

APPENDIX M

Impact Events Register

NORTHERN
WATER PROJECT



IMPACT EVENT REGISTER

This Appendix provides a summary of the evaluation of uncertainty for all potential impact events that have been identified for the Northern Water Project EIS. Only chapters for which impact events have been identified and assessed are addressed in this Appendix.

The evaluation follows the method outlined in Chapter 8 Impact Assessment Methodology.

For each impact event, Table 1 below outlines:

- the expected level of impact, as presented in the relevant impact assessment chapter in the EIS
- the level of certainty in the assessment of expected impact (classified using the factors outlined in Table 8-4 in Chapter 8)
- an evaluation of uncertainty using the risk assessment process outlined in Table 8-5 and Table 8-6 in Chapter 8, for impact events with a ‘Low’ or ‘Medium’ level of certainty.

Where the level of certainty in assessment of expected impacts is ‘High’, uncertainty is not evaluated further.

In the evaluation of uncertainty, the assessment considers the credible worst-case consequence that could occur (and the likelihood of such a consequence occurring) if assumptions made in the impact assessment were found to be incorrect.

Table 1: Impact events

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
CHAPTER 9: USE OF LAND AND MARINE WATERS							
Land Use							
<i>Land Access Management Plans and property-specific Land Management Plans will minimise the potential for disruption to landholder operations during the construction phase.</i>	Disruption of landholder operations and activities due to: • requirements for land access for surveys, construction and monitoring for transfer system and electricity infrastructure construction • requirements to move livestock out of construction zones	Negligible	High	Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
	Disruption to landholder activities at the desalination plant site due to the extended construction period	Minor	Medium	Level of uncertainty due to the unpredictability of the nature or extent of landholder disruptions over the extended construction period at the desalination plant site.	Minor	Possible	Low
<i>A Third Party Agreement with Defence will minimise the potential for disruption to Defence operations and training activities during the construction phase</i>	Construction activities on defence land disrupt Defence operations and training activities.	Negligible	High	The Third Party Agreement between Defence and the Project establishes the requirements to ensure Project construction activities do not impede Defence's capabilities and site access.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Impacts to property infrastructure and access during construction will be managed in consultation with landholders</i>	Loss of access or damage to property infrastructure including tracks and fences	Minor	High	Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
	Changes to landholder movement across the property due to construction of desalination plant access	Minor	High	Effects of loss of access on landholder operations during construction will be negotiated with the landholder to ensure impacts are minimised.	N/A	N/A	N/A
<i>Ongoing engagement with landholders will seek to minimise impacts to lifestyle amenity as a result of construction activities</i>	Presence and movement of construction workers, vehicles and equipment disrupts landholder amenity	Negligible	High	Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
	Disruption to landholder lifestyle and amenity on Mullaquana Station due to the presence and movement of construction workers, vehicles and equipment and the extended construction period	Minor	Medium	Level of uncertainty due to the unpredictability of the nature or extent of impacts to landholder amenity over the extended construction period at the desalination plant site.	Minor	Possible	Low
<i>Impacts to land use from land disturbance from pipeline and transmission line construction will be minimised by post-construction reinstatement activities and landholder consultation</i>	Disturbance of land and vegetation reduces suitability for ongoing land use	Negligible	High	Land clearance will be reinstated in agreement with affected landholders and Project CEMP. Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
<i>Implementation of best practice vehicle hygiene during Project activities will minimise the risk of introducing or spreading weeds, pests or pathogens</i>	Introduction or spread of weeds, pests and pathogens	Negligible	Medium	Level of uncertainty is due to lack of information of extent of the presence of weeds, pests and pathogens at the time of construction and dependent on the effectiveness of the implemented control measures	Minor	Possible	Low
<i>Consultation with landholders on location of Project infrastructure has considered potential long-term impacts on landholder activities</i>	Presence of Project infrastructure impacts future land uses including mining tenements.	Negligible	High	Consultation with directly affected landholders about location of Project infrastructure will minimise potential for long term impacts. Third party agreements will be executed where there is a known potential for an interface of activities to occur.	N/A	N/A	N/A
	Transfer system pipeline impacts ongoing Defence operations and training activities at the Cultana Training Area.	Negligible	High	Defence has formally approved the proposed siting of the Project's infrastructure through CUTA. Terms for ongoing access to the permanent easement will be agreed between the State and Commonwealth.	N/A	N/A	N/A
<i>Engagement with landholders regarding ongoing access requirements will minimise disruption to land use and minimise property access and security impacts</i>	Presence of access tracks increase potential for unauthorised access to properties.	Negligible	High	Consultation with directly affected landholders about access to their properties will minimise property security impacts. Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Impacts to communications will be momentary and limited to passing under transmission lines</i>	Presence of transmission lines interferes with communication networks and radio frequencies	Negligible	High	There is a very limited number of potential receptors in the vicinity of transmission lines. Widely used design standards to reduce impacts have been demonstrated to be effective at a range of sites.	N/A	N/A	N/A
Use of marine waters							
<i>Desalination plant design and implementation of a Marine and Coastal Construction Environmental Management Plan will minimise impacts to nearby marine parks</i>	Marine construction works impact conservation values and uses of Marine Parks	Negligible	High	Impacts due to water quality may occur surrounding construction zones but is not expected to impact on the marine parks due to their distance from construction activities. Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
<i>Impacts to marine users as a result of the exclusion zone surrounding the desalination plant intake and outfall pipes are not expected</i>	Exclusion zone reduces access to the area available for marine activities.	Negligible	High	Proposed exclusion zone will reduce the area available for marine activities however the proposed area will constitute less than 0.006% of the Spencer Gulf marine waters. Management measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
CHAPTER 10: COASTAL PROCESSES							
<i>Selection of tunnel boring construction methodology will avoid construction impacts to the active coastal zone and coastal hydrodynamic environment</i>	Construction of intake and outfall structures impacts sediment transport and the hydrodynamic regime	Negligible	High	Construction avoids the active coastal zone. No pathway for impact to occur.	N/A	N/A	N/A
<i>Seabed disturbance for construction of intake and outfall structures will have negligible impacts on coastal processes</i>	Construction of intake and outfall structures impacts the seabed, suspends sediments and hydrodynamic environment	Negligible	High	Construction avoids the active coastal zone. No pathway for impact to occur.	N/A	N/A	N/A
<i>No release of spoil or water produced by the TBM during construction is expected as it will be managed with settling ponds</i>	Spoil and water generated by the tunnel boring process impacts local coastal zone and coastal processes	Negligible	High	No discharge of water or construction spoil from the TBM process to the coastal or marine environment – managed on land. No pathway for impact to occur.	N/A	N/A	N/A
<i>(Operation)– There will be no impact to coastal processes or the coastal environment from the presence of the intake/outfall structures</i>	Presence of desalination infrastructure in marine environment impacts local coastal processes	Negligible	High	No permanent infrastructure in the nearshore active coastal zone. No pathway for impact to occur.	N/A	N/A	N/A
CHAPTER 11: MARINE ENVIRONMENT							
Habitat impacts (benthic habitats and flora)							
<i>Marine construction works will result in the direct loss (permanent and temporary) of a small area benthos (subtidal Zostera seagrass and sandy habitats)</i>	Marine construction works result in the removal, clearance, damage and/or disturbance of marine habitats and species (e.g. seagrass, benthic fauna)	Negligible	High	Marine ecology baseline studies (including seagrass and benthic mapping) are detailed and extensive providing high certainty in the location of receptors. Calculated areas of potential impact resulting from the Reference Design are accurate.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
				For the intended removal, clearance or damage to seagrass as part of Project construction, approval is being sought under the <i>Native Vegetation Act 1991</i> and through the EIS process. The Project will seek to avoid and minimise damage to these sensitive habitats, and a Significant Environmental Benefit (SEB) would offset any unavoidable native vegetation removal.			
<i>Increased turbidity and sedimentation from marine construction works will have short term localised impacts on benthic habitats</i>	Increased turbidity and sedimentation from marine construction works will impacts benthic habitats and species	Minor	High	Appropriate and industry standard strategies would be adopted to mitigate turbidity and sedimentation (to be confirmed as part of detailed design and in management plans).	N/A	N/A	N/A
<i>Introduction of new hard substrate/infrastructure in the marine environment encourages settlement by opportunistic species leading to localised ecological changes (not including IMS)</i>	Introduction of new hard substrate encourages settlement by opportunistic species/ acting as artificial reef, altering local habitat composition and ecology	Negligible	High	Appropriate and industry standard strategies would be adopted to mitigate harmful colonisation of new substrates during construction and operation (to be confirmed as part of detailed design and in management plans).	N/A	N/A	N/A
Marine discharge during construction							
<i>Temporary marine construction discharges are not planned and hence will not impact water quality, seagrass or intertidal communities</i>	Temporary marine construction discharges to marine environment leads to increased nutrient/chemical/turbidity impacting marine ecosystem	Negligible	High	Temporary marine construction discharges are not planned and hence will not impact water quality, seagrass or intertidal communities. Wastewater produced on the marine jack-up barge will be collected and temporarily stored in wastewater tanks. Wastewater will then be pumped out onto another tank on the supply vessels for transport back to Whyalla Port and then discharged on land according to the relevant approval processes.	N/A	N/A	N/A
<i>Natural landform and active stormwater management measures will be effective to protect the marine environment</i>	Stormwater discharge to marine environment leads to increased nutrient/chemical/turbidity impacting marine ecosystem	Negligible	High	Stormwater management designs and strategies have been adopted that prevent discharge of stormwater from the Project to the marine environment (refer to Chapter 13 Surface Water and Appendix H-7 Stormwater Management Plan).	N/A	N/A	N/A
Underwater noise and vibration							
<i>Underwater noise from construction (tunnelling, boring and piling) will be short term and localised and, with management measures in place, are not expected to cause injury/behavioural response in marine fauna</i>	Underwater noise from construction (piling, tunnelling, boring) affects marine fauna	Minor	High	Mitigation and management measures for underwater noise from construction will include "soft start" procedures and establishing safety zones for marine mammals during piling. Activity-specific safety zones (detailed in Appendix G-9) have been established for implementation during impact piling during construction. These measures will help to ensure noisy activities cease as	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
				marine mammals approach and do not cause injury/behavioural response in marine fauna. Marine underwater modelling has been undertaken to predict potential impacts on marine fauna.			
<i>Vibration from construction (tunnelling, boring, dredging, piling) will be short term and localised and, with management measures in place, may elicit a minor behavioural response in benthic invertebrates</i>	Underwater vibration from construction (piling, tunnelling, boring, dredging) affects marine benthic invertebrates	Minor	Medium	The fauna considered in this assessment are limited to benthic marine invertebrates since vibration of the substrate does not directly affect pelagic animals. Impacts to benthic marine invertebrates from vibration are not well understood. The short-term nature of the piling in any one location means the worst-case consequence from vibration remains minor, and as low as practicable.	Minor	Unlikely	Low
<i>Underwater noise and vibration from operation (noise from pumps) will not lead to injury/behavioural response in marine fauna</i>	Underwater noise and vibration from operation (noise from pumps) affects marine fauna	Negligible	High	Underwater noise modelling results, detailed in Appendix G-9, provide a comprehensive overview of the anticipated noise levels and their spatial distribution. Noise contour plots illustrate the areas affected by operational noise, indicating that sound levels will diminish rapidly beyond the immediate vicinity of the intake and outfall structures. Noise impacts on fauna from day-to-day operation (i.e. from intake and outlet pumps) are expected to be contained within 40 m of the intake and outfall risers.	N/A	N/A	N/A
Operation – Return water dilution and dispersion							
<i>Return water dilution and dispersion will achieve 95% marine species protection in close proximity to the diffuser</i>	Return water dilution and dispersion does not meet EPA water quality requirements (is not adequate to protect 95% of species at appropriate distance from the diffuser)	Minor	High	Based on 10 th percentile dilutions 51 GL/y scenario, the area potentially affected by dilutions below the 95% protection level was not more than 13 ha, with a maximum modelled distance of 370 m from the diffuser. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions.	N/A	N/A	N/A
<i>Potential accumulation of salinity during dodge tides will be short-term and is not expected to lead to significant stratification</i>	Weak mixing conditions during dodge tides may lead to short term accumulation of salt in marine waters	Negligible	High	Short-lived salinity accumulation and stratification within 500 m due to tides / currents at the site. The modelling results indicate that dissolved oxygen depletion is unlikely to happen as a result of the return water discharge (see Appendix G-12 for further details).	N/A	N/A	N/A
<i>Temperature of the return water will not impact on the marine environment</i>	Ineffective mixing of return water at the outfall may lead to elevated seawater temperature altering water	Negligible	High	Significant temporal natural variation in marine water temperature	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
	quality and leading to ecological impacts			Modelling shows minimal difference with or without desalination plant operation. Temperature changes in close proximity to the diffusers are barely discernible.			
<i>The return water is not expected to impact on habitat-forming mangrove, seagrass and Bryozoan communities</i>	Discharge of return water impacts mangrove, seagrass, bryozoan habitats	Negligible	High	The following sensitive receptor locations all exceeded a 99.7% species protection level (refer to Appendix G-3 Table 21) – nearby Posidonia, Amphibolis and Zostera seagrass habitat boundaries, intertidal mangrove boundary, Bryozoan beds, Upper Spencer Gulf Marine Park and Franklin Harbour Marine Park. Small area of potential impact, seagrass avoided by return water zone of potential effect, sensitive receptor habitats well represented throughout USG. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions.	N/A	N/A	N/A
<i>The zone of potential ecological effect may have minor, localised, and intermittent impact on sandy habitat</i>	Discharge of return water impacts sandy benthic habitats (increased salinity)	Minor	High	Small area of potential impact, seagrass avoided by return water zone of potential ecological effect, impacted sandy habitats well represented throughout USG. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions. If assumptions are wrong, still likely to remain minor impact.	N/A	N/A	N/A
<i>Dilution of the return water would be effective and ensure protection of epibenthic fish and invertebrates</i>	Dilution of return water is not adequate to protect 95% of species at appropriate distance from the diffuser, impacting on epibenthic fish and invertebrates	Minor	High	Plume dispersion modelling predicts that return water mixing and dilution would be effective to protect fish and invertebrates from chronic impact as the 95% species protection level is achieved in close proximity to the diffusers (outside a 13 ha area, across all seasons). Fish are also able to osmoregulate. No examples were found in the literature of a desalination plant negatively impacting epifauna communities. Seagrass avoided by zone of potential ecological effect. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
				different seasons, based on conservative assumptions.			
<i>Dilution of the return water would be effective and ensure protection of infauna</i>	Dilution of return water is not adequate to protect 95% of species at appropriate distance from the diffuser, impacting on infauna	Negligible	High	Plume dispersion modelling predicts that return water mixing and dilution would be effective to protect infauna from chronic impact as the 95% species protection level is achieved in close proximity to the diffusers (outside a 13 ha area, across all seasons). No examples were found in the literature of a desalination plant negatively impacting infauna communities provided a diffuser was used to facilitate return water dispersion. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions.	N/A	N/A	N/A
<i>Chemical content of the return water will not impact marine biota</i>	Discharge of chemicals (used as part of the desalination plant process) in return water impacts marine biota (through introduction of toxicants)	Negligible	Medium	The safe dilution rates derived for salinity ecotoxicity are likely to also be protective for antiscalant and CIP chemical toxicity (Appendix G-10). Examples from other desalination plants suggest that antiscalants and other cleaning chemicals generally make a negligible contribution to the toxicity of the return water (Appendix G-10). Chemical usage is subject to detailed design, but will be in line with those approved by the South Australian EPA for use at the Adelaide desalination plant.	Minor	Unlikely	Low
<i>Total suspended solids from the desalination pre-treatment / backwash process will not impact the receiving environment</i>	TSS from return water impacts flora and fauna	Negligible	High	Suspended solids from the desalination plant backwash process are predicted to have no impact on the receiving marine environment, as the modelled changes in total suspended solids are small and within natural variation. Proven pre-treatment technology commonly employed in industrial, municipal, and mining applications, notably including seawater desalination and coastal wastewater. Pre-treatment system collects and manages solid waste on land with no spoil or algal matter being returned to the marine environment.	N/A	N/A	N/A
<i>Although stratification may be influenced by the return water for up to 500 km from the outfall, the limited duration and extent of the stratified layer would not be sufficient to</i>	Discharge of return water leads to water column stratification and resultant anoxic conditions near the sea floor (impacts to marine biota)	Minor	High	Dispersion modelling suggests stratification may be influenced by the return water for up to 500 m from the outfall, however, given the return water will be greater than 80% saturated, the limited duration and	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>impact near bed dissolved oxygen concentrations</i>				extent of the stratified layer would be insufficient to impact near bed dissolved oxygen concentrations.			
<i>There will be negligible long-term effects to the salinity of Spencer Gulf from the desalination plant return water (including interactions with climate change)</i>	Discharge of return water leads to long term effects in Spencer Gulf (in conjunction with climate change)	Negligible	High	Far field modelling climate scenario undertaken by SARDI was undertaken using a well developed model. The far field model is calibrated against a robust and long-term dataset, including IMOS data. Independent peer review has confirmed the appropriateness of the model.	N/A	N/A	N/A
<i>Desalination plant operation will not result in impacts to conservation significant marine species</i>	Plant operation leads to impacts to conservation significant species	Negligible	High	Plume dispersion modelling predicts that return water mixing and dilution would be effective to protect marine species from chronic impact as the 95% species protection level is achieved in close proximity to the diffusers (outside a 13 ha area, across all seasons). Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions.	N/A	N/A	N/A
<i>Desalination plant return water will not result in impacts to commercially important (aquaculture or fishery) species</i>	Desalination plant return water will impact commercially important (aquaculture or fishery) species	Negligible	High	Plume dispersion modelling predicts that return water mixing and dilution would be effective to protect marine species from chronic impact as the 95% species protection level is achieved in close proximity to the diffusers (outside a 13 ha area, across all seasons). The Project design has specifically avoided disturbance to coastal and intertidal areas and to long established dense Posidonia seagrass beds. Dilution of the return water within all seagrass and mangrove habitats would be sufficiently high often enough to protect more than 99% of species from chronic impacts, resulting in negligible risk to these ecosystems. All of the species most relevant to fisheries near Mullaquana Station have a tolerance for higher salinity than would be experienced as a result of return water discharge, as inferred from their distribution in the USG. Fish have the ability to move or osmoregulate. Extensive baseline data available, expert inputs, validated model, provides accurate predictions over different seasons, based on conservative assumptions.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
Light Spill							
<i>Night lighting at the desalination plant will be designed to meet best practice standards as not to create light spill into the marine environment, and will not impact marine fauna</i>	Illumination at night from desalination plant during operation displaces / disturbs nearby fauna	Negligible	Medium	The marine area adjacent the desalination plant site is not a highly utilised location for threatened or migratory species. It is not a known regular migration pathway for whales, turtles or the Giant Australian Cuttlefish. Key design and operational mitigations will be confirmed as part of detailed design and will include applying best practice lighting design principles from the National Light Pollution Guidelines for Wildlife (DCCEW). Incorporating effective design and mitigation measures is expected to minimise light spill such that marine fauna will not be adversely exposed to lights from the desalination plant operation.	Minor	Unlikely	Low
Entrainment							
<i>Entrainment of larvae via desalination plant intake during operation will not impact regional populations of ecologically/commercially/culturally important species</i>	Entrainment of plankton (including eggs) and larvae via desalination plant intake during operation impacts regional species population	Minor	Medium	Intake velocity is <0.15 m/s as calculated for the Reference Design. Entrainment modelling took a conservative approach and was based on the highest capacity modelled scenario (i.e. the hypothetical case of 73 GL/y). This provides confidence that results would be overestimating entrainment for the design capacity (i.e. 51 GL/y).	Minor	Rare	Low
<i>Entrapment of marine species in desalination plant intake structure during operation is not expected to occur, and will not impact regional species populations of ecologically/commercially/culturally important species</i>	Entrapment of marine species in desalination plant intake structure during operation impacts regional species population	Negligible	High	The seawater intake is positioned and designed to minimise entrainment of fish and other pelagic biota. The intake is raised 3 m from the seabed to avoid entrainment of sand or benthic organisms, and the presence of intake grills/screens would prevent the likelihood of larger animals entering. The intake has been designed with a low intake velocity (<0.15 m/s) to allow for fish to safely swim away from the intake structure, and the intake screen (with velocity cap) will be designed to exclude larger materials.	N/A	N/A	N/A
Marine Biosecurity							
<i>The impact to marine ecology from the introduction, establishment or spread of marine invasive species during construction will be effectively mitigated and managed</i>	Introduction or spread of marine pest species/disease via vessels/equipment during construction results in impacts to ecology	Minor	Medium	One invasive marine species is present within the MSA, the European fan worm (Appendix G-15). Appropriate and industry standard strategies would be adopted to mitigate invasive marine species (to be confirmed as part of detailed design and in management plans).	Major	Rare	Medium

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>The impact to marine ecology from the introduction, establishment or spread of marine invasive species during operations will be effectively mitigated and managed</i>	Introduction or spread of marine pest species/disease via vessels/equipment during operation results in impacts to ecology	Moderate	Medium	One invasive marine species is present within the MSA, the European fan worm (Appendix G-15). Appropriate and industry standard strategies would be adopted to mitigate invasive marine species (to be confirmed as part of detailed design and in management plans). Regular ongoing maintenance and monitoring required.	Major	Rare	Medium
Waste from spent tunnel boring machine							
<i>There will be no ongoing contamination risk associated with the TBM remaining in the marine environment</i>	Hydrocarbons or other contaminants from TBM head released into environment and lead to contamination	Negligible	High	Once the intake and outfall tunnels have been constructed the TBM(s) will be drained of all oil and fuel and where possible machine parts may be salvaged for reuse or recycling. The TBM 'shell' will then be grouted / concreted in place. This is a standard practice for TBMs and has been used in various tunnelling projects associated with desalination plants and urban development including the channel tunnel between England and France.	N/A	N/A	N/A
Option Case Assessment- Float and Sink Pipeline Option							
<i>The Float and Sink Pipeline Option would involve a greater extent of seabed disturbance to install and accommodate the pipeline on the seabed than the Reference Design and impacts are assessed as Minor</i>	Seabed disturbance from construction of the Float and Sink Pipeline Option will impact on marine fauna	Minor	High	Marine ecology baseline studies (including seagrass and benthic mapping) are detailed and extensive providing high certainty in the location of receptors. Calculated areas of potential impact resulting from the Reference Design and option case are accurate. For the intended removal, clearance or damage to seagrass as part of Project construction, approval is being sought under the <i>Native Vegetation Act 1991</i> and through the EIS process. The Project will seek to avoid and minimise damage to these sensitive habitats, and a Significant Environmental Benefit (SEB) would offset any unavoidable native vegetation removal.	N/A	N/A	N/A
<i>Construction of the Float and Sink Pipeline Option will increase Project underwater noise generation compared to the Reference Design, and the impacts on marine fauna of underwater noise generated by this Option are considered Minor</i>	Underwater noise from construction of the Float and Sink Pipeline Option will impact on marine fauna	Minor	High	Mitigation and management measures for underwater noise from construction will include "soft start" procedures and establishing safety zones for marine mammals during piling. Activity-specific safety zones (detailed in Appendix G-9) have been established for implementation during impact piling during construction. These measures will help to ensure noisy activities cease as	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
				marine mammals approach and do not cause injury/behavioural response in marine fauna. Marine underwater modelling has been undertaken to predict potential impacts on marine fauna.			
<i>Operation of the desalination plant with the Float and Sink Pipeline Option implemented would have a negligible increase in the potential for Project underwater noise generation compared to the Reference Design from the noise emitted through the seabed pipe</i>	Underwater noise from operation of the Float and Sink Pipeline Option will impact on marine fauna	Negligible	High	The Noise and Vibration Assessment (Appendix G-9) assumed that for engineering purposes, the sunk pipe would need to be relatively stiff and thick-walled. Such a pipe would substantially limit vibration of the pipe and therefore significantly reduce underwater noise radiation into the surrounding water column, making adverse impacts on marine fauna from outlet pump or flow-induced underwater noise radiated from the pipes unlikely.	N/A	N/A	N/A
<i>The impact to marine ecology from the introduction, establishment or spread of marine invasive species during construction and operation will be effectively mitigated and managed and the expected impact remain similar to the Reference Design</i>	Option case leads to introduction, establishment or spread of marine invasive species during construction and operation	Moderate	Medium	One invasive marine species is present within the MSA, the European fan worm (Appendix G-15). Appropriate and industry standard strategies would be adopted to mitigate invasive marine species (to be confirmed as part of detailed design and in management plans). Regular ongoing maintenance and monitoring required.	Major	Rare	Medium
CHAPTER 12. SOILS, LANDFORM AND GEOLOGY							
<i>The potential for soil erosion due to Project activities is low and will be readily managed through best practice erosion and sediment controls</i>	Disturbance of soil for construction results in erosion of soils within and outside the construction area.	Negligible	Medium	Site specific data is not available for the entire alignment; however, control strategies are industry standard and proven effective.	Minor	Rare	Low
<i>Pipeline construction will be appropriately managed to maintain soil viability and minimise loss of topsoil</i>	Incorrect stockpiling of topsoils or poor stockpile stabilisation results in a decline in soil viability or quantity due to mixing with subsoil or wind and water erosion.	Negligible	High	Control strategies are industry standard and proven effective. Additional data would not change the level of impact or management measures required.	N/A	N/A	N/A
<i>Compacted soils in areas of temporary disturbance will be rehabilitated following construction</i>	Compaction of soils during pipeline construction results in an ongoing reduction in soil fertility.	Negligible	Medium	Construction methodology is industry standard noting site specific methodology may be required in sand dune areas where the risk is higher.	Minor	Rare	Low
<i>Pipeline design will consider the potential presence of acid sulfate soils and impacts will be prevented by appropriate construction methodology</i>	Disturbance of acid sulfate soils during construction results in acidification generation and a decline in soil or water quality	Minor	Medium	Assessment has been based on regional data and there may be small areas of previously unidentified ASS that could be uncovered. Industry standard control measures will be used and procedures for unexpected finds of ASS will be included in CEMP.	Moderate	Rare	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Pipeline construction has considered areas of saline soils and disturbance will be managed to prevent impacts to soils, surface water and vegetation</i>	Disturbance of existing saline soil results in reduced quality of vegetation or surface water.	Negligible	Medium	There is some uncertainty regarding construction methodology around salt lakes (where presence of saline soils occurs). Industry standard control measures will be used to manage soils.	Minor	Rare	Low
<i>Contamination of soil is not expected to occur as result of Project activities due to implementation of appropriate storage and handling of fuels and chemicals</i>	Spills of chemicals or hydrocarbons results in contamination of soils.	Negligible	High	Industry standard control measures are widely established.	N/A	N/A	N/A
<i>Previously contaminated soil will be appropriately managed and reused where possible in accordance with the waste management hierarchy</i>	Disturbance of contaminated soils results in mobilisation of contamination.	Negligible	Medium	Assessment has been based on regional data and there may be small areas of previously unidentified contamination that could be uncovered. Industry standard control measures will be used and included in CEMP.	Moderate	Rare	Low
<i>Spoil from Project earthworks will be assessed for appropriate re-use in accordance with the waste management hierarchy</i>	Excess spoil/imported fill – changes soil profile, fertility, etc.	Negligible	High	Site specific data has been obtained for desalination plant site, control measures are industry standard.	N/A	N/A	N/A
<i>Negligible impacts are expected from the use of saline water for dust suppression</i>	Use of saline water for dust suppression results in impacts to soils	Negligible	High	Industry standard control measures are widely established.			
<i>Impacts to the pipeline from ground movement due to the presence of collapsible soils, expansive clays and karst features will be minimised through pipeline design</i>	Collapsible soils, expansive clays and karst features cause issues for rehabilitation resulting in surface subsidence or increased soil erosion.	Negligible	Medium	Identification of problem soils is based on the existing level of survey work and assessment. Site specific controls for problem soils to be incorporated into detailed design.	Minor	Rare	Low
<i>Desalination plant design has considered risks of ground subsidence over the 100-year design life of the Project</i>	Collapse of intake / outfall tunnels due to ground pressure.	Negligible	High	Site specific geotechnical investigations have been undertaken. Design of tunnels that can withstand pressures is well understood and will be refined further through detailed design.	N/A	N/A	N/A
CHAPTER 13: SURFACE WATER							
<i>Pipeline construction methodology and other infrastructure siting will be designed to avoid sedimentation of watercourses</i>	Vegetation clearance / disturbance of soil for pipeline construction results in sedimentation of surface water	Negligible	Medium	Controls are well understood and industry standard. Construction methodology for watercourses is subject to detailed design.	Minor	Unlikely	Low
<i>Dewatered groundwater from construction of watercourse, road and railway crossings will be reused where possible or discharged or disposed of in accordance with EPA requirements</i>	Dewatering of excavations (i.e. from rainfall or saline groundwater if intersected) and subsequent discharge, leads to a decrease surface water quality	Minor	Medium	Some uncertainty regarding presence of groundwater at locations as well as construction methodology. Management of waste water will be in accordance with industry standard controls.	Minor	Possible	Low
<i>Release of hydrotest or chlorinated water will be in accordance with appropriate industry standards to avoid impacts to sensitive environments</i>	Release of hydrotesting water or chlorinated product water impacts aquatic ecosystems	Negligible	High	Well known impacts and control measures. No sensitive ecosystems near discharge points.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Stormwater structures at pump stations and substations will be designed to ensure post development discharge does not exceed pre-development and all discharge meets required water quality targets</i>	Onsite stormwater management strategies at pump stations or substations lead to a decrease in surface water quality.	Negligible	Medium	Plans to be developed through detailed design. Well known impacts and control measures. No sensitive ecosystems near pump stations or substations.	Minor	Possible	Low
<i>Potential impacts to surface water quality during construction will be minimised by implementing best practice management of stormwater</i>	Vegetation clearance / disturbance of soil for desalination plant construction results in erosion and subsequent sedimentation of surface water	Negligible	High	Well known impacts and control measures. No sensitive ecosystems near discharge points.	N/A	N/A	N/A
<i>Stormwater structures at the desalination plant will be designed to ensure post development discharge does not exceed pre-development and all discharge meets required water quality targets</i>	Onsite stormwater management strategies leads to a decrease surface water quality	Negligible	High	Well known impacts and control measures. No sensitive ecosystems near discharge points.	N/A	N/A	N/A
<i>Transfer system and electrical infrastructure construction and operations will not alter drainage patterns and surface water flow regimes</i>	Construction of pipeline alters surface water flows, impacting downstream users and environments	Negligible (buried pipe) – Minor (above ground installation)	Medium	Construction methodology for each watercourse will be finalised through detailed design. Control measures for the various options are well understood and examples of similar, effective controls are currently available in the project area.	Minor	Unlikely	Low
<i>Contamination of surface water is not expected to occur as a result of Project activities due to appropriate storage and handling of fuels and chemicals</i>	Spills of chemicals or hydrocarbons results in contamination of surface water	Negligible	High	Industry standard control measures are widely established.	N/A	N/A	N/A
<i>Impacts to surface water users from Project construction and operation will be negligible</i>	Presence of desalination plant alters surface water flows and quality, impacting adjoining land users and environments	Negligible	Medium	Surface water users have been identified at a desktop assessment. Any water quality impacts from construction will be short term and stormwater management plans during operations aim to maintain flow levels.	Minor	Unlikely	Low
<i>Management of potential impacts to surface water quality from construction of transfer system infrastructure will avoid impacts to aquatic ecology</i>	Construction impacts from transfer system reduces water or soil quality, impacting upon aquatic ecosystems.	Negligible	Medium	Uncertainty in potential for minor adjustments to the placement of infrastructure resulting from detailed design or application of construction methodologies	Minor	Rare	Low
CHAPTER 14: GROUNDWATER							
<i>Short-term groundwater drawdown is expected at the desalination plant site during construction of the box cut, decline and tunnel boring machine (TBM) launch facilities. Impact to GDEs, threatened ecological communities or registered groundwater users is expected to be avoided</i>	Groundwater abstraction (within desalination plant site) results in drawdown of aquifers and reduction in groundwater availability for flora, fauna and groundwater users	Negligible	Medium	Groundwater modelling has been undertaken based on some site specific baseline data, however, temporal data is limited. Effective strategies to be adopted as part of detailed design.	Moderate	Unlikely	Medium

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>through implementation of proposed mitigation measures</i>							
<i>Dewatering for construction of the box cut, decline and TBM launch facilities, at Mullaquana Station is unlikely to lead to oxidation of potential acid sulphate soils</i>	Dewatering of groundwater at desalination plant site causes oxidation of potential Coastal Acid Sulphate Soils (CASS) and results in contamination of soil, water and vegetation community.	Negligible	Medium	Groundwater modelling has been undertaken based on some site specific baseline data, however, temporal data is limited. Effective strategies to be adopted as part of detailed design.	Moderate	Unlikely	Medium
<i>A short-term reduction in groundwater due to dewatering from pipeline excavations is not expected to impact groundwater dependent ecosystems</i>	Interception of groundwater during construction of transfer system reduces quantity available to potential GDEs.	Negligible	Medium	While there is limited available data along the transfer system, the impacts are minor, well known and can be managed using industry standard control measures.	Minor	Unlikely	Low
<i>Groundwater drawdown during construction of the pipeline is not expected to impact registered groundwater users</i>	Interception of groundwater during construction of transfer system reduces quantity available to other users.	Negligible	Medium	Uncertainty is related to potential for unregistered bores close to the transfer system that would not be identified through desktop searches.	Minor	Unlikely	Low
<i>Contamination of groundwater is not expected to occur as a result of Project activities due to implementation of appropriate storage and handling of fuels and chemicals</i>	Spills of chemicals or hydrocarbons results in contamination of groundwater.	Negligible	High	Well known industry standard control measures, insufficient volumes of chemicals or hydrocarbons to result in impact to groundwater.	N/A	N/A	N/A
CHAPTER 15: TERRESTRIAL FLORA AND FAUNA							
<i>Approximately 1992 ha of native vegetation will be cleared during construction along the approximately 406 km length of the Project. The majority of this is temporary and represents a very small proportion of native vegetation in the region traversed by the Project. This clearance will be offset by achieving a SEB in accordance with the Native Vegetation Act</i>	Vegetation clearance results in removal of remnant vegetation and habitat for flora and fauna.	Minor	Medium	Final clearance areas are not defined and may vary from expected. Ineffective implementation of management measures (e.g. designated clearance extent) could also result in larger clearance than expected.	Moderate	Rare	Low
<i>Progressive rehabilitation of temporary disturbance following construction in accordance with the Project's rehabilitation framework and management plans will reduce the long-term impact of vegetation clearance</i>	Ineffective rehabilitation of temporary disturbance does not reduce the long-term impact of vegetation clearance.	Negligible	Medium	Final clearance areas are not defined and may vary from expected. Success of rehabilitation and rate of regeneration could vary depending on external factors (e.g. rainfall, stocking rates)	Moderate	Rare	Low
<i>The Project will not significantly increase habitat fragmentation</i>	Construction and presence of the Project leads to the fragmentation of habitat.	Negligible to Minor	Medium	Final clearance areas are not defined and may vary from expected. Prediction of fragmentation impacts is based on limited data.	Moderate	Rare	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Indirect impacts to vegetation and fauna habitats will be short term and limited in extent</i>	Activities including vegetation clearing, earthworks and vehicle movement generate dust emissions that reduce vegetation health	Negligible to Minor	Medium	Effectiveness of management measures could vary if implementation is inadequate or in extreme weather events.	Minor	Possible	Low
	Erosion and sedimentation from disturbed areas or alteration of surface water flows impact vegetation and fauna habitats	Negligible	Medium	Effectiveness of management measures could vary if implementation is inadequate or in extreme weather events.	Minor	Unlikely	Low
	Activities such as wastewater management, dewatering or dust suppression using saline water reduce health of adjacent vegetation or impedes regrowth after rehabilitation	Negligible	Medium	Final locations, water salinity and extent of use are not defined.	Minor	Possible	Low
	Accidental spills / loss of containment from the transport, storage and handling of hydrocarbons and chemicals impact vegetation or habitats	Negligible	Medium	Unplanned event (e.g. due to accident or ineffective implementation of management measures) could occur and event and/or cleanup could result in impact to vegetation and habitat.	Minor	Unlikely	Low
<i>Lighting effects at camps and other sites during construction will be short term and localised and will not have a significant impact on fauna</i>	Illumination at night from camp and construction areas adversely impacts nearby fauna	Negligible	Medium	Final locations of camps and extent of lighting at facilities during construction are not known.	Minor	Unlikely	Low
<i>Lighting at the desalination plant during operation will not have a significant impact on fauna</i>	Illumination at night from desalination plant during operation displaces or adversely impacts nearby fauna	Negligible	Medium	Ecological assessments provide a high level of confidence that there are not important populations of light-sensitive species at or near the site, however survey coverage is limited to the vicinity of the site.	Minor	Unlikely	Low
<i>Noise disturbance during construction will be temporary and localised and will not have a significant impact on fauna</i>	Noise and vibration from plant and equipment during construction impacts fauna on and beyond the Project site	Negligible to Minor	Medium	There is spatial and temporal variability in the occurrence and extent of fauna species present, and the area over which behavioural or masking responses may occur is broadly estimated.	Minor	Possible	Low
<i>Noise generated during operation at the desalination plant and pump station sites will be localised and will not have a significant impact on fauna</i>	Noise during from desalination plant and pump station sites during operation impacts fauna on and beyond the Project site	Negligible to Minor	Medium	There is spatial and temporal variability in the occurrence and extent of fauna species present at the sites, and the area over which behavioural or masking responses may occur is broadly estimated.	Moderate	Rare	Low
<i>Measures will be implemented to minimise the incidence of fauna injury or mortality during construction. Any impacts would be short term and localised to the work front and are not likely have a significant impact on any species</i>	Construction activities result in injury or fauna mortality (e.g. vehicle strike, entrapment in excavations)	Negligible to Minor	Medium	The frequency of collision or entrapment may vary (e.g. with favourable environmental conditions)	Minor	Possible	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Potential for collision with transmission line infrastructure. is not expected to have a significant impact on any species</i>	Presence of transmission lines results in bird strike / electrocution resulting in injury or fatality to threatened species, listed migratory species or other species	Negligible	Medium	Flight paths and behaviours of birds that occur in the region, including waterbirds, are variable and can influence mortality rates.	Minor	Possible	Low
<i>Construction activities may temporarily displace fauna, with no expected long-term population impacts</i>	Construction activities result in temporary displacement of fauna	Negligible	Medium	There is spatial and temporal variability in the occurrence and extent of fauna species present and the degree to which they may be displaced.	Minor	Unlikely	Low
<i>Project activities and the presence of access tracks and other operational infrastructure are not expected to result in an increase in the existing level of pest species</i>	Vegetation clearance of the pipeline and access track increase opportunity for feral animal predation and / or competition	Negligible	Medium	There is spatial and temporal variability in the occurrence and extent of pest species (e.g. they may increase in response to favourable environmental conditions). Ineffective implementation of management measures (e.g. covering of waste) could also result in larger impact than expected.	Minor	Unlikely	Low
<i>Project activities are not expected to result in an introduction, increase or spread of weeds above existing levels</i>	Introduction or spread of weeds during construction or operation results in habitat degradation	Minor	Medium	There is spatial and temporal variability in the occurrence and extent of weed species (e.g. they may increase in response to favourable environmental conditions). Ineffective implementation of management measures (e.g. hygiene practices) could also result in larger impact than expected.	Moderate	Unlikely	Medium
<i>Project activities are not expected to result in introduction or spread of pathogens</i>	Introduction or spread of pathogens during construction or operation results in habitat degradation	Negligible	High	No pathogens of concern for native flora and fauna have been identified.	N/A	N/A	N/A
<i>The level of risk associated with fires during construction and operation can be appropriately managed with the implementation of risk treatment and mitigation measures</i>	Inadequate management of Project fire risk results in loss or degradation of vegetation and habitat and fauna injury / mortality	Negligible	High	Control strategies are industry standard and proven effective. However an impact could still occur as a result of extreme weather events or ineffective implementation of management measures.	Moderate	Rare	Low
<i>There are no Critically Endangered or Endangered TECs (i.e. MNES under the EPBC Act) present and there is no expected impact to TECs listed as Vulnerable under the EPBC Act</i>	Vegetation clearance impacts EPBC-listed critically endangered or endangered ecological communities	Negligible	High	Ecological assessments have indicated there are no critically endangered or endangered ecological communities present.	N/A	N/A	N/A
<i>There are no critically endangered or endangered TECs (i.e. MNES under the EPBC Act) present and there is no expected impact to TECs listed as Vulnerable under the EPBC Act</i>	Vegetation clearance impacts EPBC-listed vulnerable ecological communities	Negligible	Medium	There is uncertainty in modelling of groundwater drawdown adjacent to the desalination plant (refer to Chapter 14 Groundwater above).	Moderate	Unlikely	Medium

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>The Project will not impact any State-listed TECs</i>	Vegetation clearance impacts State-listed threatened ecological communities	Negligible	High	Ecological assessments have indicated there are no State-listed ecological communities present.	N/A	N/A	N/A
<i>There are no impacts expected to any EPBC-listed flora</i>	Vegetation clearance impacts EPBC-listed flora	Negligible	High	Ecological assessments have indicated there are no EPBC-listed flora species present or possibly occurring.	N/A	N/A	N/A
<i>The Project is not expected to have a significant impact on most species of EPBC-listed fauna. It may have a significant impact on Western Grasswren, which can be compensated for through implementation of offsets. No long-term impacts to EPBC-listed fauna are expected</i>	Vegetation clearance and other Project disturbance impacts EPBC-listed threatened fauna	Minor (Western Grasswren) Negligible (other species)	Medium	There is spatial and temporal variability in the occurrence and extent of fauna species, and some uncertainty in the predictions of extent and severity of impact.	Moderate (Western Grasswren) Minor (other species)	Unlikely	Medium (Western Grasswren) Low (other species)
<i>No significant impacts to EPBC-listed migratory fauna are expected</i>	Vegetation clearance and other Project disturbance impacts EPBC-listed migratory fauna	Negligible	High	There is a high level of certainty due to the very limited extent of potentially suitable habitat identified in desktop and field surveys.	N/A	N/A	N/A
<i>No significant or long-term impacts to State-listed threatened flora and fauna are expected</i>	Vegetation clearance and other Project disturbance impacts State listed flora and fauna	Negligible	Medium	There is spatial and temporal variability in the occurrence and extent of species, and some uncertainty in the predictions of extent and severity of impact.	Minor	Unlikely	Low
<i>The Project will not have a significant impact on other flora and fauna species, including Rare or regionally listed species</i>	Vegetation clearance and other Project disturbance impacts other flora and fauna species, including Rare or regionally listed species	Negligible	Medium	There is spatial and temporal variability in the occurrence and extent of species.	Minor	Unlikely	Low
<i>The Project will not have a significant impact on any culturally significant species</i>	Vegetation clearance impacts culturally significant species	Negligible	Medium	There is spatial and temporal variability in the occurrence and extent of species. Final clearance areas are not defined and may vary from expected.	Minor	Unlikely	Low
<i>As the expected impacts are largely short term and related to the construction phase, there is limited vulnerability of affected terrestrial flora and fauna under climate change scenarios</i>	Vulnerability of flora and fauna to impacts from the project increases under climate change scenarios	Negligible	Medium	There is uncertainty in the level of interaction between regeneration success and climate change scenarios.	Minor	Unlikely	Low
CHAPTER 16: ABORIGINAL CULTURAL HERITAGE							
<i>No known cultural heritage will be impacted by the Project due to infrastructure site and alignment selection, engagement with Traditional Owners and the undertaking of cultural heritage surveys</i>	Inappropriate location of infrastructure results in damage, disturbance or interference with sites, objects or remains.	Negligible	High	Desktop review, engagement and extensive cultural heritage surveys undertaken with Traditional Owner groups. Siting of infrastructure will not impact cultural heritage as the implementation of management measures has been assumed to be effective.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Aboriginal sites, objects or remains that may be inadvertently discovered during construction, operations or maintenance will be addressed through heritage management processes agreed through ILUA negotiations, including Aboriginal Cultural Heritage Agreement and Management Plans, CHMPs, ILUA Implementation Plans, the Project CEMP and OEMP, and in compliance with the Aboriginal Heritage Act 1988 (AH Act)</i>	Discovery of unknown Aboriginal sites, objects or remains during construction or operations may result in damage, disturbance or interference with Aboriginal heritage values.	Minor	Medium	Despite surveys being undertaken and the presence of monitors, level of uncertainty remains due to the potential for discovery of unknown sites of Aboriginal heritage, particularly at sites sch as watercourse and dune crossings.	Moderate	Rare	Low
	Operational and maintenance activities associated with the Project result in impacts to Aboriginal cultural heritage.	Negligible	High	Approved areas have been determined as a result of numerous cultural heritage surveys. Access tracks will be established alongside the pipeline for use during maintenance activities. All works to be undertaken in accordance with CHMPs and an OEMP.	N/A	N/A	N/A
<i>Operational and maintenance activities associated with the Project are not expected to result in impacts to Aboriginal cultural heritage as no activities will be conducted outside previously disturbed or surveyed areas and as long as agreed operational cultural heritage management measures are implemented as required</i>	Access outside approved areas damages, disturbs or interferes with sites, objects or remains of Aboriginal heritage significance	Negligible	High	Approved areas have been determined as a result of numerous cultural heritage surveys. All works to be undertaken in accordance with CHMPs and OEMP.	N/A	N/A	N/A
CHAPTER 17: NON-ABORIGINAL CULTURAL HERITAGE							
<i>Project infrastructure locations and alignments have been selected to avoid known sites of heritage significance</i>	Inappropriate location of infrastructure impacting non-Aboriginal cultural heritage	Negligible	High	There is a high level of certainty in the baseline assessment of existing non-Aboriginal cultural heritage.	N/A	N/A	N/A
<i>Discovery of potential sites or objects of cultural heritage significance will be managed in accordance with CEMP procedures</i>	Land disturbance during construction results in the discovery of historic or archaeological sites or objects	Negligible	High	There is a high level of certainty in the baseline assessment of existing non-Aboriginal cultural heritage. There is a high level of certainty in strategies, controls and mitigations to be adopted in an CEMP.	N/A	N/A	N/A
<i>Discovery of potential sites or objects of cultural heritage significance will be managed in accordance with OEMP procedures</i>	Operational activities result in impacts to non-Aboriginal cultural heritage	Negligible	High	There is a high level of certainty in the baseline assessment of existing non-Aboriginal cultural heritage. There is a high level of certainty in strategies, controls and mitigations to be adopted in an OEMP.	N/A	N/A	N/A
<i>Discovery of historic shipwreck material or relics will be managed in accordance with procedures in the Marine and Coastal Construction Environmental Management Plan</i>	Marine construction or operations activities result in disturbance or damage to historic shipwreck material.	Negligible	High	While there is a level of uncertainty in the exact location of shipwrecks in relation to Project marine infrastructure, there is a high level of certainty in strategies, controls and mitigations to be adopted in the Marine and Coastal CEMP.	N/A	N/A	N/A
CHAPTER 18: AIR QUALITY							

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Dust generation from construction activities at Mullaquana Station infrastructure sites will not have a significant impact on the small number of sensitive receptors</i>	Dust generation from construction activities at Mullaquana Station Desalination Plant and infrastructure.	Negligible	Medium	Limited site specific data available, air quality modelling not undertaken, however, the impacts are well understood and easily managed using industry standard control strategies.	Minor	Unlikely	Low
<i>Impacts to sensitive receptors during construction of water delivery infrastructure will be short-term, localised and minor</i>	Dust generation impacts sensitive receptors during construction of water delivery infrastructure.	Negligible	Medium	Limited site specific data available, air quality modelling not undertaken, however, the impacts are well understood and easily managed using industry standard control strategies.	Negligible	Unlikely	Low
<i>Construction sites will be promptly and effectively rehabilitated to minimise the potential for ongoing dust impacts</i>	Dust impacts to sensitive receptors from construction of transfer system.	Negligible	Medium	Rehabilitation strategies will vary along the alignment and are subject to climactic conditions. However, there are very few close sensitive receptors.	Minor	Possible	Low
<i>Effective dust management will minimise impacts of deposited dust on vegetation</i>	Construction activities result in deposited dust impacting upon vegetation.	Negligible	Medium	Threshold of impact for deposited dust on vegetation will be species specific, dust strategies are well known to be effective.	Negligible	Unlikely	Low
<i>Odour impacts from construction at the desalination plant site will be managed through appropriate separation distances between receptors and saturated sediments storage locations</i>	Odour impacts from construction of desalination plant bringing saturated sediments to surface.	Negligible	High	Distance from sensitive receptors will limit this impact without further control strategies required. Unlikely to have future land use changes at Mullaquana Station.	N/A	N/A	N/A
<i>There is a low risk of odour impact from desalinated water and pipeline air valves</i>	Odour impacts from transfer system.	Negligible	High	No source of impact.	N/A	N/A	N/A
<i>Traffic and wheel generated dust during inspection and regular maintenance activities along the pipeline would be within expected background levels</i>	Dust impacts from traffic associated with maintenance of transfer system.	Negligible	High	Management measures are routine and used throughout multiple industries, source is within background variation of traffic movements.	N/A	N/A	N/A
<i>Decommissioning of the desalination plant and other Project infrastructure will not result in significant air quality impacts at sensitive receptors</i>	Dust impacts due to decommissioning and rehabilitation of Project infrastructure.	Negligible	Medium	No source of impact is anticipated as the pipeline would remain in place.	Minor	Possible	Low
CHAPTER 19: NOISE AND VIBRATION							
<i>There will be minor, short-term impact on sensitive receptors due to noise and vibration disturbance during land clearing and construction of the desalination plant</i>	Noise and vibration from construction of the desalination plant results in impact to amenity of sensitive receptors.	Minor	High	Modelling of levels undertaken based on desktop and some site-specific data. Management measures are routine and used through multiple industries.	N/A	N/A	N/A
<i>There will be minor, short-term impact on sensitive receptors due to noise disturbance during land clearing and construction of the transfer system</i>	Noise from construction of the transfer system results in impact to amenity of sensitive receptors	Minor	High	Modelling of levels undertaken based on desktop and some site-specific data. Management measures are routine and used through multiple industries.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>There will be negligible, short-term impact on sensitive receptors due to vibration disturbance during land clearing and construction of the transfer system</i>	Vibration from construction of the transfer system results in impact to amenity of sensitive receptors	Negligible	High	Modelling of levels undertaken based on desktop and some site-specific data. Management measures are routine and used through multiple industries.	N/A	N/A	N/A
<i>Noise from temporary construction camps, laydown and staging area is not expected to adversely affect the amenity of residential receptors</i>	Noise from temporary construction areas impacts on amenity of receptors.	Negligible	High	There is a High level of certainty in this assessment. The final location of construction camps and laydowns are to be confirmed during detailed design, but the design management measures are industry standard and effective.	N/A	N/A	N/A
<i>The noise impact associated with haulage and large vehicle movements is expected to be minor and short-term</i>	Traffic noise from heavy vehicles associated with the project impacts upon the amenity of receptors	Minor	High	Well known impact with well known mitigation measures.	N/A	N/A	N/A
<i>There will be minor short-term impact on amenity or receptors from airblast and ground vibration during transfer system construction</i>	Vibration or air overpressure from blasting impacts upon sensitive receptors	Negligible	High	Well known impact with well known mitigation measures.	N/A	N/A	N/A
<i>There will be negligible impact from the operation of the desalination plant</i>	Noise associated with operation of the desalination plant impacts any potential sensitive receptors	Negligible	High	Modelling of levels undertaken based on desktop and site specific data. Management measures are routine and used through multiple industries.	N/A	N/A	N/A
<i>There will be negligible noise impacts from the operation of the pump stations</i>	Noise associated with operation of the pump stations impacts any potential sensitive receptors	Negligible	High	Modelling of levels undertaken based on desktop and site specific data. Management measures are routine and used through multiple industries.	N/A	N/A	N/A
<i>Corona discharge events are not expected to create noise impacts that could affect sensitive receptors</i>	Noise from Corona discharge events impacts potential sensitive receptors	Negligible	High	This is a well-known and understood phenomenon with well documented natural noise attenuation.	N/A	N/A	N/A
<i>Cumulative impacts from Lincoln Gap Wind Farm and the proposed Lincoln Gap Pump Station result in minor impacts during construction and negligible impacts during closure</i>	Cumulative impact of noise on the receptors at Lincoln Gap from the approved Lincoln Gap Wind Farm and the proposed Lincoln Gap Pump Station	Minor	High	Modelling of levels undertaken based on desktop and some site-specific data. Management measures are routine and used through multiple industries. Acoustic report for Lincoln Gap Wind Farm supports this assessment.	N/A	N/A	N/A
CHAPTER 20: LANDSCAPE AND VISUAL AMENITY							
<i>Minor impacts during the construction phase of the desalination plant will be temporary and limited to a small number of sensitive visual receptors</i>	Presence and movement of construction equipment and vehicles at the desalination plant results in temporary visual amenity impacts to sensitive receptor locations	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI and will be either transient and temporary or minimised by distance from the site.	N/A	N/A	N/A
	Light spill from construction site results in impacts to sensitive receptor locations	Minor	High	Visual impacts of light spill from the desalination plant construction site are not expected due to the distance to identified SRLs.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Impacts to visual amenity at sensitive visual receptors due to construction of the Mullaquana transmission line are expected to be temporary and minor</i>	Mullaquana transmission line impacts views from sensitive receptor locations during construction.	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI.	N/A	N/A	N/A
<i>The desalination plant, new transmission line and substation will have a negligible to minor impact on landscape character and visual amenity at a small number of sensitive receptor locations</i>	Desalination plant impacts views from sensitive receptor locations during operations:	–	–	–	–	–	–
	• SRL 1 Eight Mile Creek Beach	Negligible	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI	N/A	N/A	N/A
	• SRL 2 Cowleds landing	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI	N/A	N/A	N/A
	• SRL 3 Nonowie Homestead	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI	N/A	N/A	N/A
	• SRL 4 Lincoln Highway	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI	N/A	N/A	N/A
	• SRL 5 Hummock Hill	Negligible	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI	N/A	N/A	N/A
	• SRL 6 Mullaquana Homestead	Minor	Medium	Visual impacts have been predicted through the modelled ZTVI, however accuracy of assumptions used in the modelling is subject to final design. This uncertainty has greater weight for this location as the closest sensitive receptor.	Moderate	Possible	Medium
	• Views from offshore	Minor	High	Visual impacts from offshore are expected to be minor. Effective design strategies for desalination plant buildings to be adopted to reduce visual impacts.	N/A	N/A	N/A
	• Light spill from the operational desalination plant results in impacts to sensitive receptor locations	Negligible	High	Visual impacts from offshore are expected to be negligible. Effective lighting design in accordance with Australian Standards to be adopted to reduce visual impacts.	N/A	N/A	N/A
	• Light spill from the operational desalination plant results in visual amenity impacts at Mullaquana Station homestead	Minor	Medium	The potential for impact of lighting and light spill was considered in the LCVIA. Uncertainty due to accuracy of assumptions in the assessment regarding effectiveness of final design in mitigating effects at this sensitive receptor location.	Moderate	Possible	Medium
<i>The Mullaquana transmission line will have a minor impact on landscape character and visual amenity at a small number of sensitive receptor locations</i>	Mullaquana transmission line impacts views from sensitive receptor locations during operation.	Minor	High	Visual impacts to sensitive receptor locations have been predicted through the modelled ZTVI.	N/A	N/A	N/A

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Pump stations, storages and transmission lines will be visible and in some cases prominent when viewed from major highways, however visual impacts will largely be fleeting and temporary for the majority of visual receptors</i>	Construction activities for transfer system and electricity infrastructure results in temporary visual amenity impacts to sensitive receptor locations including views from roads	Negligible	High	Predicted visual impacts are supported by field data and specialist technical assessment.	N/A	N/A	N/A
	Presence of transfer system infrastructure (pump stations/ storages) and electricity infrastructure (transmission lines and substations) impacts the landscape character and results in visual amenity impacts to receptors:	–	–	–	–	–	–
	Lincoln Gap pump station and transmission line	Negligible	High	Predicted visual impacts are supported by field data and specialist technical assessment.	N/A	N/A	N/A
	Kalaya pump station, transmission line and substation	Moderate	High	Predicted visual impacts are supported by field data and specialist technical assessment.	N/A	N/A	N/A
	Bimba storage	Minor	High	Predicted visual impacts are supported by field data and specialist technical assessment.	N/A	N/A	N/A
CHAPTER 21: TRAFFIC AND TRANSPORT							
Road operations							
<i>Impacts on the capacity of the existing traffic network from increased traffic volumes during Project construction and operation are expected to be minor</i>	Construction traffic volumes affect the capacity of the local traffic causing disruption to local communities and other road users	Minor	Medium	Accuracy of assumptions and estimates used in the assessment is subject to final design, access and methodology decisions.	Minor	Possible	Low
	Operation traffic volumes affect the capacity of the local traffic network.	Negligible	High	Operation estimates are well below construction traffic volume estimates which are worst case.	N/A	N/A	N/A
<i>Movement of OSOM vehicles will be in accordance with NVHR requirements and the Construction Traffic Management Plan to minimise potential impacts</i>	Movement of OSOM vehicles results in increased road safety risks.	Negligible	High	OSOM movements will be undertaken in accordance with permits issued by the NVHR. Industry standard control measures will be applied.	N/A	N/A	N/A
<i>Road condition audits and inspections will minimise the potential for impacts to road pavements from heavy and OSOM vehicle movements</i>	Heavy vehicles movements may result in damage or deterioration of road pavements and / or road furniture.	Minor	Medium	Road condition audits and inspections will increase understanding of current road conditions and extent to which management measures will be required.	Minor	Possible	Low
<i>Implementation of appropriate road upgrades, turn treatments, sight distances and traffic management measures will minimise potential impacts from the Project to road capacity and safety</i>	Increase in vehicle movements, particularly heavy vehicles, affects road safety through greater interaction between construction vehicles and the public.	Negligible	Medium	Uncertainty in the final location of access points and treatment and upgrades that may be required.	Minor	Possible	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Potential impacts on road safety from increased traffic volumes and heavy vehicle movements will be minimised through a Road Safety Audit and implementation of the Construction Traffic Management Plan</i>	Community perception that increased Project traffic, particularly from heavy vehicles within urban areas and on local roads will reduce road safety.	Negligible	High	Road safety measures will be incorporated in the Construction Traffic Management Plan and implemented as a high priority. Industry standard control measures will be applied.	N/A	N/A	N/A
<i>Impacts to community amenity due to construction traffic will be managed through the Construction Environmental Management Plan (CEMP) and the CTMP</i>	Project construction traffic has the potential to temporarily affect the daily operations of residents and businesses.	Minor	High	Compliance with the Project CEMP and CTMP mitigation measures based on industry standards.	N/A	N/A	N/A
<i>Crossings of highways and local roads will be managed to ensure any impacts to traffic movements are short term and localised</i>	Disruption to traffic due to pipeline crossing construction works on arterial roads.	Negligible	High	Traffic management measures at crossing locations will be incorporated in the Construction Traffic Management Plan and implemented as a high priority. Industry standard control measures will be applied.	N/A	N/A	N/A
<i>No impacts to public transport, car parking, school bus routes and pedestrian / cycling access are expected from construction and operation of the Project</i>	Increased traffic, particularly from heavy vehicles within urban areas and on local roads will impact public transport, car parking, school bus routes and pedestrian / cycling access.	Negligible	High	Limited overlap of Project sites with public transport, car parking and pedestrian / cycling access. Implementation of control measures in the Construction Traffic Management Plan. Industry standard control measures will be applied.	N/A	N/A	N/A
Maritime operations							
<i>Implementation of Marine and Coastal Construction Environmental Management Plan (MCCEMP) will minimise impacts to marine operations due to Project construction vessel movements</i>	Marine construction works and vessels impact other maritime and shipping operations in Upper Spencer Gulf.	Negligible	High	Low number of marine vessels predicted for construction and operation. Implementation of control measures in Marine and Coastal Construction Environmental Management Plan. Industry standard control measures will be applied.	N/A	N/A	N/A
<i>Impacts of an exclusion zone for the desalination plant intake and outfall structures on marine operations are not expected due to the low level of marine vessel traffic</i>	The permanent presence of the exclusion zone impacts vessel movements of other marine users.	Negligible	High	Low number of marine users in the area covered by the exclusion zone. Control measures are considered routine and used effectively throughout industry.	N/A	N/A	N/A
Rail operations							
<i>Railway crossing methodology and consultation with railway operators will avoid impacts to freight and passenger services and railway infrastructure</i>	Pipeline construction under rail lines disrupts service and other rail operations.	Negligible	High	Construction operations will be undertaken in accordance with Australian Standards and requirements agreed with rail line operators.	N/A	N/A	N/A
Air operations							
<i>Use of air services by FIFO construction workforce is not expected to negatively impact the capacity and cost of flights to</i>	FIFO worker demand exceeds the capacity at affected airports	Negligible	Medium	Uncertainty in the eventual level of demand for air services by the FIFO workforce and the response by airline and airport operators.	Minor	Possible	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>and from Whyalla, Port Augusta and Olympic Dam</i>	resulting in impacts to local communities (flight availability /cost).						
<i>The potential for wire strike or other collision with transmission lines by low-flying aircraft will be mitigated through industry standard controls (e.g. marking of transmission line conductors), consultation with CASA and operation of air safety regulations</i>	Presence of the transmission line results in impact on aerial activities and local airfields	Negligible	High	Management measures are routine, well understood and used through multiple industries.	N/A	N/A	N/A
CHAPTER 23: SOCIAL ENVIRONMENT							
<i>Early and ongoing engagement with local communities will minimise the potential for impacts to social cohesion due to the presence of construction workers</i>	Accommodation / presence of construction workers impacts social cohesion in local communities	Minor	Medium	Uncertainty in workforce size, location, timing and duration of workforce mobilisation and demobilisation.	Moderate	Rare	Low
<i>Impacts on local housing availability and affordability will be minimised by accommodating the majority of non-local construction workers in temporary workforce accommodation and existing short-stay / tourism accommodation facilities</i>	Accommodation of construction workforce impacts the availability / affordability of local housing / rental / short-term and tourism accommodation:	Minor	Medium	Uncertainty in workforce size, accommodation mix, timing and duration of workforce mobilisation and demobilisation.	Moderate	Possible	Medium
	Temporary workforce accommodation	Negligible	Medium	Uncertainty in workforce size, temporary accommodation locations, timing and duration of workforce mobilisation and demobilisation.	Minor	Rare	Low
<i>Impacts to local housing availability and affordability from the operational workforce will be negligible due to the relatively small number of long-term staff required</i>	Accommodation of operational workforce impacts the availability / affordability of local housing and rental accommodation	Negligible	High	The likely operational / long term workforce numbers are small and are well understood.	N/A	N/A	N/A
<i>Presence of construction workforce is not expected to negatively impact access to local services</i>	Presence of construction workforce places pressure on local services (e.g. health, emergency and education)	Negligible	High	The Project will provide its own health and emergency services to its workforce.	N/A	N/A	N/A
<i>The Project has the potential to contribute to broader economic revitalisation and to reinforce community confidence, sense of place and resilience across the Project Area</i>	Project construction and operation activities negatively impact the sense of place for communities on the USG and Far North.	Minor	Medium	Uncertainty due to the range of impacts that maybe experienced across the Project Area.	Moderate	Rare	Low
<i>Impacts to community amenity (e.g. air quality, noise, traffic, visual and the marine environment) have been assessed in the EIS and with proposed mitigation measures in place the overall impacts to community amenity are expected to be minor</i>	Project construction and operation activities cause impacts to community amenity through noise, vibration, changes to visual amenity, air emissions, increased traffic on roads and perceived changes to current lifestyles.	Minor	Medium	Refer to noise and vibration, visual amenity, air quality and traffic assessments for relevant uncertainty factors.	Moderate	Rare	Low

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
CHAPTER 25: HAZARDS AND RISK MANAGEMENT ¹							
<i>Historical flooding risk at the site is low. Desalination plant design will ensure that stormwater management will not increase the flood risk compared to existing conditions</i>	Construction and operation of the desalination plant alters surface water flows	Negligible	High	Modelling has been undertaken and standard industry accepted management measures will be effective.	N/A	N/A	N/A
<i>The pipeline will generally be located underground and will not change the flood risk to people, property, infrastructure, and the environment along the alignment</i>	Construction and operation of the pipeline alters surface water flows	Negligible	High	Rehabilitation strategies to reinstate natural ground surface are well known and demonstrated to achieve these outcomes.	N/A	N/A	N/A
<i>Pump stations and substations have been located to minimise the risk of flooding and impacts to surface water flows</i>	Construction and operation of the pump stations and substations alters surface water flows	Negligible	Medium	While the assessment of risk is based on regional data with a lower level of confidence, the mitigation measures to manage impacts are industry standard, require minimal checking and can be used across a wide variety of sites.	Minor	Possible	Low
<i>There is a low risk of impacts to the environment caused by disturbance of existing known contamination during Project construction or operations</i>	Disturbance of existing contamination resulting in mobilisation of contamination	Negligible	Medium	Site specific information is available, industry standard controls are available.	Moderate	Rare	Low
<i>Due to implementation of appropriate storage and handling of fuels and chemicals, there is a low risk of marine spills associated with the Project</i>	Spills to the marine environment from vessels associated with construction of the intake and outfall infrastructure.	Negligible	High	Standard industry accepted management measures for vessel operations will be effective.	N/A	N/A	N/A
<i>The Project design includes measures to remove algal organic matter and high suspended solids to maintain effective plant operation in case of a bloom</i>	Algal bloom impairs the operation of desalination plant, and results in potentially harmful algal matter returned to the marine environment	Negligible	High	Proven pre-treatment technology commonly employed in industrial, municipal, and mining applications, notably including seawater desalination and coastal wastewater. Pre-treatment system collects and manages solid waste on land with no spoil or algal matter being returned to the marine environment.	N/A	N/A	N/A
<i>Localised changes to water quality are unlikely to result in conditions that would contribute to the onset of a HAB</i>	Desalination plant return water creates an environment that contributes to the onset of an algal bloom	Negligible	High	Results of hydrodynamic modelling show that the action of the diffusers and the local hydrological conditions work to effectively disperse the return water and that salinity, suspended solids and temperature all quickly return to ambient conditions within a short distance from the desalination plant outfall (within hundreds of metres).	N/A	N/A	N/A
<i>Localised changes to water quality are unlikely to result in conditions that would contribute to the onset of a HAB</i>	Marine construction disturbs sediments that contribute to the onset of an algal bloom.	Minor	Medium	This sediment characterisation baseline survey was undertaken prior to the South Australian HAB potentially effecting the Project area.	Minor	Rare	Low

¹ Bushfire impacts and risks have not been included in this table as they were assessed via a different methodology as outlined in Appendix N Bushfire Risk Management Plan.

Key Finding	Potential impact event	Expected level of impact	Level of certainty in assessment of expected impact	Factors contributing to level of certainty	Evaluation of uncertainty		
					Consequence (worst case)	Likelihood	Risk rating
<i>Transport, storage and disposal of dangerous substances will be in accordance with industry standard practice to reduce the risk to public safety to ALARP</i>	Transport, storage, use and disposal of dangerous substances.	Negligible	Medium	While the control measures are industry standard and used widely across Australia, there remains potential for public to deliberately bypass security measures (unauthorised access).	Major	Rare	Medium (ALARP)
<i>Public exposure to the risk of uncontrolled blasts will be avoided through transport, storage and use of explosives in accordance with relevant legislation, standards and codes of practice</i>	Public safety or amenity impacts as a result of blasting during construction of transfer system and electrical infrastructure	Negligible	High	Industry standard control strategies with personnel present and monitoring requirements for all blast events.	N/A	N/A	N/A
<i>Hazards management and emergency response in relation to Department of Defence land will be in accordance with the Project's broader health, safety and environmental management frameworks, and the Third Party Agreement between the Project and Defence</i>	Hazards or emergencies associated with construction activities result in safety issues for and / or disruption of Defence operations and training activities.	Negligible	High	The Third Party Agreement between Defence and the Project will establish specific safety, security, emergency management and coordination obligations that apply to activities undertaken on Defence land.	N/A	N/A	N/A
<i>Open trenches will be secured outside of work hours to prevent impacts to public safety</i>	Trips and falls into open trenches during construction of transfer system.	Negligible	High	Standard industry accepted management measures will be effective.	N/A	N/A	N/A
<i>Construction methodologies to prevent accidental damage and avoid impacts to the operation of the Moomba-Port Bonython Liquids Pipeline will be developed in consultation with the pipeline operator</i>	Impacts on the Moomba-Port Bonython Liquids Pipeline from construction of the transfer system	Negligible	High	There are industry standard control measures to manage this risk which will be confirmed in consultation with the pipeline operator to ensure they are fit for purpose.	N/A	N/A	N/A
<i>Exclusion zones will ensure no members of the public are close enough to construction to be impacted by UXO</i>	Impacts to members of the public from construction interacting with UXO	Negligible	High	Best available data on locations of potential UXO has been collected. No members of public will be close enough for this to be a credible risk.	N/A	N/A	N/A
<i>Design tolerance is well above the 1 in 500 year seismic event and the consequence would be limited to discharge of product water</i>	Earthquake impacts desalination plant or pipeline.	Negligible	High	Design to withstand well above the 1 in 500 year exceedance risk.	N/A	N/A	N/A
<i>Electrical infrastructure will be designed to ensure exposure of the public to EMF is well below acceptable limits</i>	Impacts to public safety from EMF exposure associated with electrical infrastructure	Negligible	High	Significant research has gone into designing Australian Standards to ensure no impact for compliant infrastructure	N/A	N/A	N/A
<i>Electrical infrastructure will be designed to relevant Australian Standards to reduce the risk of electrocution to as low as reasonably practicable</i>	Electrocution as a result of member of the public accessing electrical infrastructure.	Negligible	Medium	While the control measures are industry standard and used widely across Australia, there remains potential for public to deliberately bypass security measures (unauthorised access to Project sites).	Critical	Rare	High (ALARP)