Appendix F
Updated mitigation measures table

The table below provides a consolidated list of the mitigation measures for the Modified development. The list includes mitigation measures for the approval development that would be relevant to the Modified development (and revised where required to align with BESS facility as shown in **bold**), as well as new measures that have been identified during the environmental impact assessment for the proposed BESS facility (shown in **bold)**.

Construction (C), Operation, (O), Decommissioning (D)

Safeguards and Mitigation Measures	Design	C	O	D
General				
Consultation with local community, to minimise impact of construction of adjacent agricultural activities and access.		C		
Consultation would be undertaken with Essential Energy regarding connection to the substation and design of electricity transmission infrastructure.		C		
Development of a complaints procedure to promptly identify and respond to issues generating complaints.		C	O	D
Biodiversity				
Stockpiling materials and equipment and parking vehicles would be avoided within the dripline (extent of foliage cover) of any native tree.		C		D
Prior to the commencement of work, a physical vegetation clearing boundary at the approved clearing limit is to be clearly demarcated and implemented. The delineation of such a boundary may include the use of temporary fencing, flagging tape, parawebbing or similar.				
Where possible, use non barbed-wire on exterior fencing to minimise bird collision risks.			O	
Where possible, landscape plantings would be comprised of local indigenous species with the objective of increasing the diversity of the existing vegetation. Planting locations would be designed to improve the connectivity between patches in the landscape where consistent with landscaping outcomes. **On the BESS facility site native vegetation commensurate to the surrounding remnant PCT should be planted. This should be done to compensate for woody vegetation cleared between November and December 2015**			O	
If night work is unavoidable, ensure any floodlights are directed away from vegetation.		C		D
Weed and hygiene protocols would be prepared and implemented. **On the BESS facility site remove all propagules of exotic flora from within the impact area and adjoining patch (within 10m) to prevent the spread or growth of exotic flora**		C		D
During operation direct lights away from vegetation.			O	
Weed and planting protocols would be prepared and implemented			O	

Safeguards and Mitigation Measures	Design	C	O	D
Where possible, it is recommended that areas of inundation mapped within the BESS facility site be avoided by micro-siting the BESS facility to align with areas of drier vegetation.	**Design**			
Aboriginal heritage		C		
All relevant staff and contractors should be made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977.*		C		D
If suspected Aboriginal objects are identified the following procedures must be followed: **1. Immediately cease all activity at the location.** **2. Ensure no further harm occurs, secure the area, consult with the onsite RAP.** **3. Notify the Environment Protection Authority's Enviro Line on 131 555, Warren LALC on 0268 474 599 and an archaeologist (RPS +61 2 8099 3200).** **4. No further action to be undertaken until Heritage NSW provides written consent.**				
Protocols must be provided that ensure the risk of encountering burials is appropriately managed. If burials are identified, work must immediately cease, the site must be secured, NSW Police must be contacted and HNSW must be notified.		C		D
All human remains in, on or under the land must not be harmed. If suspected human remains are located during any stage of the proposed works: **1. Immediately cease all activity at the site.** **2. Ensure no further harm occurs, secure the area to avoid further harm to the remains.** **3. Notify the NSW Police 000.** **4. Notify the Environment Protection Authority's Enviro Line on 131 555, Warren LALC on 0268 474 599 and an archaeologist (RPS +61 2 8099 3200).**				
Further archaeological assessment would be required if the proposal activity extends beyond the area of the current investigation. This would include consultation with the registered Aboriginal party and may include further field survey.		C	O	D
Noise				
Implement noise control measures such as those suggested in Australian Standard 2436-2010 "*Guide to Noise Control on Construction, Demolition and Maintenance Sites*", to reduce predicted construction noise levels.		C		
Highly noise intensive works should only be undertaken during the following standard construction hours, unless otherwise assessed and justified: **7 am to 6 pm Mondays to Fridays, inclusive; and** **8 am to 1 pm Saturdays; and** **at no time on Sundays or public holidays**		C		D
Provide appropriate respite periods as per the Roads and Maritime *Construction Noise and Vibration Guideline* (August 2016) when noise intensive works are undertaken or during periods of high noise impacts				
Carry out community consultation to determine the need and frequency of respite periods, if necessary				
Avoid loading and unloading of materials / deliveries outside of daytime hours				
Site entry and exit points should be located as far as possible from sensitive receivers				

Safeguards and Mitigation Measures	Design	C	O	D
Compounds and work areas should be one-way to minimise the need for vehicles to reverse				
Work compounds, parking areas, equipment and stockpiles should be positioned away from noise- sensitive locations and/or in shielded locations				
Trucks should not idle near to residential receivers				
Stationary sources of noise, such as generators, should be located away from sensitive receivers				
Training should be provided to project personnel, including relevant sub-contractors, on noise and vibration requirements and the location of sensitive receivers during inductions and toolbox talks				
Delivery vehicles should be fitted with straps rather than chains for unloading, wherever possible				
Truck drivers should avoid compression braking as far as practicable				
Use the minimum sized equipment necessary to complete the work and where possible, use alternative, low-impact construction techniques				
Power tools should use mains power where possible rather than generators				
Shut down machinery, including generators, when not in operation				
Avoid dropping materials from a height and dampen or line metal trays, as necessary				
Ensure equipment is operated in the correct manner				
All equipment should be appropriately maintained and fitted with noise control devices, where practicable, including acoustic lining of engine bays and air intake / discharge silencers, etc.				
Provide appropriate notice to the affected sensitive receivers prior to starting works and before any noisy periods of works				
Provide signage with a 24 hour contact number				
Where there are complaints regarding noise, review and implement additional control measures, where feasible and reasonable				
Conduct noise and/or vibration monitoring in response to any formal complaints received				
Conduct vibration monitoring whenever vibration intensive works are undertaken within the minimum working distances of sensitive receivers or structures.				
During detailed design / equipment procurement, ensure that the BESS facility noise emission sources achieve quantities and sound power levels equal to or lower than presented in this report. If overall BESS facility noise emissions are expected to be higher, additional assessment should be considered	Design			
Where new and improved BESS facility technology becomes available within the life of the project, replacement of BESS facility equipment should aim to achieve sound power levels equal to or lower than presented in this report. If overall BESS facility noise emissions are expected to be higher, additional assessment should be considered			O	
All formal / reoccurring operational noise complaints should be investigated and where necessary, operator attended noise compliance measurements should be undertaken to measure and compare the site noise level contributions to the predicted values and the PNTLs presented in this report				
All site noise levels should be measured to exclude any influential source not associated with the project				
If the measured site noise levels are below the predicted values and comply with the PNTLs presented in the Noise Impact Assessment, no further mitigation or management measures are required				

Safeguards and Mitigation Measures	Design	C	O	D
If the measured site noise levels are above the predicted noise levels or PNTLs presented in the Noise Impact Assessment, further mitigation and/or management measures should be considered				
Visual				
The materials and colour of onsite infrastructure would, where practical, would be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that would blend with the landscape.	**Design**			
Review and limit the impacts of the construction laydown areas on the site				
Review lighting design to mitigate its impact on adjacent residential areas.				
Lighting would be designed to align with principles identified within the Dark Sky Planning Guidelines (2016) and would include using shielded fittings				
Avoid unnecessary loss or damage to other vegetation adjacent to the BESS facility site by protecting vegetation not proposed for removal prior to construction		**C**		**D**
Minimise light spill from the BESS facility site by directing construction lighting into the construction areas and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to minimise any potential increase in light pollution				
Temporary hoardings, barriers, traffic management and signage would be removed immediately when no longer required				
The site is to be kept tidy and well maintained, including removal of all rubbish at regular intervals.				
Minimise light spill from the BESS facility site by directing operational lighting into the site and ensuring the site is not over-lit. This includes the sensitive placement and specification of lighting to mitigate increase in light pollution			**O**	
Undertake regular maintenance work to the area around the BESS facility to maintain a clean and safe working environment				
Damage to fencing, Graffiti and other visual nuisance should be removed during operation to maintain the visual appearance of the BESS facility				
Review any future changes to the facility in relation to their impacts on visual amenity				

Adhere to requirements of the Dark Sky Planning Guidelines (2016) and implement the following practices:

- **Eliminate upward spill light**
- **Direct light downwards, not upwards**
- **Avoid 'over' lighting**
- **Switch lights off when not required**
- **Use energy efficient bulbs**
- **Use asymmetric beams, where floodlights are used**
- **Confirm lights are not purposefully directed towards reflective surfaces**
- **Use warm white colours.**

Safeguards and Mitigation Measures	Design	C	O	D
Soils and water quality				
A soil and water management plan, and erosion and sediment control plans, would be prepared, implemented and monitored during the proposal, in accordance with Landcom (2004), to minimise soil (and water) impacts. These plans would include provisions to: Carry out soil testing prior to any impacts, to inform any soiltreatments (such as application of gypsum in compacted areas and top soil management) and provide baseline information for the decommissioning rehabilitation. Install, monitor and maintain erosion controls. Ensure that machinery leaves the site in a clean condition toavoid tracking of sediment onto public roads which may cause risks to other road users through reduced road stability. Manage topsoil: In all excavation activities, separate subsoilsand topsoils and ensure that they are replaced in theirnatural configuration to assist revegetation. Stockpile topsoilappropriately so as to minimise weed infestation, maintain soil organic matter, maintain soil structure and microbial activity. Minimise the area of disturbance from excavation and compaction; rationalise vehicle movements and restrict thelocation of activities that compact and erode the soils as much as practical. Any compaction caused duringconstruction would be treated such that revegetation wouldnot be impaired. Ensure any discharge of water from the site is managed to ensure ANZECC (2000) water quality criteria are met. Manage works in consideration of heavy rainfall events; if aheavy rainfall event is predicted, the site should be stabilised,and work ceased until the wet period had passed.		C		D
A spill response plan would be developed as part of the overall risk management plan to prevent contaminants affecting adjacent surrounding environments. The plan would: Manage the storage of any potential contaminants onsite. Mitigate the effects of soil contamination by fuels or other chemicals (including emergency response and EPA notification procedures and remediation. Ensure that machinery arrives on site in a clean, washed condition, free of fluid leaks.		C	O	D
A protocol would be developed in relation to discovering buried contaminants within the proposal site (e.g. pesticide containers). It would include stop work, remediation and disposal requirements.		C		D
Design would take into account: Stage construction where necessary to avoid working in areas that are inundated with water. **Where possible installation of electrical equipment elevated above ground level at the BESS facility site**	Design			
All staff would be appropriately trained through toolbox talks forthe minimisation and management of accidental spills.		C	O	D
All fuels, chemicals, and liquids would be stored at least 50 m away from any waterways or drainage lines and would be stored in an impervious bunded area.		C	O	D
Adequate incident management procedures would be incorporatedinto the Construction Environmental Management Plan, including requirement to notify EPA for incidents that cause material harmto the environment (refer s147-153 *Protection of the Environment Operations Act*).		C	O	D
The refuelling of plant and maintenance would be undertaken inimpervious bunded areas on hardstand areas only.		C	O	D

Safeguards and Mitigation Measures	Design	C	O	D
Machinery would be checked regularly to ensure there is no oil, fuel or other liquids leaking from the machinery.		C		D
Traffic/Transport				
A Traffic Management Plan would be developed as part of the CEMP, in consultation with Warren Council and **TfNSW**. The plan would include, but not be limited to: Assessment of road condition prior to construction on all local roads that would be utilised. A program for monitoring road condition, to repair damageexacerbated by the construction and decommissioning traffic. Designated routes of construction traffic to the site. Carpooling/shuttle bus arrangements to minimise vehicle numbers during construction. Scheduling of deliveries. Community consultation regarding traffic impacts for nearbyresidents. Consideration of cumulative impacts. Consideration of impacts to the railway. Traffic controls (speed limits, signage, etc.). Procedure to monitor traffic impacts and adapt controls(where required) to reduce the impacts. Providing a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures.		C		D
The proponent would repair any damage resulting from proposal traffic (except that resulting from normal wear and tear) as required at the proponent's cost.		C	O	D
Land use				
A Rehabilitation Plan would be prepared to ensure the site is returned to it pre **BESS facility** land capability. The plan would be developed with reference to base line soil testing and with input from an Agronomist to ensure the site is left stabilised, under a cover crop or other suitable ground cover. The plan would reference: *Australian Soil and Land Survey Handbook* (CSIRO, 2009) *Guidelines for Surveying Soil and Land Resources* (CSIRO, 2008) The land and soil capability assessment scheme: second approximation (OEH, 2012) Below ground infrastructure that impedes cropping (less than 500mm depth) may be removed, subject to consultation with the land owner.				D
Waste				
A Waste Management Plan (WMP) would be developed in consultation with Warren Shire Council (with regard to disposal options). It would include but not be limited to: Identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy. Quantification and classification of all waste streams. Provision for recycling management onsite. Provision of toilet facilities for onsite workers and how sullage would be disposed of (i.e., pump out to local sewage treatment plant).		C	O	D

Safeguards and Mitigation Measures	Design	C	O	D
Tracking of all waste leaving the site.				
Disposal of waste at facilities permitted to accept the waste. Consultation would be undertaken with local waste facility operators to ensure that loads do not exceed capacity.				
Requirements for hauling waste (such as covered loads).				
Disposal options for excess waste (Warren Shire has limited options available for the disposal of waste and other viable options would need to be implemented).				
Wooden crates used on site would need to be thoughtfully disposed of offsite. The crates often cannot be chipped to be used as mulch due to chemical sprays used.				
Septic system is installed and operated according to the local Warren Shire Regional Council regulations.				
Hazards and risk				
All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required.		C		
Design of electrical infrastructure would minimise EMFs.		C		
Follow industry guidance with respect to minimising exposure to EMF		**C**	**O**	**D**
BESS facility equipment and systems would be designed and tested to comply with international and/ or Australian standards and guidelines	**Design**			
Use of fully bunded oil storage for BESS facility transformers in accordance with AS1940		**C**	**O**	
Regular tank inspections included in inspection requirements for BESS facility transformers			**O**	
Develop a Fire management plan for the BESS facility to address: **Transformer failure and fire** **Fire starting on site** **Explosion / Thermal Runaway reaction – powerpacks in containerised modules**		**C**	**O**	**D**
Site operating procedures in place to avoid workers coming in contact with electrified systems at the BESS facility site			**O**	**D**
BESS facility BMS fault detection and safety shut-off systems provided		**C**	**O**	
Installation of security fencing around battery facilities and around entire BESS facility site		**C**		
Use of internal access roads with appropriate turning circles		**C**	**O**	**D**
Earthing system installed as per normal electrical facilities		**C**		
Installation of CCTV security system to monitor key areas		**C**	**O**	
Completion of a lightning risk assessment in accordance with AS1768		**C**	**O**	**D**
Include lightning protection measures if deemed necessary		C	O	D
Develop a Bushfire Management Plan to include but not be limited to: Management of activities with a risk of fire ignition. Management of fuel loads onsite.		C	O	D

Safeguards and Mitigation Measures	Design	C	O	D
Storage and maintenance of firefighting equipment, including siting and provision of adequate water supplies for bushfire suppression. This includes access to the onsite dam if required for fire emergency situations. The below requirements of Planning for Bush Fire Protection **2019** - ○ Identifying asset protection zones ○ Providing adequate egress/access to the site ○ Emergency evacuation measures ○ **Non-combustible fencing be installed and located 10m from the BESS facility and related infrastructure.** ○ **At the commencement of building works and in perpetuity, the 10m APZ around the external boundary fence shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of Planning for Bushfire Protection 2019, and NSW Rural Fire Service 'Standards for Asset Protection Zones'** ○ **The entire area within the fenced BESS facility compound shall be managed as an Inner Protection Area IPA as outlines within Appendix 4 of Planning for Bushfire Protection 2019, and NSW Rural Fire Service 'Standards for Asset Protection Zones'** ○ **Access from Mitchell Highway to the BESS facility compound would be established** ○ **Fire trail access around the perimeter fence of the BESS facility compound is provided** ○ **A supply pipe from the static water tank associated with the control room shall be established and positioned outside the BESS facility compound to enable responding fire fighters to access this water supply. The location of the supply pipe shall be adequately sign posted for 'Static Water Supply' and complying with the static water provisions within Table 7.4a of PBP 2019.** Operational procedures relating to mitigation and suppression of bushfire relevant to the solar farm **and BESS facility.**				
Air quality				
Protocols to guide vehicle and construction equipment use, to minimise emissions would be included in construction and operational environmental management plans. This would include but not limited to Australian standards and the POEO Act.		C	O	D
Protocols would be included in construction and decommissioning to minimise and treat dust (water carts or similar in response to visual cues). This may involve installation of barriers such as shade cloth, to protect receivers.		C		D
Historic heritage				
Should an item of historic heritage be identified, NSW Heritage would be contacted prior to further work being carried out in the vicinity.		C	O	D
Community				
The Community Consultation Plan would be implemented to manage impacts to community stakeholders, including but not limited to: Protocols to keep the community updated about the progress of the proposal and proposal benefits. Protocols to inform relevant stakeholders of potential impacts (haulage, noise etc.). Protocols to respond to any complaints received.		C		
Liaison with local industry representatives to maximise the use of local contractors, manufacturing facilities, materials.		C		
Liaison with local representatives regarding accommodation options for staff, to minimise adverse impacts on local services.		C		D

Safeguards and Mitigation Measures	Design	C	O	D
Liaison with local tourism industry representatives to manage potential timing conflicts with local events.		C		D