



ENVIRONMENTAL RISK ASSESSMENT AND MITIGATION MEASURES

The following section provides recommendation for mitigation measures in response to potential impacts identified in **Section 6** of the EIS. The structure of mitigation measures is based on the DPIE's hierarchy of approaches for managing impacts identified in the *Draft Environmental Impact Assessment Guidance Series* released by DPE in June 2017, as:

- **Performance based measure** – identify performance criteria that must be complied with to achieve an appropriate environmental outcome but do not specify how the outcome is to be achieved.
- **Prescriptive measure** – require action to be taken or specify something that must not be done.
- **Management based measure** – identify one or more management objectives that must be achieved through the implementation of a management plan.

Following the implementation of appropriate mitigation measures as recommended, it is determined that the proposal will not result in any significant adverse impacts on the surrounding environment. The following table illustrates how the matters raised within the SEARs will be addressed.

This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 *Risk Management–Principles and Guidelines* (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures. In accordance with the SEARs, the Environmental Risk Assessment (ERA) addresses the following significant risk issues:

- The adequacy of baseline data;
- The potential cumulative impacts arising from other developments in the vicinity of the site; and
- Measures to avoid, minimise, offset the predicted impacts where necessary involving the preparation of detailed contingency plans for managing any significant risk to the environment.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence'.

Likelihood		Consequence	
A	Almost certain	1	Widespread and/or irreversible impact
B	Likely	2	Extensive but reversible (within 2 years) impact or irreversible local impact
C	Possible	3	Local, acceptable or reversible impact

Likelihood		Consequence	
D	Unlikely	4	Local, reversible, short term (<3 months) impact
E	Rare	5	Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix.

		LIKELIHOOD				
		A	B	C	D	E
CONSEQUENCE	1	High	High	Medium	Low	Very low
	2	High	High	Medium	Low	Very low
	3	Medium	Medium	Medium	Low	Very low
	4	Low	Low	Low	Low	Very low
	5	Very low	Very low	Very low	Very low	Very low

The results of the environmental risk assessment for the proposed development are presented in the below table and are based upon the range of technical and specialist consultant reports appended to the EIS. The table has directly related mitigation measures responding to each impact also based upon the range of technical and specialist consultant reports appended to the EIS.

N.B. 'O' – Operational; 'C' – Construction; 'Pe' – Performance based mitigation measure; 'Pr' – Prescriptive based mitigation measure 'Ma' – Management based mitigation measure

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Approach	Mitigation Measure (Pe/Pr/Ma)	Residual Impact
Biodiversity	Clearing of 0.01 hectares of PCT 44 - <i>Forb-rich</i>	C	A	5	Very Low	The extent of native vegetation on site is minimal	Ma	Low to Nil

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	<i>Speargrass - Windmill Grass - White Top grassland of the Riverina Bioregion</i> and two small trees.					and its condition has been assessed as 'highly degraded'. The removal does not entail any impacts on threatened communities or species and does not trigger the need for offsets. Notwithstanding the above, a Biodiversity Management Plan (BMP) will be prepared prior to construction, which will include site induction, appropriate delineation of working areas and no-go zones, and other measures identified by the project ecologies to protect the natural values of the area.		
	Indirect impacts including pathogen and weed propagation	C & O	C	3	Medium	Hygiene protocols will be outlined within a Construction Environment Management Plan (CEMP), which will detail measures to sterilise equipment, ensure the protection of no-go zones from potentially contaminated sources and contingency and	Pe/Ma	Low

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						monitoring measures to prevent pathogenic outbreaks. A Weed Management Plan will be provided as part of the CEMP with measures detailing sequential weed control, including timing and methodology of control.		
Aboriginal Heritage	Potential impact on unexpected Aboriginal artefacts on the development footprint	C	E	4	Very Low	An unexpected finds procedure will be implemented during construction which will detail management measures to follow in the unlikely event that any suspected or confirmed archaeological material is uncovered during any works on the Site.	Pe/Ma	Low
Land	Erosion and Sedimentation	C	C	4	Low	A Soil and Water Management Plan (SWMP) is to be prepared in accordance with <i>Managing Urban Stormwater – Soils and Construction Volume 1</i> (Landcom, 2004).	Pe/Ma	Low

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						The SWMP will be prepared as part of a Construction Environmental Management Plan (CEMP) to manage potential risks to soils, surface and ground water. The construction SWMP is to be prepared with reference to relevant development controls within the Deniliquin DCP. Recommended measures for the construction SWMP include but are not limited to: ▪ Measures to minimise and manage the potential for erosion and sediment transport within and from the Project area. ▪ Measures to manage accidental spills and waste storage. ▪ Measures to manage stormwater and the potential for contaminated runoff from the Development site.		

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						- Measures to ensure that excavation activities and any stockpiling are managed to minimise the potential for downstream contamination. - Measures to ensure that areas of exposed soil and the time in which they are exposed are minimised as far as practical.		
	Soil disturbance and sedimentation associated with vegetation clearing, excavation, and stockpiling activities.	C & O	D	4	Low	The construction of the development shall be managed in compliance with measures specified within the construction SWMP to ensure impacts to water quality are appropriately managed. Measures shall be implemented to ensure that areas of exposed soil and the time in which they are exposed, are minimised as far as practical during construction.	Pe	Low

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	Wastes, Spill and Emergency Management.	C	D	2	Low	The construction SWMP shall include procedures to reduce and manage the risk of emergency events and the potential for wastes and spills to contaminate soils. Recommended measures to manage the potential for contaminated discharge include: The storage of all fuel chemicals and liquids in sealed bunded areas on level ground away from stormwater drainage lines and waterways Ensuring refuelling and maintenance activities are restricted to designated areas with appropriate bunding and spill capture controls Implementing controls as part of the construction SWMP that provide procedures to respond to emergencies and spills.	Pr/Ma	Low

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						Ensuring visual inspections of drainage lines and disturbed areas are undertaken during construction to assess any potential soil or surface water issues. The installation and maintenance of stormwater control measures including drainage networks that segregate stormwater runoff according to its contamination.		
		O	D	2	Low	During operation procedures shall be developed to reduce the potential contamination of soils, surface and ground water, resulting from wastes, spills and/or emergency incidents. Suggested measures to control the potential for contamination during operation include: The appropriate storage of equipment and hazardous substances during operation.	Pe/Ma	Low

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						Ensuring that plant and stormwater control measures are maintained to prevent contamination of soil. Preparation of appropriate procedures to response to emergency incidents, spills and leaks from the Development site, including operational equipment and maintenance activities.		
		D	D	2	Low	Decommissioning A decommissioning plan shall be developed which minimises the contamination of soils, surface and ground water, resulting from wastes, spills and/or emergency incidents. Suggested measures to control the potential for contamination during decommissioning including: A soil sampling plan to be undertaken prior to decommissioning to assess any risk of contamination.	Ma	Low

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						Preparation of procedures to minimise risk of contamination		
	Soil mixing / topsoil loss	C, O & D	C	4	Low	As part of the CEMP for the Project, soil management measures should include: Assessment of topsoil depth prior to stripping to minimise mixing of topsoil and subsoil Topsoil and subsoil should be stripped and stockpiled separately for rehabilitation works following excavation Avoid stripping and stockpiling soil following heavy rain periods Avoid compaction of topsoil during stripping and stockpiling operations If required, amelioration of topsoil and/or subsoil during stripping in accordance with a soil scientist's recommendations. Prevent erosion of stockpiles using soil stabilising	Pr/Ma	Low

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						biopolymers, cover crops or other forms of stabilisation Test stockpiled soils to determine amelioration requirements prior to reinstatement.		
	Soil compaction	C, O & D	B	4	Low	As part of the CEMP for the Project, soil compaction management measures should include: Development of controlled traffic practices for plant machinery movements Avoid excavation and plant machinery movements on wet soils following heavy rain periods Prevent long term storage of plant machinery on clay or wet soils Avoid long term exposure of subsoils which are more susceptible to compaction Progressively stabilise and rehabilitate soil as soon as	Pr/Ma	Low

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						practically possible after excavation Ensure soil is replaced in correct subsoil/topsoil orders Ensure vegetative cover is re-established after soil rehabilitation		
Visual impacts	Visual impact of the Project on surrounding landowners and public views.	O	B	4	Low	Inclusion of vegetation buffers around appropriate parts of the perimeter of the project boundary.	Pe	Low to Nil
Noise and Vibration								
Construction Noise	Construction is expected to be carried out during standard work hours where feasible however, some works may be required to be conducted out of these hours.	C	C	3	Low	- Ensuring deliveries are made during standard hours. - The selection and duration of use for equipment that is generating noise.	Ma	Very Low
	During the construction phase, heaving vehicles will be utilised for the delivery of materials and equipment, along with light vehicles transporting workers to and from the	C	C	3	Low		Ma	Very Low

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	site. During peak construction traffic flows, road traffic noise criteria may be exceeded along these routes.					locations, and acceptable delivery hours for the site. ▪ Using the most suitable equipment necessary for the works at any one time. ▪ Regularly inspecting and maintaining plants to avoid increased noise levels. ▪ Use of quieter methods where feasible and reasonable. ▪ Use of temporary noise screens around noisy construction plants. Screens will be positioned to interrupt a direct line of sight between the major noise source and potentially affected receivers.		
Operational Noise	Noise impacts from the proposed project during the operational phase.	O	C	3	Low	▪ Selecting a substation transformer with a Sound Power Level (SWL) of	Pe/Pr	Low

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						equal or less than 90 dBA. - Optimising the detailed design and facing the PCUs towards the north-west. - The installation of a 5m tall acoustic barrier along the eastern side of the site. Upon implementation of all mitigation measures it is considered that the acoustic amenity of the local area will be effectively managed and that the project won't have a significant noise impact onto adjacent sensitive receivers		
Transport	Impacts on road network from the construction phase. Operational traffic impacts have been assessed to be negligible.	C	D	4	Low	Traffic control would be required to manage and regulate construction vehicle traffic movements to and from the site during construction. To minimise disruptions and congestion, the project will schedule the movement of oversized	Pe/Ma	Low

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						vehicles outside of peak traffic periods. A Traffic Management Plan will be prepared and implemented during construction to ensure that there are no enhanced road hazards nor cumulative impacts from surrounding developments. During construction, all vehicles and machinery associated with the construction of the site will be contained within the site. All vehicles associated with construction works, including the delivery and removal of materials and debris, will use the haulage route identified. Construction workers will be transported to and from the site on shuttle buses. The process for worker collection will be as follows: Workers travelling on shuttle buses will be housed in		

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						accommodation in Deniliquin or nearby towns, they will be grouped in nearby accommodation to ensure easy pick up. - Workers will arrive a designated must point 45 minutes before the start of the work day. - Buses will collect staff 30 minutes prior to the on site start time to allow for travel. - In the evening, workers will be collected from site and ferried back to the muster point. Workers travelling in utility vehicles will be car pooling with two people per vehicle. To ensure that this is maintained, staff will be accommodated together in the same accommodation in Deniliquin or surrounding towns.		

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						Before starting the construction, the contractor will conduct a dilapidation survey of the nearby roads within a two-kilometre radius of the Site. During and after construction, the Site management team and an independent appointed party shall monitor the road conditions utilised by construction vehicles. If any significant damage is caused by the Applicant or its subcontractors, the Site manager shall engage a contractor to repair the roads.		
Water-Flooding	While flood modelling has shown the proposed BESS will have negligible impact upon the peak water levels across the site and wider model domain, and there is no predicted indirect or direct damage to the community in the event of significant flooding, steps should still be taken in the construction, operation	C & O	D	4	Low	Regarding access implications, works to access roads during the construction phase may impede emergency services. To avoid this, it is recommended to not impede the movement of vehicles on the Riverina Highway more than necessary during the construction and operation of the BESS.	Pe/Ma	Low

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	and decommissioning phases to minimise the flood risk to the site and wider community.					Based on the flood depth, velocity and hazard levels estimated in the flood modelling of the site, the site is generally categorised as low risk to surface water flooding. The following measures are proposed to be adopted at the site: Any sensitive infrastructure such as inverters and battery storage, would be located on raised fill pads with 300 mm freeboard above the maximum of the 1% AEP flood level. It is common for this type of infrastructure to be housed within shipping containers or small sheds with relatively small footprints. Given the shallow depths across the site, raising these small fill pads is highly unlikely to result in any adverse impacts offsite.		

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						▪ The footings should be designed to withstand the flood velocities described in this report, which are mostly low in the lease area. ▪ It is recommended that the best practice principles for stormwater and sediment control be incorporated into the design, construction, and operation phases of the BESS site. ▪ It is anticipated that vehicles can safely access and egress from the Site, however consideration should be given to not restrict the movement of emergency vehicles on the Riverina Highway with any scheduled roadworks. ▪ Monitoring and maintenance of any installed culverts to avoid blockage is		

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						recommended to facilitate conveyance to the west. Upon implementation of the mitigation measures, it is anticipated that the project will not have any residual adverse impact on the flood risk and its appropriate management of the local area.		
Water - Groundwater	The risk of aquifer contamination associated with the proposed development during construction and operation is considered low due to the Subject Site only storing a small volume of banded fuel and no other sources of contamination during operation and no stored materials or refuelling/maintenance or washdowns etc. occurring during construction and therefore having no sources onsite.	C & O	D	3	Low	Mitigation measures are focused primarily on preventing chemical spills from reaching the groundwater system in the unlikely event of leakage. It is anticipated that some of these measures will be contained as part of an Environmental Management Plan post-approval as contingency measures. These include: Regular maintenance and inspection of fuel bund, oil bund and battery storage units.	Pr/Ma	Low

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						▪ Development of site management plans detailing responses to leaks such as spill kits, removal and appropriate testing and disposal of impacted soils, and options for installing groundwater monitoring bores in the case of a significant fire or unexpected leak. ▪ Drilling of a shallow monitoring bore(s) at the Subject Site to understand the thickness of overlying clay and water level in the shallow aquifer prior to construction. Should an onsite shallow monitoring bore identify an absence of clay and/or shallow water level at the Subject Site, further shallow monitoring bores may be required and further consideration of potential		

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						impacts from proposed excavations. - Failing the above measure, measure water level in the shallow aquifer as close to the Subject Site as possible to attain current water levels and verify whether construction works may intersect the groundwater system. ▪ If a significant contaminant release or major fire occurs, then additional shallow bores should be installed up- and downgradient of the development to determine local groundwater flow direction and verify impacts to the local groundwater system. Upon implementation of mitigation measures, it is considered that the Project will have a negligible impact on the groundwater		

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						resources of the locality, resulting in no impacts on groundwater quality and quantity during the construction, operation or decommissioning.		
Hazards								
Li-ion battery fault, thermal runaway and fire	Despite the improvement in battery technology, several degradation mechanisms are still present within the battery which can result in thermal runaway. These effects arise primarily as a result of high discharge, overcharging, or water ingress into the battery which results in a host of by-products being formed within the battery during charge and discharge cycles.	O	D	2	Low	The following recommendations have been made as a result of the assessment to mitigate any potential hazards that could result during the construction and operation of the development: ▪ BESS will be tested in accordance with UL9540A. ▪ Testing to demonstrate clearances required to prevent the propagation of fires between separated units. ▪ BESS is to be installed in accordance with the manufacturer and UL9540A report recommended	Pe/Ma	Low
Li-ion battery fire and toxic gas dispersion	In the event of a BESS failure causing a fire, toxic by-products of combustion may form. Hydrogen Fluoride could cause	O	D	2	Low			

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	danger to life in certain concentrations.					clearances based on testing.		
Electrical equipment failure and fire	Potential for electrical equipment failure is a possibility in any project with this type of infrastructure however, the equipment to be used is standard across industry and therefore not a unique dire scenario.	O	E	3	Very Low	▪ BESS to be installed with fire protection systems specified by the manufacturer and UL9540A report. ▪ Before construction, a detailed design to validate the system can be installed in the project area whilst meeting the recommended clearances.		
Transformer internal arcing, oil spill, ignition and bund fire	The oil contained in transformers can vaporise if arcing occurs, resulting in rapid pressurisation within the reservoir. The oil anticipated to be used provides an increased safety margin however, does not negate the possibility of this occurring.	O	E	3	Very Low	▪ UL testing information shall be made available to the certifying authority. It is noted that a confidentiality agreement may be required.		
Transformer electrical surge protection failure and explosion	In the event the transformer receives an extreme surge of energy and the electrical surge protection measures fail, the mineral oil may start to decompose and vaporise,	O	E	3	Very Low	▪ The vent covers of the BESS shall be constructed of non-combustible material. ▪ The vents shall not be located above battery		

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	resulting in gas bubbles of hydrogen and methane which would lead to an event where these flammable gases increase toward explosive limits.					packs within the BESS container.		
Electromagnetic field Impacts	Electric and Magnetic fields can appear naturally or man-made wherever there may be electricity sources. BESS create EMFs from operational electrical equipment and has the potential to produced extremely low frequency (ELF) EMFs in the range of 30 to 300 Hz.	O	E	4	Very Low			
Bushfire	As determined in the EIS, potential impacts from the BESS could involve accidental ignition and electrical fire in very extreme cases.	O	E	3	Very Low	- At the commencement of construction, and in perpetuity, all ground within the subject site shall be maintained as an Inner Protection Area. - New access roads shall comply with the requirements for Non-	Pe/MA	Low

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						Perimeter Roads as detailed in Table 5.3b of <i>Planning for Bushfire Protection 2019</i>, - Static water supplies shall comply with the requirements of <i>Planning for Bushfire Protection 2019</i> - Any new electrical services must comply with the relevant Australian Standards in specific <i>AS/NZS 7000 Overhead Line Design</i>. - Post-approval but, prior to occupation, a bushfire emergency management and operations plan is to be prepared consistent with the NSW Rural Fire Service Guide to developing a Bush Fire Emergency Management and Evacuation Plan. This assessment shall also include the additional detail required		

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						within s8.3.5 of <i>Planning for Bushfire Protection 2019</i> .		
Social and Economic	Short-term accommodation and local services may be impacted during construction.	C	C	3	Medium	Workforce accommodation has been assessed within an appropriate catchment area. It has been determined that workers can be accommodated in nearby towns and a shuttle bus service will be provided to transport them to and from the site. Shuttle buses will be used to transport personnel to and from the sites as described in the EIS and in the Transport section of this table.	Ma	Low
Non-Aboriginal Cultural Heritage	Potential presence of non-Aboriginal Cultural Heritage.	C	E	5	Very Low	A heritage impact statement has been prepared as part of this development application which concluded there is no potential for the proposed works to have any heritage impacts. Therefore, no mitigation measures are required.	N/A	Nil

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Waste								
Construction phase	During the development phases of the Project, a range of waste will be generated from construction operations. This will include materials associated with packaging such as cardboard, as well as excavated material, excess building materials, general waste and other non-putrescible waste that will result from general site operation. The Site does not require the demolition of any buildings or structures, therefore the only waste in consideration is in relation to the construction of the BESS compound during the construction phase.	C	A	3	Medium	A Waste Management Plan has been prepared to include the procedures to follow for the handling of waste during construction. Where practicable, and in consultation with Edward River Council, the Applicant will use local facilities to minimise transportation and to ensure the regular removal of waste from the site. Any hazardous waste will be handled appropriately by a licenced contractor to be disposed off-site at a suitable facility. The following management measures are proposed during construction: - All site personnel will be advised of the Waste Management Plan during inductions and training. - All site personnel will be encouraged to separate waste streams to	Ma/Pr	Low

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						maximise recycling and reuse opportunities. ▪ No waste burnt or buried on site. ▪ Combustible fuel loads (if required) (e.g. diesel fuel tanks) will be managed onsite to minimise fire risks ensuring compliance with other procedures provided via other management plans. ▪ Securely covered, clearly labelled segregated waste and recycling bins would be provided at strategic locations adjacent to the site construction site office(s) and amenities area. ▪ Site bins will be routinely inspected to ensure there is capacity to contain waste generate during construction and operation.		

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						- Waste and recycling bins will be emptied as required. - Onsite general waste and recycling bins will be appropriately covered minimising the potential for pollution and impacts to surrounding amenity. - Specialist waste bins (e.g. steel, timber) will be emptied as required. - All waste leaving the site (e.g. regulated waste) will be entered into a site waste register to track relevant details of the waste being removed from the site. - Topsoil will be stockpiled and reused on-site for rehabilitation. Excess topsoil generated during the construction activities will be retained for use in rehabilitation.		

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						- Any excess subsoil that requires removal from the site will be appropriately disposed of at licenced waste facility. - It is anticipated that chemical port-a-loo's will be provided at strategic locations around the site for use by personnel during the construction phase. Where possible these port-a-loo's will be located on a trailer to allow for easy redistribution. Waste from port-a-loo's will be disposed of offsite at a licensed treatment facility. - Regulated liquid waste, if generated, will be disposed of at an appropriately licenced facility. - The waste classification guidelines will be continually reviewed to		

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						determine whether waste generated during each phase of the project is classed as hazardous. ▪ No hazardous waste is expected to be stored on-site to enable the proposed development. In consideration of potentially hazardous substances the development has the potential to use the following: – Diesel (Class 3). – Petrol (Class 3). – Lithium-ion batteries (Class 9) – Mineral oil ▪ Fuel containers will be reused as far as practicable.		

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						- Fuel containers will be disposed of in accordance with EPA guidelines for hazardous waste as required. - Dangerous or hazardous materials, if stored onsite, would be stored and handled in accordance with <i>AS1940-2004: The storage and handling of flammable and combustible liquids</i>.		
Operational phase	It is anticipated that waste generated during the operational phase will be minimal and classified as 'general waste'.	O	A	5	Very Low	Where practicable, and in consultation with Edward River Council, the Applicant will use local facilities to minimise transportation and to ensure the regular removal of waste from the site. The availability of disposal arrangements and the forms of waste accepted by contractors and licenced facilities will be reviewed on a continual basis in consultation with Edward River Council and at each	Ma	Very Low

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						stage of the project, ensuring that facilities are available to accept and appropriately dispose of the types of waste generated. Waste tracking including records of the types of waste generated, quantities and disposal arrangements will be implemented during each stage of the development and inform reviews on the availability of disposal arrangements.		