Appendix D Environmental management measures summary

Table D-1. Summary of environmental management measures

Impact	Reference	Environmental management measure	Timing
General			
Construction impacts	GEN1	An CEMP will be prepared for the Project. The CEMP will detail how the performance outcomes, commitments, and environmental management measures for the Project will be implemented and achieved during construction. The CEMP will also provide the roles and responsibilities of key construction personnel and describe how environmental risks associated with the Project will be managed.	Prior to construction
Operational impacts	GEN2	An Operational Environmental Management Plan (OEMP) will be prepared to mitigate and manage environmental impacts during operation of the Project. The OEMP will include a program for monitoring and reviewing the performance of environmental controls, and where agreed corrective actions are implemented if necessary	Prior to operation
Decommissioning impacts	GEN3	A Decommissioning and Rehabilitation Plan will be prepared prior to the cessation of operations.	Prior to decommissioning
Biodiversity			
Impacts on vegetation	B01	Construction personnel are to be informed of the environmentally sensitive aspects of the site (native vegetation and nest boxes), including plans for impacted and adjoining areas showing vegetation communities and important Squirrel Glider habitat areas.	Construction
	B02	The limits of the work zone, areas for parking and turning of vehicles and plant equipment would be accurately and clearly marked out prior to commencement of works. Vehicle movements and materials storage will be restricted to the disturbance footprint, so that native vegetation disturbance is minimised as much as possible and the drip-line of trees are avoided.	Prior to construction
Impacts on fauna	B03	Artificial lighting planned for installation at the entry gate and along the site access road needs to be designed to avoid light spill into Squirrel Glider habitat / nest boxes present which includes the location of the nest box present in south-west and south-east corner, west and east of entry gate. Lighting should be directed to the north or south.	Prior to construction, construction, operation

Impact	Reference	Environmental management measure	Timing
	B04	Where possible, barbed wire fencing would not be used on any new boundary fencing. Fencing should be lowered to the minimum height required to maintain security	Prior to construction, construction
		but aiming to avoid creating high barrier for Squirrel Gliders.	
	B05	A pre-clearing inspection would be undertaken 48 hours prior to the proposed clearing of the scattered mature trees, by an ecologist and the Contractor's Environmental Manager (or delegate). The pre-clearing inspection would include, as a minimum identification of any threatened fauna, or nest sites present in these trees.	Construction
		An ecologist should be present during the felling of Tree 1 and Tree 2 to collect any displaced or injured fauna and release offsite. The trees should be felled carefully by an arborist, cutting down a section at a time rather than felling from the base.	
		Any injured fauna will need to be transported to a vet for treatment.	
Impacts from weed invasion	B06	Weed management is to be undertaken in areas affected by construction for a period of up to 6 months post construction to ensure weeds are not established and potentially spread to the surrounding environment.	Construction, operation
Loss of shelter for native fauna	B07	A large nest box suitable for a Common Brushtail Possum is to be installed in retained vegetation to the immediate south of Tree 2.	Construction
		An additional two bat boxes should also be installed as compensation for the loss of Tree 1 and Tree 2 which have small hollows, these can be placed in VZ1.	
Aboriginal heritage			
Impacts to potential Aboriginal sites	AH01	The sensitive archaeological landform will be demarcated as an exclusion zone on all appropriate plans.	Prior to construction
Impacts on unknown Aboriginal sites	AH02	In the unlikely event that unexpected Aboriginal heritage items are encountered during works, the Unanticipated Finds Protocol (Appendix F) will be implemented.	Construction

Impact	Reference	Environmental management measure	Timing
	AH03	If suspected human remains are located during any stage of the Project, work will stop immediately, and the NSW Police and Coroner's Office will be notified. NSW Heritage will be notified if the remains are found to be Aboriginal	Construction
	AH04	All staff and contractors involved in the proposed work should undergo a cultural heritage induction to ensure they avoid the sensitive archaeological landform, can recognise Aboriginal artefacts and are aware of the legislative protection requirements for all Aboriginal sites and objects under the NPW Act and are familiar with the Unanticipated Finds Protocol (AH02) and the skeletal remains protocol (AH03).	Construction
Land			
Erosion hazard	L1	An Erosion and Sediment Control Plan (ESCP) will be prepared and will detail the specific erosion and sediment control measures to be implemented within the Project, in accordance with the principles and requirements of Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004). As a minimum the ESCP would include: Plans for temporary drainage, scour protection and control measures to reduce erosion and water quality impacts from increased sediment loads from the construction stie. The ESCP would identify location of proposed sediment basins if applicable Dust suppression and monitoring to ensure no downstream sedimentation or air quality impacts.	Prior to construction, construction, decommissioning
	L2	 To manage soil hazards: Minimise the total area of bare earth exposed at any time Employ interim rehabilitation strategies to minimise dust generation and soil erosion on parts of the Project that cannot yet be permanently rehabilitated Where required, rehabilitate all areas of the Project that are not proposed for future disturbance as soon as is practicable following construction and decommissioning Minimising the number of stockpiles, area used for stockpiles, and time that they are left exposed 	Construction, decommissioning

Impact	Reference	Environmental management measure	Timing
		 Locating stockpiles away from drainage lines, including at least 40 m away from any waterway and away from areas where they may be susceptible to wind erosion Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required. 	
Visual amenity			
Light spill	LV01	All lighting would be designed and operated in accordance with AS4282-2019 Control of the obtrusive effects of outdoor lighting.	Construction, operation
Vegetation planting	LV02	Additional trees (including Squirrel Glider feed trees) and screening vegetation will be provided within the Project area near Trout Farm Road.	Detailed design, operation
	LV03	A landscape management plan will be prepared to guide the installation, establishment and maintenance of the proposed native vegetation and landscape works.	Detailed design, Construction
Noise and vibration			
Construction and decommissioning noise	NV1	In line with the requirements of the SEARs, a Construction Noise and Vibration Management Plan (CNVMP) has been developed, attached in Appendix J . This CNVMP will be updated as the Project develops and followed during construction.	Pre-construction, construction
	NV2	 Where reasonable and feasible, standard noise mitigation measures based on those provided in EMF-NV-GD-0056 Construction Noise and Vibration Guideline (Roads) (TfNSW, 2023) will be adopted, including: Wherever possible and safe, limit work to standard hours of construction Select low-noise plant and equipment Ensure equipment mufflers operate in a proper and efficient manner Where possible, use quieter and less vibration emitting construction methods Only have necessary equipment on-site and turn off when not in use Where possible, concentrate noisy activities at one location and move to another as quickly as possible 	Construction, decommissioning

Impact	Reference	Environmental management measure	Timing
		 Vehicle movements, including deliveries outside standard hours, would be minimised and avoided where possible All plant and equipment is to be well maintained and, where possible, fitted with silencing devices Use only the necessary size and powered equipment for tasks Implement training to induct staff on noise sensitivities Where possible, consider the application of less intrusive alternatives to reverse beepers such as 'squawker' or 'broadband' alarms Consider the installation of temporary construction noise barriers or earth mounds for concentrated, noise-intensive activities Where practicable, install enclosures around noisy mobile and stationary equipment as necessary Where possible, avoid simultaneous operation of two or more noisy plant close to receivers The offset distance between noisy plant and sensitive receivers would be maximised Plan traffic flow, parking and loading/unloading areas to minimise reversing movements Complete routine monitoring to evaluate construction noise levels and evaluate whether the mitigation measures in place are adequate or require revision. 	
Construction and decommissioning vibration	NV3	 Should vibration impacts be identified, or vibration complaints received, measures for limiting vibration impacts from Assessing Vibration: a technical guideline, (DECC, 2006) will be adopted where reasonable and feasible: Choosing alternative, lower-impact equipment or methods wherever possible Scheduling the use of vibration-causing equipment at the least sensitive times of the day (wherever possible) Locating high vibration sources as far away from sensitive receiver areas as possible Sequencing operations so that vibration-causing activities do not occur simultaneously. Keeping equipment well maintained 	Construction, decommissioning

Impact	Reference	Environmental management measure	Timing	
		 Do not conduct vibration intensive works within the recommended safe setback distances. Informing nearby receivers about the nature of construction phases and the vibration-generating activities. 		
Construction traffic noise	NV4	 Where reasonable and feasible, measures to address construction traffic noise will be adopted, including: Schedule construction traffic movements to avoid night periods and other sensitive times Revising vehicle routes and scheduling to reduce heavy vehicle traffic along roads predicted to experience construction traffic noise impacts Avoiding the use of compression brakes Ensuring vehicles are adequately silenced before leaving or accessing the Project area. 	Construction	
Operational noise	NV5	 Detailed design will consider and implement reasonable and feasible measures to comply with PNTLs. The following would be considered further as part of detailed design: Further consideration of actual noise specification for final selected BESS technology noting that all BESS technology providers are actively engaged in improving noise performance Ability to deliberately program fan duty to flush out internal temperature build-up before it triggers a spike or otherwise limit maximum fan speeds at different time periods (noting that this may jeopardise performance or life expectancy which would not be considered reasonable and feasible) Ability to better attenuate at source noise through other means (silencers, fan blade refinements etc) Confirmation of the need, location, properties, effectiveness of noise barriers. 	Detailed design	
Operational noise	NV6	As soon as feasible following commissioning, undertake operational noise monitoring to verify the noise levels predicted and confirm that noise from the Project remains below the Project Noise Trigger Levels.	Operation	
Traffic and transport				

Impact	Reference	Environmental management measure	Timing
mpacts to the local road network	TT1	A Construction Traffic Management Plan (CTMP) will be prepared and will include: Confirmation of haulage routes Access arrangements to the Project area, including entry and exit locations. Preferred times of transport to and from the Project area to minimise impacts on the road network Measures to minimise the number of workers using private vehicles. Management of OSOM vehicles (within in separate OSOM management plan (TT5)) The maximum parameters of the materials to be transported to and from the Project area. Site-specific traffic control measures (including signage) to manage and regulate traffic movement including management measures for any potential sight distance issues. Relevant traffic safety measures, including driver induction, training, safety measures and protocols. Requirements for, and placement of, traffic barriers. Requirements and methods to consult and inform the local community of impacts on the local road network due to the development-related activities. Consultation with Transport for NSW (TfNSW), the National Heavy Vehicle Regulator (NHVR) and Albury City Council. Consultation with the emergency services to ensure that procedures are in place to maintain safe, priority access for emergency vehicles. A response plan for any construction-related traffic incident. Monitoring, review and amendment mechanisms. Individual traffic management requirements at each phase of construction. Coordination strategy with Lauren Jackson Sports Centre Upgrade project and Inland Rail project (if required). The CTMP will be prepared in consultation with TfNSW and Albury City Council and approved by the Consent Authority.	Prior to construction

Impact	Reference	Environmental management measure	Timing
	TT2	Group transport, such as buses for workstreams of more than 20 persons as well as ride sharing systems, will be implemented, where practical, to reduce the number of traffic movements on Trout Farm Road.	Construction, decommissioning
	ТТ3	Dedicated and demarcated parking areas for light and heavy vehicles will be provided within the Hume North BESS Project area. Vehicles associated with the Project will not be permitted to park on public areas and will be contained within the Project area.	Prior to construction
	ТТ4	 Heavy vehicle movements to and from the Project area will be scheduled to minimise traffic disruption to the surrounding road network to the extent reasonable and feasible. This may include: Scheduling the movement of construction material, equipment and waste to occur outside of peak periods Scheduling heavy vehicle deliveries to be evenly dispersed as far as practical to minimise convoying or platoons and queuing outside the Project area or on the road network. 	Prior to construction, construction, operation, decommissioning
Heavy vehicles	TT5	A separate OSOM Transport Management Plan will be prepared as part of the CTMP and will include: Identification of the final OSOM route to Hume North BESS Project area Measures to provide an escort for the loads Times of transporting to minimise impacts on Trout Farm Road Location of rest areas and the requirement of rest stops along the route The maximum parameters of the materials to be transported to and from the Project area Communication strategy and liaising with emergency services and police Any minor temporary civil infrastructure work which may be required to accommodate OSOM movements Measures to inform school bus service operators of any planned construction activities/movements along school bus routes.	Prior to construction
	ТТ6	A vehicle access permit will be sought (from NHVR in consultation with Albury City Council) for all B-doubles and OSOM vehicle movements on Riverina Highway (between Elizabeth Mitchell Drive and Murray Street), Murray Street	Prior to construction

Impact	Reference	Environmental management measure	Timing
		and Trout Farm Road. The heavy vehicle and OSOM movements will be in accordance with the permit requirements and be outside of peak traffic periods where possible.	
	ТТ7	The OSOM route will be finalised in consultation with relevant road authorities (including Victorian authorities) prior to official NHVR application and will consider potential impacts to pavement, bridges and culverts along the route. The OSOM route will be re-assessed once the vehicle and load dimensions have been confirmed prior to transportation. Additionally, once BESS material specifications have been confirmed in detailed design, the Proponent will consult with relevant power and utilities authorities to confirm suitability of the transport. If required, potential line lift and/or other assistance for OSOM vehicle to traverse under overhead cables will be arranged.	Prior to construction
	ТТ8	A road dilapidation report will be submitted prior to construction and decommissioning works and post construction and decommissioning. Road dilapidation surveys will be undertaken in accordance with Austroads guidelines and standards. Any damage attributable to Project construction and decommissioning would be repaired.	Prior to construction
	ТТ9	A NHVR exemption permit will be sought for any parts of the final OSOM route which requires access through roads which are restricted or conditionally approved for OSOM vehicles, including Murray Street and Trout Farm Road.	Prior to construction
	TT10	Swept path assessments will be finalised for intersections and proposed road upgrades following detailed design in consultation with relevant road authorities. The design will be developed to the standard and satisfaction of the Victoria Department of Transport and Planning and NSW road authorities, including Transport for NSW, as appropriate under Section 138 of the NSW Roads Act 1993.	Prior to construction
Road safety	TT11	A Driver Code of Conduct will be prepared as part of the CTMP and be used to outline the rules and behaviours which drivers associated with the Project will be required to adhere to. The Driver Code of Conduct will outline arrangements for light and heavy vehicle drivers, including: General requirements, including site induction requirements 	Prior to construction, construction, operation, decommissioning

Impact	Reference	Environmental management measure	Timing
		 Travelling speeds and safe driving practices, particularly through residential areas and school zones Fatigue management Adherence to designated haulage routes Public complaint resolution and penalties and disciplinary action. An example driver code of conduct is included in Appendix K. 	
	TT12	Public roads will not be obstructed by any materials, vehicles, skip bins or the like, under any circumstances.	Construction, decommissioning
	TT13	'Trucks Turning' warning signs will be installed on both approaches to the intersection of Trout Farm Road / Murray Street and Riverina Highway / Hume Highway (M31) to advise existing road users of the increased heavy vehicle volumes. The signs will be removed upon the completion of construction work.	Construction, decommissioning
	TT14	All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the Project area.	Construction, decommissioning
	TT15	Speed reductions, use of fog lights during periods of low visibility, cessation of work and site shutdowns will be implemented as required during periods of adverse weather.	Construction, operation, decommissioning
	TT16	Road Safety Audits will need to be undertaken and considered during remaining design development stages.	Prior to construction
Road upgrades	TT17	The existing Project site access will be upgraded and is subject to detailed design incorporating a road safety audit and will be developed in consultation with the relevant road authority.	Prior to construction, construction
Water			
Erosion and sedimentation	SW01	Construction Soil and Water Management Plan (CSWMP) will be prepared which will outline measures to manage soil and water impacts associated with the construction works. The CWSMP will include:	Prior to construction, construction, decommissioning

Impact	Reference	Environmental management measure	Timing
		 Measures to minimise/manage erosion and sediment transport both withing the construction footprint and off-site including requirements for the preparation of an Erosion and Sediment Control Plan (ESCP) for construction (as per SW02) Measures to manage stockpiles including: Minimising the number of stockpiles, area used for stockpiles and the time that they are left exposed Locating stockpiles away from drainage lines, waterways and areas where they may be susceptible to wind erosion Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required Reuse of virgin excavated natural material (VENM) and excavated natural material (ENM) as fill where possible. Transport of excavated material unsuitable for use as fill off site to a licenced facility. Measures to manage potential tannin leachate Procedures to capture, contain and appropriately dispose of any concrete waste from concrete works including designated lined, bunded and controlled concrete wash-out areas Measures to reduce the risk of litter and spills and leaks entering downstream waterways and/or leaching into the soils and groundwater table, including: All fuels, chemicals and liquids would be stored on level ground away from waterways and would be stored in sealed bunded areas within the construction site Refuelling and minor maintenance activities would be limited to designated areas with established spill capture and management controls An emergency spill response procedure would be prepared as part of the CSWMP Installing and maintaining control measures such as silt fencing and gross pollutant traps. 	

Impact	Reference	Environmental management measure	Timing
	SW02	The ESCP would detail the specific erosion and sediment control measures to be implemented at the Project area in accordance with the principles and requirements of <i>Managing Urban Stormwater – Soils and Construction, Volume 1</i> (Landcom, 2004). The ESCP would include:	Prior to construction, construction, decommissioning
		 Plans for temporary drainage, scour protection and control measures to reduce erosion and water quality impacts from increased sediment loads from the construction site Location and size of the proposed construction detention basin in accordance with the Blue Book Dust suppression to ensure no downstream sedimentation or air quality impacts. 	
Construction – impacts to overland flows and overland flooding	SW03	 Design and construction of stormwater drainage system to provide appropriate mitigation of increased site runoff rates and to provide appropriate management of site runoff Design to ensure that external overland flows are conveyed appropriately through the site Construction materials would be located outside of the overland flow path (refer to Figure 7-17 from the EIS) or alternatively the flow path would be re-directed around the construction area. 	Detailed design
Operation – stormwater runoff	SW04	 The design of permanent drainage and water management would demonstrate ability to meet project performance outcomes of no pollution of waters Operational water quality controls would include a retention basin which will be designed to control stormwater runoff to prevent flooding and to direct water away from sensitive downstream receivers Scour protection, control measures and maintenance of access roads would be implemented to reduce erosion and water quality impacts Monitoring of receiving drainage channels downstream of the discharge location(s) to identify any evidence of channel erosion and scour. 	Operation

Impact	Reference	Environmental management measure	Timing
Operation – spills and emergency management	SW05	 Appropriate storage of equipment and hazardous substances Operational procedures for emergency response to spills and leaks from equipment and maintenance activities. 	Operation
Preliminary hazards analysis			
Thermal runaway	PHA1	 All relevant requirements in the Australian Standards are applied for the Project, and requirements in major BESS international Standards such as the US National Fire Protection Association Code NFPA855. 	Detailed design
	PHA2	 Procurement of a battery system that is certified under an internationally recognised test method such as the Underwriters Limited UL 9540A Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems, together with other means of demonstrating that a credible fire within a battery enclosure will not propagate to other enclosures, and measures to prevent or mitigate potential damaging overpressure. 	Detailed design
	РНА3	Emergency Management Plan and Procedures to be developed for Project construction and operation. Evacuation protocols will be developed and integrated into the Emergency Management Plan and Procedures for those not involved in any emergency response and any not wearing appropriate PPE The possibility of gas and pressure release from a battery enclosure, including the risk associated with opening a door during a thermal (runaway) event will be considered and communicated to first responders with appropriate responses.	Detailed design
Fire safety	PHA4	Preparation of a Fire Safety Study in consultation with FRNSW and DPHI during detailed design.	Detailed design
Spills and leaks	PHA5	Measures to prevent leaks from the BESS and transformers, and for containing spills if they occur, should be addressed in the detailed design phase.	Detailed design
Bush fire risk			

Impact	Reference	Environmental management measure	Timing
Emergency management	BF01	A Bushfire and Emergency Management Operation Plan (BEMOP) will be prepared to support emergency management for the Project and ensure bushfire protection actions are maintained in accordance with NSW RFS Planning for Bushfire Protection 2019.	Detailed design, operation
		 The BEMOP will guide annual monitoring of the fire mitigation works for the Project operations and surrounding landholding, including: Asset Protection Zone (APZ) and landscape fuel load management (refer to EMM BF02, BF03) Access provisions. Main access, internal roads and alternate egress will provide for safe, reliable, and unobstructed passage by a Category 1 firefighting vehicle and maintained for the life of the development Water supplies as per Fire Safety Study specifications. Water supply to be accessible and have appropriate firefighting appliance connections Emergency response. 	
		The BEMOP will be developed in consultation with the local NSW RFS District Office and be communicated to relevant stakeholders.	
APZ	BF02	 APZs will be a minimum 15 m width around Project infrastructure (including the BESS compound, switch room and transformer, operation and maintenance facility). APZ to be managed as Inner Protection Area for the life of the Project and will apply the following vegetation management requirements: There will be no trees within the APZ There would be no shrubs within the APZ, not including managed screen plantings Grass will be kept mown to no more than 100 mm in height and leaves and vegetation debris will be removed Roads and paved/cleared areas are suitable within the APZ. Temporary construction and laydown areas, site access and associated fencing do not require specific APZ. 	Detailed design, operation

Impact	Reference	Environmental management measure	Timing
Landscaping	BF03	 Landscape maintenance will include the APZ and proposed vegetation screening to reduce fire intensity and rate of spread as it may approach a structure or structures APZ management to manage fuel loads as required Vegetation screening not within the 15 m APZ and maintained to remove dead/dry vegetation and fuel build-up The vegetation screens will be managed under a landscape or vegetation management plan so that they are managed in perpetuity as a low threat and do not increase the threat toward the Project Ongoing monitoring and maintenance of landscaping and bushfire fuel loads. 	Operation
Offices and buildings	BF04	Offices and maintenance buildings will comply with minimum BAL29 bushfire construction levels as detailed in AS3959.	Detailed design
Social and economic			
Community and stakeholder engagement	S01	 A Community and Stakeholder Engagement Plan (CSEP) will be prepared and implemented to help provide timely and accurate information to the community during construction. The plan will include but not be limited to: Mechanisms to provide details and timing of proposed activities, potential impacts and mitigation measures to nearby residents and communities, visitors and motorists (e.g. haulage activities, high noise generating activities, etc) Processes for engaging with affected residents and stakeholders about potential impacts and proposed management measures Process for receiving and responding to queries and complaints regarding the Project's construction, operation and decommissioning, e.g. a Project website with contact details. 	Prior to construction, construction, operation, decommissioning
Community values	S02	The Project will engage and work with local interest groups, such as land care, to assist or inform restoration works (eg. planting Squirrel Glider habitat trees or rehabilitating wildlife corridors).	Prior to construction, construction

Impact	Reference	Environmental management measure	Timing
Local businesses and suppliers	S03	To minimise potential impacts and maximise opportunities for business and industry, the Project will: Commit to considering local business opportunities in Project procurement practices, including encouraging contractors to source local goods and services, where possible Consider a number of initiatives to encourage use of local services such as preparing a register of local businesses with which to communicate opportunities, and engaging with local Councils and business groups about local business and skill requirements to improve preparedness.	Prior to construction, construction, operation, decommissioning
Waste			
Waste generation	WS01	 A Waste Management Plan will be prepared, implemented and regularly updated to manage waste generated by the Project during construction, operation and decommissioning. The plan will confirm the following: A summary of the waste types, classification and estimated annual quantities of wastes produced during construction of the Project Measures to manage waste disposal in accordance with the principles of the waste hierarchy, with emphasis on reduce, reuse, recycle prior to disposal of its wastes Procedure for assessing, classifying and storing waste in accordance with the Waste Classification Guidelines (EPA, 2014) and management options Procedures for storage, transport and disposal of waste Monitoring, record keeping and reporting, such as waste tracking data demonstrating the lawful disposal of contaminated products, waste or residues generated at the facility. 	Construction, operation, decommissioning