable change outside natural variation / occurrence.	Detectable change to population size and / or behaviour, with no detectable impact on population viability (recruitment, breeding, recovery) or dynamics. Recovery in less than 1 year (relative to species lifecycle) following completion of Project construction.	Detectable change to population size and / or behaviour, with no impact on population viability (recruitment, breeding, recovery) or dynamics. Recovery in 1 to 2 years following completion of Project construction.	Detectable change to population size and / or behaviour, with an impact on population viability and or dynamics. Recovery (ie within historic natural variability) in 3 to 10 years following completion of Project construction.	Local extinctions are imminent / immediate or population no longer viable. Recovery, if at all, greater than 10 years following completion of Project construction.
SOCIAL*	Amenity - Recreation	Short term interruptions in recreational use (say 1 to 2 days).	Activities restricted in a localised area for short-term periods (months).	Restriction on whole or parts of communities to pursue personal recreational pursuits when visiting the area during construction period. No impact post construction period.	Long term inability for whole communities to pursue personal recreational pursuits when visiting the area post construction period (ie. > 2 yrs).	Long-term inability for the general community to pursue personal recreational pursuits when visiting the area post-construction period for more than 10 years.
SOCIAL*	Amenity - Sensory / Perception (visual, noise, odour).	Short term impacts that alter perception of area as a high amenity place to live / visit. Region still seen as attractive place to live.	Short term (months) localised impacts that alter perception of area as a high amenity place to live / visit. Region not locally seen as attractive place to live.	Medium term (1-2 years) impacts that alter perception of area as a high amenity place to live / visit. Region not widely seen as attractive place to live.	Community perception that the area is significantly impacted. Area loses appeal as residential area. Recovery > 2 years.	Community perception that the area is significantly impacted as a residential location and a recreational area and is a place to be avoided. Recovery, if at all, >10 years.
SOCIAL*	Non-Aboriginal Heritage	No measurable alterations to existing natural and human processes already impacting on heritage sites.	Detectable impact to State or Commonwealth significant site with heritage values remaining largely intact. OR Partial reduction in heritage value intrinsic to non-State/Commonwealth significant site.	Partial reduction in heritage value intrinsic to State or Commonwealth significant site. OR Substantial reduction in heritage value intrinsic to non-State/Commonwealth significant site.	Substantial reduction in heritage value intrinsic to State or Commonwealth significant site. OR Complete loss of heritage value intrinsic to non-State/Commonwealth significant site.	Complete loss of heritage value intrinsic to State or Commonwealth significant site.
SOCIAL*	Aboriginal Heritage	No measurable change in existing natural and human processes	Partial and localised impact on one or more Aboriginal heritage sites.	Substantial damage / destruction / removal of a single site.	Complete destruction / removal of multiple sites in a localised area.	Complete destruction / removal of sites across multiple areas.

CONSEQUENCE LEVEL		Negligible	Minor	Moderate	Major	Extreme
		impacting on Aboriginal heritage sites.				
ECONOMIC*	Tourism	Limited and short-term reduction in tourist visitation. Limited impacts localised and not area wide. No significant impact on tourism businesses. Region still seen as attractive place to visit.	Short term reduction in tourism use. Recovery in less than 1 year.	Substantial reduction in tourism use. Recovery in 2-10 years.	Permanent reduction in visitation with changes in character of visitors. Impact area wide. Business viability compromised across wide range of sectors with substantial business failure in both direct and flow on sectors. Impact noticed on region.	Permanent loss of icon tourism assets of national significance. Significant flow on affects to supporting businesses.
ECONOMIC*	Shipping/Mining/Other industries (East Arm specific)	Disruption is of negligible consequence. Disruption for 1-2 hours.	Disruptions to other businesses for a day	Other businesses need to close for 2 days, or significant ongoing unexpected interruptions to other business.	Other businesses closed for 2-6 days.	Other businesses impacted for more than a week. Closure of shipping channel to all vessels. Infrastructure loss has extreme consequences. Shipping channel is not able to be opened for more than 1 week.
ECONOMIC*	Delayed project benefits	Project delayed by <1 month	Project delayed by 1-3 months	Project delayed by 3- 6 months.	Project delayed by 6months - 1 year.	Project delayed by more than 1 year.
PUBLIC HEALTH AND SAFETY	Minor injury / illness	Minor injury or illness to less than 10 individuals.	Minor injury or illness to between 10 and 100 individuals.	Minor injury or illness to between 100 and 1000 individuals.	N/A	N/A
PUBLIC HEALTH AND SAFETY	Major injury / illness	N/A	Major injury or illness to 1 individual.	Major injury or illness to between 1 and 10 individuals.	Major injury or illness to between 10 and 100 individuals.	Major injury or illness to between 100 and 1000 individuals.
PUBLIC HEALTH AND SAFETY	Fatality / serious injury, disability	N/A	N/A	1 fatality or serious injury	Between 1 and 10 fatalities or serious injuries	Greater than 10 fatalities / serious injuries

*This table was used to inform consequences during the initial risk assessment. Following the risk review process, a social and economic subject matter expert was engaged to assess the potential risks posed by the Project. The risk assessment methodologies used by these studies can be found in Appendix C: Social Impact Assessment.

Table D-4 Risk rating matrix

Risk Assessment Matrix		Consequence				
		Extreme	Major	Moderate	Minor	Negligible
Likelihood	Almost Certain	Very High	Very High	High	Medium	Low
	Likely	Very High	High	Medium	Medium	Low
	Possible	Very High	High	Medium	Low	Low
	Unlikely	High	Medium	Low	Low	Low
	Very Unlikely	High	Medium	Low	Low	Low

The risk assessment initially considered Project impacts in the absence of mitigation measures. Specific mitigation measures for adverse impacts were then considered and the assessment process was repeated to predict residual impacts (with the mitigation in place) to produce a draft risk register. Subject matter specialists then reviewed and updated the draft risk assessment register and scoring as technical studies and stakeholder consultations were completed, and the Project design and management measures were refined. As part of the specialist review, separate assessments were conducted by a social and economic specialist to further assess the potential risks posed by the Project. The methodology of these assessments can be found in Appendix C: Social Impact Assessment. An iterative approach was then taken to ensure that the mitigation and management measures were appropriate to achieve an acceptable level of residual risk.

Mitigation measures are presented in the environmental factor chapters (Chapters 7 to 11) and Chapter 13: Environmental Management Framework and summarised in the risk register below.

The process for assessment of impacts and risk and application of mitigation measures is summarised in Figure D-1.

Table D-5 EIS Risk Register

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Marine environmental quality	Construction	Dredging and spoil disposal - liberation of sediments into water column	Likely	Moderate	Medium	<p>A Dredging and Dredge Spoil Placement Management Plan (DDSPMP) will be developed that incorporates mitigation and management to minimise the impacts of suspended sediments on benthic communities.</p> <p>Modelling and assessments to support this EIS.</p> <p>Tailwater disposal through the EAW dredge settlement ponds utilising silt curtains and water quality monitoring before discharge into Darwin Harbour.</p>	Unlikely	Moderate	Low
Marine environmental quality	Construction	Disturbance of ASS - Potential to generate acidic and metal drainage/runoff	Likely	Moderate	Medium	<p>A Construction Environmental Management Plan (CEMP) which includes:</p> <ul style="list-style-type: none"> • Acid sulfate soil (ASS) Management Plan • unexpected finds protocol • Erosion Sediment Control Plan (ESCP) • suitable methodologies to minimise mud waving. 	Unlikely	Moderate	Low
Marine environmental quality	Construction	Earthworks - Discharge of sediment and associated contaminants from exposed soil during earthworks/construction phase	Almost certain	Moderate	High	<p>Construction methodologies developed to create a bund wall around the reclaim area before filling.</p> <p>Soil contamination investigations prior to EIS (Appendix N).</p> <p>A CEMP which includes:</p> <p>ASS Management Plan</p> <p>unexpected finds protocol</p> <p>ESCP.</p> <p>DDSPMP.</p> <p>Use of silt curtains during reclamation activities.</p>	Unlikely	Moderate	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Marine environmental quality	Construction and Operations	Reportable spills (hydrocarbons, chemicals, metals, paints etc) into marine environment	Almost certain	Moderate	High	Engaging with Port of Darwin regarding the Port Environmental Protection Plan. Marine Spill Response Plan in line with the Darwin Port Oil Spill Contingency Plan (OSCP) and (DIPL Marine) OSCP. Compliance with AS1940-2004 (Storage and handling of flammable and combustible liquids). Refuelling management plan. Spill kits located on site and appropriate personnel trained in their use.	Unlikely	Moderate	Low
Marine environmental quality	Operations	Discharge of contaminants (stormwater)	Almost certain	Moderate	High	Stormwater and wastewater system maintenance. OEMP to include mitigation to reduce build-up of contaminants on hardstand areas.	Unlikely	Moderate	Low
Marine flora and fauna	Construction	Dredging and Reclamation - Habitat modification	Very unlikely	Negligible	Low	DDSPMP, including monitoring and reactive management protocols. Modelling and assessments undertaken and included in EIS.	Very unlikely	Negligible	Low
Marine flora and fauna	Construction	Dredging and Reclamation - Liberation of sediments into water column (turbid plumes)	Likely	Moderate	Medium	DDSPMP, including monitoring and reactive management protocols. Modelling and assessments undertaken and included in EIS.	Unlikely	Moderate	Low
Marine flora and fauna	Construction	Dredging and Reclamation - Deposition of liberated sediments (sedimentation)	Likely	Moderate	Medium	DDSPMP, including monitoring and reactive management protocols. Modelling and assessments undertaken and included in EIS.	Unlikely	Moderate	Low
Marine flora and fauna	Construction	Dredging and Reclamation - Changes in hydrodynamic and wave conditions (erosion and accretion)	Unlikely	Minor	Low	DDSPMP, including monitoring and reactive management protocols. Modelling and assessments undertaken and included in EIS.	Unlikely	Minor	Low
Marine flora and fauna	Construction	Dredging and Reclamation - Underwater noise and vibration	Likely	Minor	Medium	DDSPMP, including monitoring and reactive management protocols. Modelling and assessments undertaken and included in EIS.	Unlikely	Minor	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Marine flora and fauna	Construction	Piling - Underwater noise and vibration	Likely	Minor	Medium	Marine Noise and Vibration Management Plan, incorporating marine fauna observations and reactive management protocols.	Unlikely	Minor	Low
Marine flora and fauna	Construction	Earthworks - Discharge of contaminants (sediments, stormwater)	Almost Certain	Minor	Medium	ESCP. Stormwater Management Plan. Compliance with AS1940-2004 (Storage and handling of flammable and combustible liquids). Stormwater retention and treatment systems incorporated into Project design.	Possible	Minor	Low
Marine flora and fauna	Construction	Earthworks- Potential to generate acidic and metal drainage, mud waving and stockpiling of ASS	Likely	Moderate	Medium	ASS Management Plan.	Unlikely	Moderate	Low
Marine flora and fauna	Construction and Operations	Vessel discharges - Hydrocarbon or chemical spills	Almost Certain	Moderate	Medium	Marine Spill Response Plan. Refuelling plan.	Unlikely	Minor	Low
Marine flora and fauna	Construction and Operations	Marine traffic - Vessel strike	Possible	Major	High	Vessel speed limitations aligned with Darwin Port Harbourmaster requirements. Standard navigational procedures and navigation aids. Protected Marine Species Management Frameworks to be adopted by Construction Contractors to reduce the potential for vessel strike.	Unlikely	Major	Medium
Marine flora and fauna	Construction and Operations	Marine traffic - Vessel grounding	Likely	Negligible	Low	Vessel speed limitations aligned with Darwin Port Harbourmaster requirements. Standard navigational procedures and navigation aids.	Possible	Negligible	Low
Marine flora and fauna	Operation	Discharge of contaminants (stormwater)	Almost Certain	Minor	Medium	Stormwater and wastewater system maintenance. OEMP that includes spill response measures.	Unlikely	Minor	Low
Marine flora and fauna	Construction and Operations	Lighting	Unlikely	Minor	Low	OEMP and CEMP will address light spill into marine environment from vessels and infrastructure. Light spill will be reduced to as low as practically possible through the implementation of lighting in accordance	Unlikely	Minor	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
						with the National Light Pollution Guidelines for Wildlife (DEE, 2020). Detailed design of the facility will incorporate lighting in accordance with National guidelines.			
Marine flora and fauna	Construction and Operations	Introduction of marine pests	Likely	Extreme	Very High	Preparation and implementation of a Biosecurity Management Plan and inspection protocols. Consultation with the Aquatic Biosecurity Unit to ensure consistency with existing quarantine arrangements for Darwin Harbour facilities. Waste management procedures to capture biofouling removed from vessels on the hardstand areas.	Unlikely	Extreme	High
Air quality and greenhouse gas	Construction	Dust emissions from activities, including reclamation, dredge spoil placement and stockpiles	Likely	Minor	Medium	Incorporation of a Construction Air Quality Management Plan (CAQMP) into the CEMP. Inform adjoining neighbours of construction activities. Dust management controls including limiting movement of dusty materials when dust levels are high, eliminating dust production at the source, use of water trucks and covering stockpiles and materials during transport.	Unlikely	Minor	Low
Air quality and greenhouse gas	Construction	Emissions from plant and vessels	Likely	Minor	Medium	Incorporation of a CAQMP into the CEMP. Limit vehicle speed on site. Seal permanent roads and areas planned to be sealed as soon as practicable. Efficient operation of machinery, equipment, vehicles, ships and dredges to minimise emissions. Clean up residues and spills in a timely manner.	Unlikely	Minor	Low
Air quality and greenhouse gas	Operations	Emissions from sandblasting and paint spraying	Likely	Minor	Medium	Incorporation of a CAQMP into the OEMP. The operational procedures shall detail the blast and paint facility maintained in a controlled environment to ensure air emissions are only released via the roof vents. Air released to atmosphere via the roof exhaust stacks shall be passed through	Unlikely	Minor	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
						particulate, VOC and odour capturing filters prior to exhaust to the atmosphere. Before blasting the Operator will undertake a risk assessment to determine the likelihood of lead paint presence and confirm through testing where relevant. Develop procedures for spray painting and managing anti fouling paint. Minimise the use of hull stain removers. Storage of solvents and waste material in containers to prevent emissions. Keep spray guns and lines clean and well maintained.			
Air quality and greenhouse gas	Operations	Emissions from operational traffic, vessels and plant	Likely	Minor	Medium	Incorporation of a CAQMP into the CEMP. Use of shore power while ships are at berth. Operate machinery and equipment to minimise exhaust emissions. Design and construct blast and paint facility using accepted practice control technologies with the aim to minimise the risk of VOC and particulate matter fugitive emissions as much as practical Install and correctly maintaining particulate and VOC control technologies. Ensure temporary building extension of the blast and paint facility for larger vessels maintains the controlled environment.	Unlikely	Minor	Low
Air quality and greenhouse gas	Construction	Increase in greenhouse gas emission resulting in global warming	Possible	Moderate	Medium	Maintain equipment and vehicles to ensure engine and fuel efficiency. Reduce travel distances both on-site and off-site. Minimise idling time of plant and equipment and switch engines off when not in use. Minimise the extent of vegetation cleared during construction. Recycle any waste produced where feasible.	Unlikely	Moderate	Low
Air quality and greenhouse gas	Operations	Increase in greenhouse gas	Possible	Moderate	Medium	Consider NTG's towards 2050 policy.	Unlikely	Moderate	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
		emission resulting in global warming				Procure power from renewable energy suppliers where practicable. Prioritise the selection and use of electric vehicles and equipment if possible. Maintain equipment and vehicles to ensure engine and fuel efficiency.			
Terrestrial environmental quality	Construction	Disturbance of contamination, ASS, or leaching of acid water, during construction.	Likely	Moderate	Medium	Preparation of an ASS Management Plan An unexpected finds procedure to identify and manage contaminated materials if present.	Unlikely	Moderate	Low
Terrestrial environmental quality	Construction	Loss of containment of construction wastes	Likely	Major	High	Engineering design to capture all hazardous waste and wastewater. A water treatment system installed during Project construction. Waste management programs which includes routine maintenance for all waste management systems.	Unlikely	Moderate	Low
Terrestrial environmental quality	Construction and Operations	Loss of containment or spills of chemicals, hydrocarbons and hazardous substances	Possible	Major	High	Chemical storage and handling procedures which includes minimising storage onsite Stormwater management system. Spill response procedures including marine spill response plan and availability of spill kits and training.	Unlikely	Moderate	Low
Terrestrial environmental quality	Operations	Loss of containment or wastes (including potentially hazardous grit blast waste material, antifoulant, organisms cleaned from vessels, removal of anodes, paint, sewage, run-off)	Possible	Major	High	Waste management programs which includes a routine maintenance for all waste management systems. Routine maintenance of wastewater and water treatment systems with links to Biosecurity Management Plan. Routine maintenance of stormwater management systems.	Unlikely	Moderate	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
Terrestrial flora and fauna	Construction	Impacts on migratory birds known to roost on Pond D at East Arm Wharf from pile driving activities	Likely	Minor	Medium	Adoption of suitable construction methodologies to minimise impacts from pile driving noise. Preparation and implementation of a Construction Noise and Vibration Management Plan (CNVMP) to support the CEMP. Light spill will be reduced to as low as practically possible through the implementation of lighting in accordance with the National Light Pollution Guidelines for Wildlife (DEE, 2020).	Unlikely	Minor	Low
Terrestrial flora and fauna	Construction	Spread of introduced weed species and pest species from movement of vehicles, vessels, machinery, materials and equipment	Likely	Moderate	Medium	Management practices to prevent the introduction and spread of weeds to be included in the CEMP and linked to the Biosecurity Management Plan as appropriate.	Possible	Minor	Low
Terrestrial flora and fauna	Operation	Spread of introduced weed and pest species movement of vehicles, vessels, machinery, materials and equipment	Likely	Moderate	Medium	Management practices to prevent the introduction and spread of weeds to be included in the CEMP and linked to the Biosecurity Management Plan as appropriate.	Possible	Moderate	Medium
Inland waters and hydrological processes	Construction	Discharge of sediments and contaminates from exposed soils	Almost Certain	Moderate	High	Preparation of a CEMP containing an ESCP reflecting relevant Australian Standards including the use of silt curtains. Unexpected finds protocols for contamination and ASS. DDSPMP. Stormwater management system.	Possible	Moderate	Medium
Inland waters and hydrological processes	Construction	Loss of containment or spills of chemicals, hydrocarbons and hazardous substances	Possible	Major	High	Chemical storage and handling procedures including minimising hazardous materials stored on site. Stormwater management system. Spill response procedures including marine spill response plan and availability of spill kits and training.	Unlikely	Moderate	Low
Inland waters and hydrological processes	Construction	Increased peak flow rate of stormwater discharges due to	Likely	Moderate	Medium	Project design and drainage strategy to incorporate stormwater outfall structures with appropriate low velocity minimisation and energy dissipation measures.	Unlikely	Minor	Low

Factor	Phase	Aspect	EIS mitigations			EIS mitigations	Residual Risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
		increase in impervious areas				Ongoing monitoring and maintenance of stormwater systems.			
Inland waters and hydrological processes	Operations	Loss of containment or spills of chemicals, hydrocarbons and hazardous substances	Possible	Major	High	<p>Contain, treat and reuse wastewater from wash down and blast and paint bays and manage solid waste material to system.</p> <p>Ongoing monitoring and maintenance of wastewater treatment system and stormwater management system.</p> <p>Chemical storage and handling procedures including minimising hazardous materials stored on site.</p> <p>Spill response procedures including marine spill response plan and availability of spill kits and training.</p>	Unlikely	Moderate	Low
Human health	Construction	Increase in biting insect populations and associated health risks to workers and community	Likely	Moderate	Medium	<p>Designs and stormwater management plans to include a drainage strategy.</p> <p>Biting Insect Management Plan compliant with NT Medical Entomology guidelines</p> <p>Monitor impacts associated with disposal of dredge spoil to land (if required).</p> <p>Ensure Biosecurity Management Plan includes requirements in relation to mosquitoes and international health regulations.</p>	Possible	Minor	Low
Human health	Operations	Increase in biting insect populations and associated health risks to workers and community	Likely	Moderate	Medium	<p>Biting Insect Management Plan compliant with NT Medical Entomology guidelines</p> <p>Ensure Biosecurity Management Plan includes requirements in relation to mosquitoes and international health regulations.</p>	Possible	Minor	Low
Human health	Construction	UXO detonation disturbance or detonation	Possible	Major	High	<p>Cultural heritage assessment including liaison with Heritage Branch regarding archaeological assessments.</p> <p>UXO to be incorporated into unexpected finds procedures.</p> <p>UXO risk assessment to be undertaken prior to construction works.</p>	Very unlikely	Moderate	Low

Table D-6 SIA Risk Register

Factor	SIA theme	Phase	Social impact or opportunity	Initial rating	SIA mitigation s	Residual rating
Social economic and cultural	People and communities - impacts on social fabric, health and wellbeing, vulnerable community segments	Construction	Reduced sense of safety as a result of road trauma	High	Traffic Management Plan covering construction traffic and haul roads. Implementation of a heavy vehicle priority systems to reduce truck stopping and increase traffic flow. Organised bus transport for workers to reduce the number of vehicles travelling to site and potential traffic congestion. Collaboration with Landbridge's traffic management plan for Darwin Port. Communication with other road users during any peak transport tasks, such as haulage of equipment and materials. Government's proposed overpass at the intersection of Berrimah Road and Tiger Brennan Drive.	Low
Social economic and cultural	People and communities - impacts on social fabric, health and wellbeing, vulnerable community segments	Construction and Operations	Reduced sense of marine safety as a result of dredging and increased marine activity on the harbour	Medium	Navigational requirements and marine safety plan including high safety standards and communication of standards and expectations to all Project staff. Harbour Master's Notices to Mariners. Good communication with other harbour users, including recreational fishing/boating community before the start of marine works and during the design and construction phase to advise of operations and safety requirements.	Low
Social economic and cultural	Cultural identity	Construction and Operations	Loss of cultural heritage due to damage, or reduced access, including fears and anxieties of damage to sites or custodians' responsibilities.	High	Aboriginal Areas Protection Authority (AAPA) Certificate. Cultural Heritage Management Plan including implementing restricted work areas and cultural protocols. Unexpected finds protocols. Monitor changes in tidal flow and sediment mobility at Catalina Island and Old Man Rock areas pre- and post-construction. Close working relationship with custodians to monitor and avoid damage.	Medium
Social economic and cultural	Cultural identity	Construction	Loss or damage to declared or valued European heritage sites, including World War II sites.	Medium	Liaison with Heritage Branch to develop interpretive signage telling the story of World War II historical and non-declared sites that will be lost. Additional marine archaeological surveys of the Project footprint Drone 3D recording of the Project area. Monitoring of sediment impacts on Catalina 2 and 3 pre- and post-construction. Larger vessel exclusion zone around Catalina 2 during construction. Arrange for the Rushcutter to be moved to a place where it can be protected and restored. Unexpected finds protocols.	Medium

Factor	SIA theme	Phase	Social impact or opportunity	Initial rating	SIA mitigation s	Residual rating
Social economic and cultural	Economics -including jobs, industry participation, livelihoods, economic development)	Construction and Operations	Strong and more diverse economy from enabling economic infrastructure and capacity building	Noticeable (positive)	Northern Territory Government's economic and investment attraction strategies to maximise benefits unlocked by the infrastructure: <ul style="list-style-type: none"> collaborative strategic planning between the Marine Industry Development Plan, gas industry task force and Middle Arm master planning a Territory Benefit Plan for the project, to maximise local industry participation and jobs NTG to prepare an Australian Industry Participation Plan. 	Beneficial (positive)
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Construction and Operations	Local businesses benefit from winning work and enhanced capabilities	Imperceptible (positive)	Design and construct contractor's local industry and Aboriginal participation plan, to meet NTG's Territory Benefit Plan. To include outline of how tenders will be packaged and promoted to suit local capacity, procurement processes that prioritise the local market and good communication of opportunities for local businesses. Industry Capability Network capability mapping to highlight local capacity and address any gaps. Maritime Industry Development Plan. Industry briefings in conjunction with the NT ICN to enhance the preparedness of local businesses to win work and manage expectations. Accountability and reporting requirements for prime contractors and their sub-contractors against local participation provisions.	Noticeable (positive)
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Construction	Frustration by businesses who fail to win tenders or have unrealistic expectations of opportunities	Low	Territory Benefit Plan to outline requirements for design and construction contractor, including packaging and promoting tenders to suit local capacity, procurement processes that prioritise the local market and good communication of opportunities for local businesses. Industry briefings in conjunction with the NT ICN to enhance the preparedness of local businesses to win work and manage expectations. Accountability and reporting requirements for prime contractors and their sub-contractors against local participation provisions. Ongoing communication to manage local content expectations and provide early advice of opportunities.	Low
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Construction and Operations	Enhanced employment and training of local people	Imperceptible (positive)	Territory Benefit Plan and contractor participation plans, including recruitment processes prioritising the local market. Maritime Industry Development Plan on workforce development. Good communication about jobs available on the Project.	Noticeable (positive)
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Construction and Operations	Aboriginal jobs and training as a result of the project	Imperceptible (positive)	Aboriginal Engagement Plan (required by Northern Australia Infrastructure Facility) to maximise Aboriginal employment and Aboriginal enterprises winning work on the project. Territory Benefit Plan to outline approach to employment and training of local Aboriginal people. Ongoing development of workforce development and skills development for the marine sector, through the Marine Industry Development Plan. Good communication about jobs available on the Project. Compliance framework to ensure accountability by contractors against commitments to employ and train local Aboriginal people.	Noticeable (positive)

Factor	SIA theme	Phase	Social impact or opportunity	Initial rating	SIA mitigation s	Residual rating
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Operations	Crowding out of other economic sectors on the harbour such as tourism and recreational fishing	Low	While the Project is predicted to have negligible to no impact on recreational and tourism businesses, monitor during construction.	Low
Social economic and cultural	Economics (jobs, industry participation, livelihoods, economic development)	Planning and Operations	Detrimental impacts on competing maritime businesses	Medium	Development of a common user facility and expanded marine repairs and maintenance industry grows the sector. Development of a Maritime Industry Development Plan with input from local industry to enhance capacity development.	Low
Social economic and cultural	Living environment	Construction	Reduced residential amenity due to traffic and noise during construction	Low	Management plans in place, including: Traffic Management Plan Air Quality Management Plan Construction Noise and Vibration Management Plan Marine Works Safety Plan. Monitoring and adaptive management of amenity impacts, such as noise and vibrations from piling, road and sea traffic congestion, dust and dredge plumes. Environmental incident reports on exceedances that create amenity impacts, such as noise and vibrations, road and sea traffic congestion, dust and dredge plumes. The Construction Contractor will develop a Complaints Management Procedure to ensure that complaints are dealt with efficiently and effectively, and stakeholders have confidence in the complaints management system.	Low

Note:

Following the risk review process, a social and economic subject matter expert was engaged to assess the potential risks posed by the Project. The risk assessment methodologies used by these studies can be found in Appendix C: Social Impact Assessment of the Draft EIS.