



Upper Hunter Battery Energy Storage System

Environmental Impact Statement - SSD 61707209

Prepared for:



Aug 2026

Acknowledgement of Country

EME Advisory recognises the continuing connection First Nations people have to their land. We would like to acknowledge the Traditional Custodians of the lands on which we work and pay our respect to Elders past, present and emerging.

Table of Revisions

Revision	Date	Description	Author	Reviewed	Approved
Rev0	17/06/2026	Environmental Impact Statement	Paul Bryant	Brian Cullinane	Brian Cullinane
Rev1	25/06/2026	Environmental Impact Statement	Paul Bryant	Brian Cullinane	Brian Cullinane
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Signed Declaration

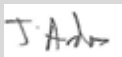
Project Details:		
Project Name:	Upper Hunter BESS	
Application number	SSD-61707209	
Site Address:	Lot 36, 37, 38, 39, 40 on Plan DP1315668; Lot 35 DP1184486; Lot 162 DP257347; Lot 27, 75 and 130 on Plan DP752485	
Proponent Details:		
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Declaration by registered environmental assessment practitioner		
The undersigned declares that this Environmental Impact Statement: • Has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021 • Contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates • Does not contain information that is false or misleading; • Addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project; • Identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; • Has been prepared having regard to the Department's State Significant Development Guidelines - Preparing an Environmental Impact Statement; • Contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; • Contains a consolidated description of the project in a single chapter of the EIS • Contains an accurate summary of the findings of any community engagement • Contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.		
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Glossary and Abbreviations

Abbreviation	Definition
ABS	Australian Bureau of Statistics
AC	Alternating Current
AADT	Annual Average Daily Traffic
ACAC	Aberdeen Community Advisory Committee
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHMP	Aboriginal Cultural Heritage Management Plan
ADG Code	Australian Dangerous Goods Code
AEGL	Acute Exposure Guideline Level
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
AOO	Area of Occupancy
APZ	Asset Protection Zone
ARTC	Australian Rail Track Corporation
ASS	Acid Sulfate Soils
BAL	Bushfire Attack Level
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCD	Biodiversity and Conservation Division
BDAR	Biodiversity Development Assessment Report
BEMEP	Bushfire Emergency Management and Evacuation Plan
BESS	Battery Energy Storage System
BFPL	Bushfire Prone Land
BMP	Biodiversity Management Plan
BMS	Battery Management System

Abbreviation	Definition
BOAMS	Biodiversity Offsets and Accounting Management System
BOS	Biodiversity Offsets Scheme
BPAD	Bushfire Planning and Assessment Design
BSAL	Biophysical Strategic Agricultural Land
BTEX	Benzene, Toluene, Ethylene and Xylene
C&D	Construction and Demolition
CBS	Community Benefits Strategy
CCTV	Closed Circuit Television
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CLM Act	<i>Crown Land Management Act 2016</i>
CNVG	Construction Noise and Vibration Guideline
CNVMP	Construction Noise and Vibration Management Plan
COPC	Contaminant of Potential Concern
CRC	Community Recycling Centre
CSEP	Community and Stakeholder Engagement Plan
CSM	Conceptual Site Model
DA	Development Application
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan
DECCW	Department of Environment, Climate Change and Water
DG	Dangerous Goods
DPHI	Department of Planning, Housing and Infrastructure
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
DPI	Department of Primary Industries
DRP	Decommissioning and Rehabilitation Plan
DRS	Decommissioning and Rehabilitation Strategy

Abbreviation	Definition
EAT	Emerson Aggregate Test
ECZ	Easement Clearing Zone
EDC	Estimated Development Cost
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EME	EME Advisory Pty Ltd
EMF	Electromagnetic Fields
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
EPI	Environmental Planning Instrument
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically Sustainable Development
FCAS	Frequency Control Ancillary Services
FDI	Fire Danger Index
FIRA	Flood Impact and Risk Assessment
FM Act	<i>Fisheries Management Act 1994</i>
FMD	Foot and Mouth Disease
FPAA	Fire Protection Association Australia
FRNSW	Fire and Rescue NSW
FSI	Fatal or Serious Injury
FTE	Full Time Equivalent
GDE	Groundwater Dependent Ecosystem
GFDI	Grassland Fire Danger Index
HAZID	Hazard Identification
HF	Hydrogen Fluoride

Abbreviation	Definition
HHA	Historic Heritage Assessment
HIPAP	Hazardous Industry Planning Advisory Paper
HNA	Highly Noise Affected
HV	High Voltage
IAP	Agriculture Industry Action Plan
IBRA	Interim Biogeographic Regionalisation for Australia
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IPA	Inner Protection Area
IPC	Independent Planning Commission
ISP	Integrated System Plan
ISSC3	Industry Safety Standard for Clearances (Electricity Supply - Vegetation)
LAeq	Equivalent Continuous A-Weighted Sound Level
LALC	Local Aboriginal Land Council
LCVIA	Landscape Character and Visual Impact Assessment
LEP	Local Environmental Plan
LETS	Low Emission Technology Statement
LFP	Lithium Iron Phosphate
LGA	Local Government Area
LSC	Land and Soil Capability
LSSE Guidelines	Large-Scale Solar Energy Guideline
LUCRA	Land Use Conflict Risk Assessment
Maizewood	Maizewood Pty Ltd
MNES	Matters of National Environmental Significance
MLEP	Muswellbrook Local Environmental Plan
MSC	Muswellbrook Shire Council
MV	Medium Voltage
MW	Megawatt

Abbreviation	Definition
MWh	Megawatt-hour
NDC	Nationally Determined Contribution
NEM	National Electricity Market
NER	National Electricity Rules
NETP	National Energy Transformation Partnership
NHCE	North Harbour Clean Energy Pty Ltd
NHVR	National Heavy Vehicle Regulator
NIA	Noise Impact Assessment
NML	Noise Management Level
NPfi	<i>NSW Noise Policy for Industry</i>
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NT Act	<i>Native Title Act 1993</i>
OCP	Organochlorine Pesticide
OEMP	Operational Environmental Management Plan
OEH	Office of Environment and Heritage
OEM	Original Equipment Manufacturer
OPP	Organophosphate Pesticide
OSOM	Oversize/Overmass
PAD	Potential Archaeological Deposit
PAH	Polycyclic Aromatic Hydrocarbon
PBP 2019	Planning for Bushfire Protection 2019
PCB	Polychlorinated Biphenyl
PCT	Plant Community Type
PCS	Power Conversion System
PHA	Preliminary Hazard Analysis
PNTL	Project Noise Trigger Level
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PPE	Personal Protective Equipment

Abbreviation	Definition
PSI	Preliminary Site Investigation
RAP	Registered Aboriginal Party
RBL	Rating Background Level
REAP	Registered Environmental Assessment Practitioner
REZ	Renewable Energy Zone
RFS	NSW Rural Fire Service
RNP	NSW Road Noise Policy
RtS	Response to Submissions
SA3	Statistical Area Level 3
SAII	Serious and Irreversible Impact
SCADA	Supervisory Control and Data Acquisition
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA	Social Impact Assessment
SHNS	Supplementary Hollow Nesting Structures
SLAIA	Soil, Land and Agricultural Impact Assessment
SSD	State Significant Development
SSI	State Significant Infrastructure
SSAL	State Significant Agricultural Land
SWA	Surface Water Assessment
SWMP	Soil and Water Management Plan
TCZ	Total Clearing Zone
TEC	Threatened Ecological Community
TfNSW	Transport for New South Wales
TGS	Traffic Guidance Scheme
The Project	The development for which SEARs are being requested, namely the construction, operation and maintenance of the Upper Hunter BESS and associated infrastructure
The Site	Lot 36, 37, 38, 39, 40 on Plan DP1315668 Lot 35 DP1184486

Abbreviation	Definition
	Lot 162 DP257347 Lot 27, 75 and 130 on Plan DP752485
TI SEPP	<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>
TIA	Traffic Impact Assessment
TMP	Transport Management Plan
TRH	Total Recoverable Hydrocarbons
UCAL	Urban Centre and Locality
UFP	Unexpected Finds Procedure
UHLEP	Upper Hunter Local Environmental Plan 2013
UHLUS	Upper Hunter Land Use Strategy
UHSC	Upper Hunter Shire Council
UNFCCC	United Nations Framework Convention on Climate Change
VI	Vegetation Integrity
VPA	Voluntary Planning Agreement
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
WLALC	Wanaruah Local Aboriginal Land Council
WMF	Waste Management Facility
WMP	Waste Management Plan
WNAC	Wonnarua Nation Aboriginal Corporation

Summary

Overview

This Environmental Impact Statement (EIS) has been prepared by EME Advisory Pty Ltd (EME) on behalf of Maizewood Pty Ltd (Maizewood; the Proponent) - a wholly owned subsidiary of North Harbour Clean Energy Pty Ltd (NHCE). The EIS supports an application (SSD-61707209) for State Significant Development (SSD) to seek consent for the Upper Hunter Battery Energy Storage System (BESS) (the Project). The Project is located within the township of Aberdeen and spans both the Upper Hunter Shire and Muswellbrook Shire Local Government Areas (LGAs). It is situated to the south of the Aberdeen town centre and immediately east of the Main Northern Rail Line and the New England Highway.

The Project will involve the following:

- Construction and operation of a lithium-ion BESS with a capacity of up to 400 megawatts (MW) power / 920 megawatt-hours (MWh) energy storage, with an alternating current (AC) energy output
- Construction and operation of a high-voltage substation located at the BESS Site including high voltage transformers and switchgear
- Overhead and underground cables to connect the Project to the electricity grid to the east of the Site, including associated easements
- Noise walls, fencing and landscaping for the BESS
- Upgrade to the Project entry located on Railway Street, Aberdeen (Upper Hunter Shire LGA) and minor road upgrades to enable component transportation to the BESS and Switching Station Site
- Installation of a switching station and associated infrastructure
- Installation on ancillary equipment including cabling, transformers, carpark, storage area, fencing, lighting, temporary construction site office and amenities

This EIS has been prepared in accordance with part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and in accordance with the Department's *State Significant Development Guidelines - Preparing an Environmental Impact Statement* (EIS Guidelines) and the Secretary's Environmental Assessment Requirements (SEARs). The consent authority for the Project is the Minister for Planning and Public Spaces (or delegates).

Objectives

The objectives of the Project are to:

- Provide energy storage for renewable energy to enable continuous and reliable electricity output as part of the rapidly expanding renewable energy industry in NSW
- Improve the security, resilience and sustainability of NSW's electricity grid
- Help reduce the direct carbon emission of the NSW's electricity grid by reducing reliance on traditional fossil fuel firming assets
- Minimise adverse impacts on the environment and community during construction and operation.

Site Location and Context

The Project is located within the Upper Hunter Shire and Muswellbrook Shire LGAs. The nearest village, Aberdeen, lies directly northwest of the Project, with Muswellbrook town located approximately 7.5 km south of the Project. The closest cities, Cessnock and Maitland, are approximately 105 km drive to the southeast.

The Project occurs over the following lots (the Site):

- Lot 36, 37, 38, 39, 40 on Plan DP1315668
- Lot 35 DP1184486
- Lot 162 DP257347
- Lot 27, 75 and 130 on Plan DP752485

The Site is located on historically cleared, undeveloped land, providing a relatively flat and accessible area suitable for infrastructure development. Its proximity to key electricity transmission assets includes:

- TransGrid's 330kV feeder no. 88, located approximately 2 km to the east, offers a high-capacity connection to the wider electricity grid
- The AusGrid Aberdeen 66_11 kV distribution zone substation, located immediately west of the Site near the Main Northern Line, steps down voltage from 66 kV to 11 kV and supplies the local distribution network.

The area is characterised by its agricultural landscapes, mining activities, and proximity to key regional centres in the Hunter Region, serving as a critical service anchor that provides essential housing, health, education, and community infrastructure to the broader Upper Hunter population.

Construction and Operation

Construction of the Project is anticipated to commence in June 2027 and span approximately 18-24 months, including installation of all infrastructure, grid connection and commissioning. Operations are expected to begin in 2028 and continue for a period of 25 years.

The BESS will operate 24 hours a day, seven days a week, and will be monitored and controlled remotely. The peak construction workforce is expected to be approximately 100 full time equivalent (FTE) personnel. Operations and maintenance will require approximately 2-3 FTE personnel on an intermittent basis.

Strategic Context and Need

The Project directly responds to a need for dispatchable, large-scale energy storage in NSW and the National Electricity Market (NEM). As coal-fired generation continues to retire from the NEM, the integration of renewable energy sources requires firming capacity that can respond rapidly to fluctuations in supply and demand.

The Project aligns with a suite of international, national, state and regional policy frameworks, including:

- Australia's obligations under the Paris Agreement, through facilitating the integration of renewable energy and reducing reliance on fossil fuel-based firming
- The AEMO 2024 Integrated System Plan, which identifies storage as a priority investment in the NEM's optimal development path

- The National Energy Transformation Partnership, which supports investment in renewables, storage and transmission infrastructure as part of Australia's coordinated energy transition
- The NSW *Electricity Infrastructure Roadmap* (2020) and *Electricity Strategy* (2019), which identify BESS as a key firming technology within the Hunter-Central Coast Renewable Energy Zone (REZ)
- The NSW Climate Change Policy Framework (OEH, 2016), which identifies energy storage as a key enabler of net-zero emissions by 2050
- The *Hunter Regional Plan 2041*, which supports diversification of the region's energy capacity and transition to net zero
- The *Upper Hunter Land Use Strategy 2017*, which supports employment-generating energy infrastructure on appropriately zoned land.

The Project is strategically located within the Hunter-Central Coast REZ, proximate to high-capacity existing transmission infrastructure and positioned to deliver reliable, dispatchable energy to a grid undergoing fundamental structural change.

Project Extent and Disturbance Footprint

The Project's land areas are summarised below.

Component	Project Extent Area (ha)	Disturbance Footprint Area (ha)
BESS Area	10.5	4.07
BESS Asset Protection Zone (APZ) /Landscaping	1.18	1.18
BESS Access Road	2.3	0.74
Transmission Easement	16.36	3.40
Access Tracks	1.75	1.75
Switching Station	1.77	1.77
Trenching	0.92	0.92
Total	34.78	13.83

Statutory and Planning Context

The Project qualifies as SSD as electricity generating works with a capital investment value in excess of \$30 million as per Clause 20 of Schedule 1 of the Planning Systems SEPP. The NSW Minister for Planning and Public Spaces is the consent authority.

An EPBC referral was submitted in September 2025 under the accredited bilateral assessment agreement. The Project was determined to be a controlled action (EPBC 2025/10353) on 8 December 2025 in relation to the following Matters of National Environmental Significance (MNES):

- Threatened Species and Ecological Communities
- Migratory Species.

The Project is permissible as SSD under the EP&A Act. Where development is partly prohibited by an environmental planning instrument (due to R1 zoned land within the easement), Section 4.38(3) of the EP&A Act provides that development consent may be granted notwithstanding that the development is partly prohibited.

Community and Stakeholder Engagement

Engagement has been ongoing since May 2023 across scoping and EIS preparation phases, encompassing community information sessions, hardcopy letters to approximately 900 Aberdeen households, newspaper and radio advertising, face-to-face meetings with adjacent landholders, and a dedicated project website. Twenty-three Registered Aboriginal Parties were notified; cultural heritage surveys were conducted over five days with nine Aboriginal representatives attending.

Key community issues and Project responses are summarised in the table below:

Issue Raised	Project Response
Visual impact of Switching Station and transmission lines	Partial underground cabling; screening vegetation; photomontages prepared and shared with affected landholders
Operational noise	Noise walls incorporated; quieter BESS unit selected; Noise Policy for Industry (NPfI) compliance demonstrated at all 38 receivers
Fire risk and battery safety	Project redesigned to avoid Bushfire Attack Level (BAL) Flame Zone and BAL 40; Fire & Rescue NSW (FRNSW) and Rural Fire Service (RFS) engaged throughout
Community benefit and benefit sharing	Community Benefit Strategy developed; Voluntary Planning Agreement (VPA) accepted by Upper Hunter Shire Council (UHSC) (February 2026); VPA offer under consideration by Muswellbrook Shire Council (MSC)
Local employment and procurement	Workforce Recruitment Strategy to be developed with local employment targets across Aberdeen, Muswellbrook, Scone and the wider Upper Hunter
Future residential land use sterilisation	Project sited and designed to mitigate potential impacts and avoid precluding Aberdeen Heights subdivision development
Construction traffic and Oversized and Over Mass (OSOM) impacts	Multiple OSOM route options assessed; Construction Traffic Management Plan to be prepared post-approval
Aboriginal cultural heritage	Aboriginal Cultural Heritage Management Plan (ACHMP) to be prepared in consultation with Registered Aboriginal Parties (RAPs); cultural training undertaken with Wanaruah Elder

Summary of Impacts and Mitigations

The environmental impact assessment has been prepared in accordance with the SEARs issued by DPHI for the Project. Each technical discipline has been assessed by suitably qualified specialists, with specialist reports appended to the EIS. The key findings across all assessed environmental factors are summarised below:

Environmental Factor	Key Finding	Key Mitigation Measures	Residual Impact
Biodiversity	Clearing of 24.49 ha of Plant Community Type (PCT) 3431 and associated Threatened Ecological Communities (TECs). No Serious and Irreversible Impacts identified.	Vegetation clearing procedures, pre-clearing surveys, fauna handling and rescue, no-go zone demarcation. Offset obligations of 285 ecosystem credits and 483 species credits to be met through the NSW Biodiversity Offsets Scheme (BOS).	Low to moderate — addressed through offset framework
Aboriginal Cultural Heritage	21 sites identified; 10 directly impacted, all of low scientific significance.	ACHMP to be prepared in consultation with RAPs prior to construction. Surface salvage of all impacted sites. Unexpected Finds Protocol to apply during works.	Low
Historic Heritage	No heritage items or significant archaeological relics identified within the Site.	Unexpected Finds Procedure to apply during works.	Negligible
Land and Soil	No contamination identified. No Biophysical Strategic Agricultural Land (BSAL) or State Significant Agricultural Land (SSAL) present. Agricultural productivity loss negligible relative to LGA-wide output.	Erosion and Sediment Control Plans; gypsum treatment of sodic soils; topsoil stripped and stockpiled for reinstatement. Agricultural land reinstated at decommissioning.	Negligible
Visual	Low to very low from all public viewpoints and most private dwellings. Moderate impact at two dwellings nearest the Switching Station.	Screening vegetation along northern and eastern BESS perimeter and Switching Station boundary. BESS sited as far south as practicable. Lighting directed inward and downward per AS4282-2023. Pre-construction design review of Switching Station orientation. Pre-construction review of Switching Station siting and orientation to reduce impacts at nearest dwellings.	Low to moderate (Switching Station) / Low to very low (BESS and transmission)
Noise — Construction	Complies with Interim Construction Noise Guideline (ICNG) at all receivers except localised, temporary Noise Management Level (NML) exceedances at two receivers during access road construction.	Construction Noise and Vibration Management Plan; minimum 7 days prior community notification to affected receivers; sequential equipment operation where practicable.	Low — temporary and localised
Noise — Operational	Complies with NPfI at all 38 assessed receivers. Maximum predicted level 36 dBA against night-time Project Noise Trigger Level (PNTL) of 38 dBA.	Original Equipment Manufacturer OEM noise attenuation kits on all battery and inverter units; 7 m high noise walls in configuration shown in Appendix K. Post-commissioning compliance assessment.	No exceedance

Environmental Factor	Key Finding	Key Mitigation Measures	Residual Impact
Traffic and Transport	Road network operates within capacity throughout construction. OSOM movements achievable subject to road upgrades.	Construction Traffic Management Plan endorsed by TfNSW and relevant Councils prior to construction. Schedule of road upgrades detailed in the EIS, majority committed under EnergyCo/TfNSW Port to REZ program. Pre- and post-construction dilapidation survey of Perth Street.	Low
Surface Water and Flooding	BESS bench above 1 in 500 Annual Exceedance Probability (AEP) flood level. Access road subject to inundation during major events.	Onsite retention/detention pond; any sensitive electrical infrastructure to be located clear of the 1 in 500 AEP flood level; flood warning signs and depth markers on access road.	Low
Bushfire	No critical infrastructure within BAL Flame Zone or BAL 40 following design modification. Compliant with Planning for Bushfire Protection (PBP) 2019.	Minimum 10 m APZ managed as Inner Protection Area for life of Project. Bushfire Emergency Management and Evacuation Plan prepared prior to construction.	Low
Hazards	Maximum consequence distance for all credible hazardous events within Site boundary. Project not a potentially hazardous industry under the Hazards SEPP 2021.	Underwriters Laboratories (UL) 9540 certification required for selected battery system; Building Management System (BMS) temperature monitoring and emergency shutdown; minimum 26 m separation to nearest Site boundary maintained. Emergency Response Plan developed in consultation with FRNSW and RFS.	Negligible off-site
Social	Positive impacts include employment, community benefit initiatives, VPAs with both councils, and First Nations cultural programs. Construction workforce accommodation pressure is the most material negative impact.	Workforce Recruitment Strategy with local employment targets. Accommodation coordinator appointed; block bookings secured minimum three months prior to mobilisation; long-term residential rentals avoided. Community Benefit Scheme (CBS) operationalised upon receipt of consent.	Medium (accommodation) / Low (all other negative impacts)
Cumulative	Low to moderate across all factors. Construction workforce accommodation is the most material cumulative concern.	Staggered worker mobilisation; rolling three-month bed forecast shared with Councils.	Low to medium

Alternatives Considered

Four alternative development options were considered: the do-nothing option, development on an alternative site, use of an alternative technology, and alternative internal layouts. Option 5 — proceeding with the Project on the Site as designed — is the preferred option. The Site's proximity to the existing TransGrid 330 kV network minimises new infrastructure requirements; the Site is currently underutilised and zoned E4 General Industrial; heritage and contamination constraints are absent; and lithium-ion battery storage provides significantly greater land-use efficiency than any comparable generation or storage technology. Internal layout refinements were

incorporated iteratively to avoid and/or minimise impacts to biodiversity values, watercourses, bushfire risk areas, and residential receptors.

Project Justification and Ecologically Sustainable Development

The Project has been assessed against the principles of Ecologically Sustainable Development (ESD):

- The precautionary principle has been applied throughout the assessment process. Where uncertainty exists, conservative assumptions have been adopted, with additional surveys committed to as part of the Response to Submissions process
- Intergenerational equity is advanced by the Project's primary function: providing the firming capacity needed to accelerate the transition from fossil fuel-based generation to renewable energy, thereby reducing carbon emissions and preserving climatic conditions for future generations
- The conservation of biological diversity and ecological integrity is addressed through the NSW BOS, which ensures that unavoidable residual impacts to threatened ecological communities and species are offset in accordance with the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- The improved valuation and pricing of environmental resources is reflected in the Project's contribution to reducing the social cost of carbon through displacing fossil fuel-based firming.

Conclusion and Recommendation

The Project is permissible as SSD under the EP&A Act, is consistent with all relevant statutory and strategic frameworks, and has been subject to thorough environmental assessment and extensive community engagement. Environmental impacts are, with limited exceptions, low to moderate and are comprehensively addressed through the mitigation and management framework established in this EIS. No Serious and Irreversible Impacts have been identified. Residual biodiversity impacts will be offset through the NSW BOS. The Proponent has agreed terms for a VPA with Upper Hunter Shire Council and is currently negotiating terms for a VPA with Muswellbrook Shire Council, providing a formal mechanism for community benefit delivery over the life of the Project. Additional direct community initiatives are being considered through the Benefit Sharing Strategy. Having regard to the environmental, economic and social assessment presented in this EIS, and the principles of ecologically sustainable development (ESD), the Project can be considered to be in the public interest.

1 Introduction

This section introduces the Project, Proponent and Site and explains the purpose and structure of the EIS.

1.1 Overview

This Environmental Impact Statement (EIS) has been prepared by EME Advisory Pty Ltd (EME) on behalf of Maizewood Pty Ltd (Maizewood; the Proponent) - a wholly owned subsidiary of North Harbour Clean Energy Pty Ltd (NHCE) to support an application for State Significant Development (SSD) consent (SSD-61707209) for the Upper Hunter Battery Energy Storage System (BESS) (the Project). The Project is located within the township of Aberdeen and spans both the Upper Hunter Shire and Muswellbrook Shire Local Government Areas (LGAs). It is situated to the south of the Aberdeen town centre and immediately east of the Main Northern Rail Line and the New England Highway (refer **Figure 1**). The EIS assesses the potential environmental impacts associated with the proposed development of the Project.

The Project will involve the following:

- Construction and operation of a lithium-ion BESS with a capacity of up to 400 megawatts (MW) power / 920 megawatt-hours (MWh) energy storage, with an alternating current (AC) energy output
- Construction and operation of a high-voltage substation located at the BESS Site including high voltage transformers and switchgear
- Overhead and underground cables to connect the Project to the electricity grid to the east of the Site, including associated easements
- Noise walls, fencing and landscaping for the BESS
- Upgrade to the Project entry located on Railway Street (an informal track to the west of the Project), Aberdeen (Upper Hunter Shire LGA) and minor road upgrades to enable component transportation
- Installation of a switching station and associated infrastructure
- Installation on ancillary equipment including cabling, transformers, carpark, storage area, fencing, lighting, temporary construction site office and amenities

This EIS has been prepared in accordance with part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and in accordance with the Department's *State Significant Development Guidelines - Preparing an Environmental Impact Statement* (EIS Guidelines) and the Secretary's Environmental Assessment Requirements (SEARs). The determining authority for the Project is the Minister for Planning and Public Spaces (or delegates).

1.2 The Proponent

The Proponent for the Project is Maizewood as detailed in **Table 1**. Maizewood (a wholly owned subsidiary of NHCE) is an Australian company dedicated to developing, owning and operating a portfolio of energy assets, with a focus on energy storage to provide firming capacity to the grid and deliver on-demand, clean energy.

Table 1 Proponent Contact Details

Full Name	Maizewood Pty Ltd
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Postal Address	Suite 16.02, Level 16, 55 Clarence St, Sydney NSW 2000
ABN	45 640 912 036
Nominated Contact	Daniel Walsh

1.3 Project

1.3.1 Objectives

The objectives of the Project are to:

- Provide energy storage for renewable energy to enable continuous and reliable electricity output as part of the rapidly expanding renewable energy industry in NSW
- Improve the security, resilience and sustainability of NSW's electricity grid
- Help reduce the direct carbon emission of the NSW's electricity grid by reducing reliance on traditional fossil fuel firming assets
- Minimise adverse impacts on the environment and community during construction and operation.

1.3.2 Background

The Project was initially proposed by Maizewood, who submitted a request for SEARs, and were provided on 28 September 2023. Following the issuance of SEARs, Maizewood was acquired by NHCE to align the Project with their strategy of expanding energy storage infrastructure and supporting the transition to clean, dispatchable energy solutions. Following a request by Maizewood, the SEARs were subsequently extended and remain valid until 28 September 2026.

On 20 January 2026, supplementary SEARs were issued following referral of the project to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which determined that the project constitutes a controlled action. These supplementary SEARs address the additional matters arising from the assessment pathway, to be considered by DPHI under the Bilateral Agreement between the Australian Government and the New South Wales Government (refer **Section 4.1**).

1.4 Site Location

The Project is located within the Upper Hunter Shire and Muswellbrook Shire LGAs. The nearest village, Aberdeen, lies directly northeast of the Project, with Muswellbrook town located approximately 7.5 km south of the Project. The closest cities, Cessnock and Maitland, are approximately 105 km drive to the southeast.

The Project occurs over the following lots (the Site), as shown in **Figure 2**:

- Lot 36, 37, 38, 39, 40 on Plan DP1315668
- Lot 35 DP1184486
- Lot 162 DP257347
- Lot 27, 75 and 130 on Plan DP752485

1.5 Site Context

1.5.1 Regional Context

The Project is situated approximately 130 km northwest of Newcastle, NSW. The area is characterised by its agricultural landscapes, mining activities, and proximity to key regional centres in the Hunter Region, serving as a critical service anchor that provides essential housing, health, education, and community infrastructure to the broader Upper Hunter population.

Nearby settlements include:

- **Aberdeen:** The nearest village, located directly northeast of the Site, has a population of 1,872 (ABS, 2021). Aberdeen is a small regional community with local services and connections to the surrounding agricultural and mining areas. Aberdeen hosts the annual Aberdeen Highland Games each July celebrating the Scottish and Celtic history of the Upper Hunter.
- **Muswellbrook:** A larger town with a population of 16,357 (ABS, 2021). It serves as a regional hub for mining, energy generation, and equine industries, with a range of infrastructure and services.
- **Scone:** Approximately 14 km north of the Project. With a population of around 6,035 (ABS, 2021), the town has a strong equestrian culture; features a mix of historic estates, rural industries, and educational institutions, and is serviced by road, rail, and a small airport.

Key Regional Centres nearby include:

- **Cessnock:** Population of 63,632 and is known for its historical links to mining and its proximity to the Hunter Valley wine region.
- **Maitland:** A growing regional centre with a population of 90,226. It is a key administrative and service hub for the wider Hunter Region.

The Project is centrally positioned relative to these nearby towns and regional centres, providing a connection to existing infrastructure and regional services.

1.5.2 Local Context

The Site is located immediately south of Aberdeen town centre, a small regional settlement within the Upper Hunter Shire LGA. The Main Northern Rail Line occurs near the western boundary of the Site with the New England Highway further to the west.

The Project is situated on historically cleared, undeveloped land, providing a relatively flat and accessible area suitable for infrastructure development. Its proximity to key electricity transmission assets includes:

- TransGrid's 330kV feeder no. 88, located approximately 2 km to the east, offers a high-capacity connection to the wider electricity grid
- The AusGrid Aberdeen 66_11 kV distribution zone substation, located immediately west of the Site near the Main Northern Line, steps down voltage from 66 kV to 11 kV and supplies the local distribution network

The Aberdeen Heights residential subdivision, located on Perth Street immediately adjacent to the Site, was developed from a 2011 concept masterplan and Stage 1 is now predominantly occupied, with some lots still vacant. The Upper Hunter Land Use Strategy identifies a Preliminary Investigation Area for further residential growth in the broader locality, which will involve Stage 2 of the Aberdeen Heights subdivision to the north of the current Perth Street development and eventually will extend towards the south once infrastructure

challenges can be addressed. The Project has been sited and designed to ensure it does not preclude or prejudice this future residential development potential.



D:\001_NAS_Data\EME00_EME_Advisory\EME01_009_UpperHunterBESS\EME01_009_UpperHunterBESS.mxd | EME01_UHBESS_Ep7_RegionalContext



LEGEND

- BESS Area
- Local Government Area
- Easement
- Switching Station
- Principal Road
- Minor Road
- Railway
- Electricity Transmission Lines

0 250 500 750 1,000
m
Scale: 1:32,000

EME
INTEGRATED
ENVIRONMENTAL
MANAGEMENT
AUSTRALIA
Sheet Size: A4
Source: LPI (Spatial NSW, 2026), BESS Data (EME Advisory, 2026)
www.eme.com.au

eme
ADVISORY

GDA2020 MGA Zone 56
25/06/2026

Upper Hunter Battery Energy Storage System

Site Location

FIGURE 2

1.5.3 Site Restrictions

1.5.3.1 Zoning

The zoning of the site and its surroundings, as defined under the relevant Local Environmental Plans (LEPs), is described in **Table 2**, **Table 3**, and shown in **Figure 3**.

Table 2 Site Zoning

Lot / Direction from Site	Zoning	Ownership	LEP
Lot 36, 37, 38, 39, 40 on Plan DP1315668	E4 General Industrial	UHSC	Upper Hunter LEP
Lot 35 DP1184486	R1 General Residential	UHSC	Upper Hunter LEP
Lot 162 DP257347	RU4 Primary Production Small Lots	Crown Land	Upper Hunter LEP
3361 - 1603 R (Wells Gully Rd)	RU4 Primary Production Small Lots	UHSC	Upper Hunter LEP
3361 - 1603 R (Wells Gully Rd)	RU1 Primary Production	MSC	Muswellbrook LEP
Lot 27, 75 and 130 on Plan DP752485	RU1 Primary Production	North Harbour Clean Energy	Muswellbrook LEP

Table 3 Zoning of Surroundings

Lot / Direction from Site	Zoning	LEP
North	E4 General Industrial R1 General Residential RE1 Public Recreation SP1 Special Activities SP2 Infrastructure RU4 Primary Production Small Lots	Upper Hunter LEP
East	RU1 Primary Production C3 Environmental Management	Muswellbrook LEP
South	C3 Environmental Management RU1 Primary Production	Muswellbrook LEP
West	SP2 Infrastructure MU1 Mixed Use R1 General Residential E1 Local Centre SP1 Special Activities	Upper Hunter LEP

Lot / Direction from Site	Zoning	LEP
	RE1 Public Recreation RU4 Primary Production Small Lots	

1.5.3.2 Easements

The following easements occur near the Project (refer **Figure 4**):

- Easement running north-south, passing adjacent to the proposed switching station for the Project, which is associated with the existing Ausgrid transmission lines
- An additional transmission line easement occurs to the north of the Project, which runs northeast from the Aberdeen township
- A short transmission line easement occurs 150 m west of the Project and runs from the nearby substation to the New England Highway

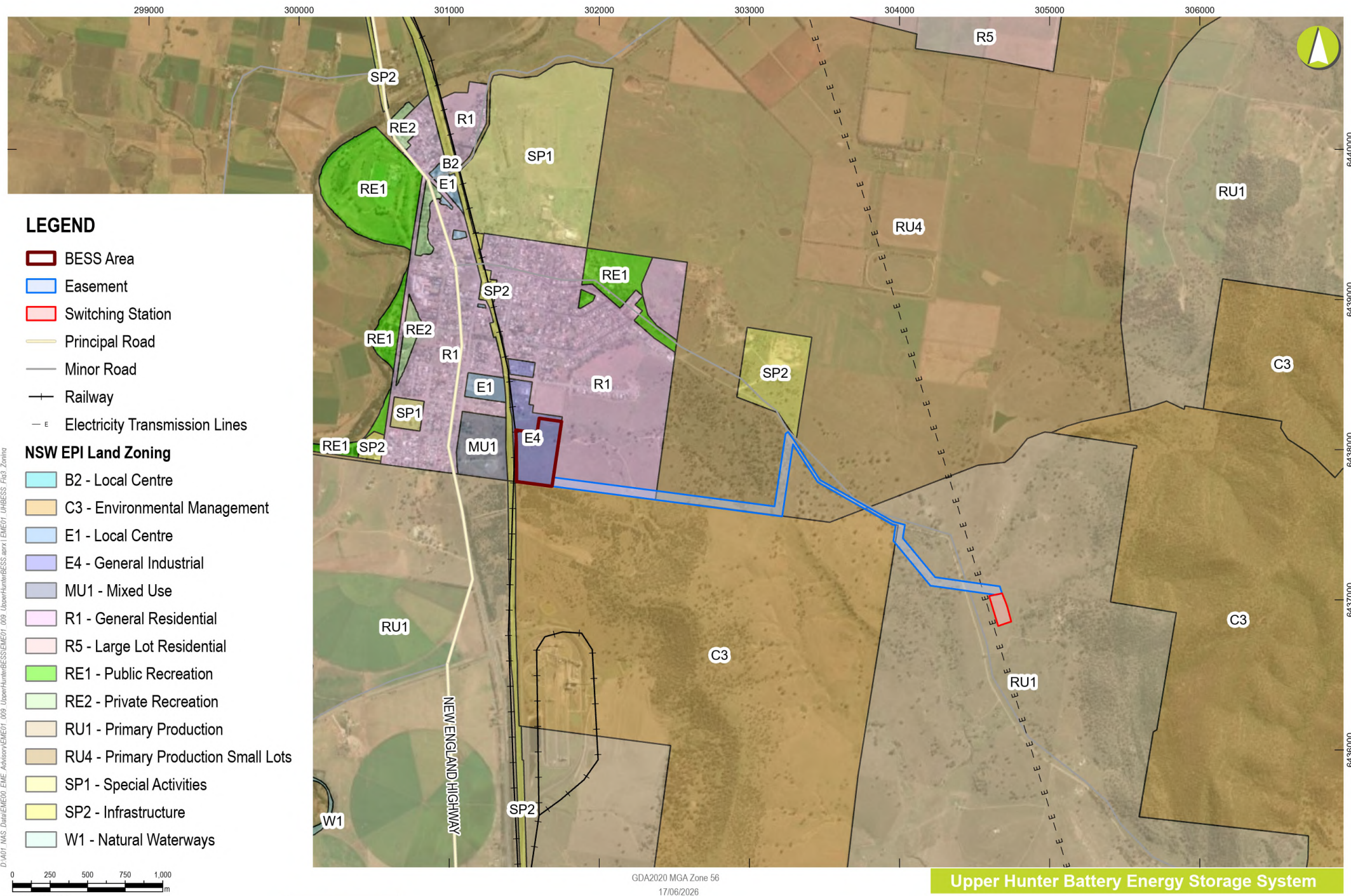
1.5.3.3 Constraints

The constraints that apply to the Project and surrounds include:

- Physical and Land Use Constraints
 - (a) Lot 162 DP257347 contains Crown land managed under the *Crown Land Management Act 2016* (NSW). Clause 69A of the Crown Land Management Regulation 2018 provides an exemption from the requirement under the Act for landowner consent for State significant development on Crown Land.
 - Main Northern Railway (Lot 9105 DP1305660) - The Project borders the Main Northern Railway to the immediate west. This active transport corridor has dictated setbacks for safety and operational reliability, and emergency response planning has been developed having regard to its presence. The Project has been designed in consultation with rail authorities including Transport for New South Wales (TfNSW) and the Australian Rail Track Corporation (ARTC) (refer **Section 5**)
 - New England Highway - Located to the west of the Project site beyond the rail corridor, the New England Highway is a major regional transport route. Its proximity provides logistical benefits for transport of materials and staff, and supports emergency access. However, it also introduces constraints - additional traffic and road safety measures, timing of transport movements to avoid peak periods, visual impact for highway users, and cumulative noise assessment. These considerations have been detailed in **Section 6**
 - Coal Mining Subsidence District (Dartbrook Coal Mine) - The Site is partially within the Muswellbrook declared mine subsidence district. Subsidence Advisory NSW has confirmed the Site is not undermined, is not within the zone of influence of any existing underground coal workings, and that design to account for future mine subsidence is not required
 - Preliminary Investigation Area - Future Residential Development. The site is adjacent to an area flagged in strategic planning documents for future residential growth known as Aberdeen Heights. The Project has been developed in consultation with the Upper Hunter

Shire Council (UHSC), and avoids impacts to the proposed Aberdeen Heights masterplan. As such, the Project will not preclude residential land use potential in the area. UHSC have also confirmed that the first stage of the Aberdeen Heights subdivision (Perth Street) is still not fully developed, and after that stage is complete the next stage of development will move towards the north. The southern portion of the masterplan, adjacent to The Site is constrained by infrastructure servicing and is likely to be some decades away from possible development.

- Seasonal Watercourses and Riparian Features - Several watercourses traverse the Site, draining east–west towards the Hunter River. These waterways are not permanently flowing but are ecologically significant during wet phases, supporting riparian vegetation and habitat connectivity. The Project layout has been refined to avoid direct impact, and construction controls will be utilised to protect water quality, prevent erosion, and restore disturbed land. Details are provided in **Section 6.8**.
- Contextual and Strategic Constraints
 - Transmission Infrastructure Proximity - The Project's location is influenced by access to existing high-voltage transmission infrastructure (TransGrid 330kV lines), providing efficient energy dispatch and minimising the need for new grid connections and easements.



Upper Hunter Battery Energy Storage System

Zoning
FIGURE 3



LEGEND

- BESS Area
- BESS Easement
- Switching Station
- Principal Road
- Minor Road
- Railway
- Electricity Transmission Lines
- Lot Boundary
- Existing Easements

0 250 500 750 1,000
m
Scale: 1:26,000

1.6 Related Developments and Approvals

There are no existing or historical developments at the Site, and the Project (if approved) will operate under a single SSD development consent.

1.7 Purpose and Structure

The purpose of this report is to assess the economic, environmental and social impacts of the Project using the structure outlined in the EIS Guidelines. The report is organized as follows:

- **Section 1: Introduction:** Provides an overview of the Project, identifies the Proponent and describes the Site and the existing approved development
- **Section 2: Strategic Context:** Considers the Project-relevant strategic context including the need for the Project
- **Section 3: Project Description:** Provides a detailed description of the Project including construction activities
- **Section 4: Statutory Context:** Identifies relevant statutory requirements for assessment of the Project
- **Section 5: Community and Stakeholder Engagement:** summarises the community and stakeholder engagement carried out to date and the key issues raised
- **Section 6: Assessment of Impacts:** Provides a comprehensive summary of the assessment of the potential environmental impacts of the Project and details proposed mitigation measures
- **Section 7: Project Justification:** Provides an overall evaluation of the Project, having regard to its environmental, economic and social impacts and the principles of ecologically sustainable development

The appendices accompanying the report include all relevant matters relating to the assessment, including detailed design and plan information, along with technical reports prepared by specialists which address key environmental issues associated with the Project. A consolidated list of mitigation measures is provided in **Appendix C**.

2 Strategic Context

This section considers the relevant strategic context for the Project including the need for the Project, important features in and around the site, avoidance and minimisation of impacts through alternatives, and the suitability of the Site.

2.1 Strategic Alignment

The strategic plans and policies outlined in this section have been considered in the assessment of the Project, with consideration to the relevant objectives and planning priorities. A summary of these strategy documents is provided in **Table 4**.

Table 4: Strategic Context for the Project

Strategy Document	Document Overview	Project Justification
International		
Paris Agreement (UNFCCC, 2015)	The Paris Agreement is an international treaty adopted under the United Nations Framework Convention on Climate Change (UNFCCC). It aims to limit global warming to well below 2°C above pre-industrial levels, with efforts to restrict it to 1.5°C. Australia, as a signatory, commits to contributing to this goal through nationally determined contributions (NDCs), which include reducing emissions and transitioning to renewable energy.	The Project aligns with Australia's obligations under the Paris Agreement by facilitating the integration of renewable energy sources into the electricity grid. By enhancing storage capacity, the Project supports the deployment of renewable energy technologies, directly contributing to emission reduction targets and the broader goal of decarbonizing the energy sector.
National		
<i>Australia's Long Term Emissions Reduction Plan (National)</i> (Department of Industry, Science, Energy and Resources, 2021)	<i>Australia's Long-Term Emissions Reduction Plan</i> sets out how Australia will achieve net zero emissions by 2050 with a focus on the role of renewable energy technology. The plan identifies low emissions technology solutions, including energy storage for firming, as a priority technology to achieving clean, cheap electricity. The current Low Emission Technology Statement (LETS), which forms part of the Plan, includes energy storage as an existing priority technology for government investment. LETS 2021 indicates that broad deployment of electrical energy storage will facilitate further integration of low-cost solar and wind electricity in the grid. Energy storage will provide system security services and be a source of reliable, dispatchable electricity, and reduce pressure on electricity prices by meeting peaks in consumer demand.	The Project would be consistent with the high priority technologies outlined in the Long-Term Emissions Reduction Plan as it would provide increased storage capacity to support the further integration of variable renewables to the grid.

Strategy Document	Document Overview	Project Justification
National Energy Transformation Partnership (NETP) (Australian Government, 2022)	The National Energy Transformation Partnership is a framework established on 12 August 2022 by Commonwealth, State and Territory Energy Ministers to support the national alignment and cooperative action needed for Australia's energy transformation. It aims to facilitate smooth transition across the energy sector by fostering collaboration on priority actions, supporting investment in renewables, storage, and transmission, and ensuring reliability and affordability as the energy market evolves and decarbonizes.	The Project directly aligns with the NETP by supporting the integration of renewable energy sources and storage into the Australian grid. It contributes to achieving net zero emissions by 2050, addresses critical challenges including transmission, generation adequacy, demand management, and gas/electricity planning, and implements enabling measures such as workforce development and community engagement. The Project's capacity investment and storage solutions will aid in maintaining energy reliability and affordability, key NETP objectives.
2024 Integrated System Plan (AEMO, 2024)	The Australian Energy Market Operator's (AEMO) <i>2024 Integrated System Plan (ISP)</i> (AEMO, 2024) is a roadmap for the transition of the National Electricity Market (NEM) power system, with a clear plan for essential infrastructure that will meet future energy needs. The ISP's optimal development path sets out the needed generation, storage and network investments to transition to net zero by 2050 through current policy settings and deliver significant net market benefits for consumers. The ISP notes that with coal retiring, renewable energy connected with transmission and distribution, firmed with storage and backed up by gas-powered generation is the lowest-cost way to supply electricity to homes and businesses as Australia transitions to a net zero economy. With approximately 90 percent of the NEM's coal fleet forecast to retire before 2035 in the most likely future scenario, and the entire fleet before 2040, replacement investments are needed for Australia's electricity system to remain secure, reliable and affordable.	The Project directly supports the ISP's optimal development path by providing fast-response, dispatchable storage capacity, ensuring greater reliability and resilience in the transitioning NEM. The Project will: • Increase the generation or demand-side capacity in NSW that would assist with smoothing the impact of variable generation, responding to sudden increases in peak demand or non-scheduled outages. • Store excess solar and wind power during periods of high generation and discharge it when demand peaks, ensuring a steady and reliable power supply while reducing reliance on fossil fuel-based peaking plants • Incorporate grid-forming inverters that support voltage control, inertia, and frequency stability, addressing potential reliability concerns as more synchronous generators retire • Absorb surplus generation during off-peak hours and release it when needed, improving network efficiency and reducing constraints, particularly in the Upper Hunter region where renewable penetration is increasing • Help control the frequency and voltage of the system, and therefore its ability to remain operational when a surge in demand or a disturbance (e.g. generator withdrawal or a transmission line fault) cause disturbances to the electricity system resulting in fluctuations of voltage, power flows, frequency and rate of change of frequency.

Strategy Document	Document Overview	Project Justification
		• Participate in Frequency Control Ancillary Services (FCAS) markets, providing rapid-response services that stabilise the grid, particularly during unexpected outages or fluctuations in supply and demand • Be strategically located near existing transmission infrastructure, allowing for continuous grid integration and reducing the need for additional costly network upgrades
<i>Guide to Ancillary Services in the National Electricity Market</i> (AEMO, 2015)	AEMO's <i>Guide to Ancillary Services in the National Electricity Market</i> outlines how it meets its responsibilities under the National Electricity Rules (NER) for ensuring the power system is operated in a safe, secure and reliable manner. To fulfil this obligation, AEMO controls key technical characteristics of the power system, such as frequency and voltage, through ancillary services. The NER provides for AEMO to purchase these services from Market Participants.	As battery energy storage can dispatch energy to the grid at short notice, the Project is a source of ancillary services that can assist AEMO in meeting its power system objectives.
State		
<i>NSW Climate Change Policy Framework</i> (OEH, 2016)	The aim of the NSW Office of Environment and Heritage (OEH) <i>Climate Change Policy Framework</i> (OEH, 2016) is to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate and current and emerging international and national policy settings and actions to address climate change. The long-term objective of the Climate Change Policy Framework is to: • Achieve net-zero emissions by 2050 • Increase resilience to a changing climate	As the Project supports the further integration of low emissions renewable energy into the grid, it supports the objectives of the Climate Change Policy Framework.
<i>NSW Electricity Strategy</i> (DPE, 2019)	The Electricity Strategy (DPE, 2019) is the NSW Government's Plan for a reliable, affordable and sustainable electricity future. The Strategy sets out actions to address the specific needs of NSW while long term national reforms are developed and implemented. The Strategy notes the variable generation profile of wind and solar and the need for other technologies which can provide electricity on demand, i.e. firming technology such as battery storage to dispatch electricity into the grid. It also highlights the important role of battery storage, as a form of electrical storage, in providing grid services such as frequency regulation (referred to as Frequency Control Ancillary Services (FCAS)) which help to balance generation and load to operate the grid safely.	The Project would support the Strategy as it provides increased storage capacity to support the further integration of renewables to the grid and is a source of FCAS services which support grid stability.

Strategy Document	Document Overview	Project Justification
<i>NSW Electricity Infrastructure Roadmap</i> (DPE, 2020)	The NSW Electricity Infrastructure Roadmap (the Roadmap) outlines a framework for transitioning the state's electricity supply towards cleaner and more reliable sources. Key aspects include the development of renewable energy zones (REZs), firming capacity such as BESS's, and infrastructure to ensure energy reliability and affordability.	The Project is consistent with the Roadmap's goals, as it provides critical firming capacity within the Hunter-Central Coast REZ. The Project will assist in stabilising the grid by addressing the intermittent nature of renewable energy sources and also support the NSW Government's target to deliver net zero emissions by 2050 while maintaining energy affordability and security.
Protection of Agricultural Land	The protection of agricultural land is a key priority in the regional and state planning policies surrounding the Project, including the <i>NSW Right to Farm Policy</i> (DPIE, 2019) and the <i>Agriculture Industry Action Plan (IAP): Primed for Growth - Investing Locally, Connecting Globally</i> (DPI, 2014). These policies aim to ensure that valuable agricultural land remains available for farming while accommodating the development of critical infrastructure. The IAP emphasizes the need for strategic investments to support agricultural productivity while promoting compatibility between agriculture and other land uses, including renewable energy developments	Areas of RU1 Primary Production and RU4 Primary Production - Small Lots occur on the eastern portion of the Project easement, which supports agricultural activities. To protect agricultural land, best practices will be implemented during construction and operation to prevent potential impacts on soil, water quality, and surrounding agricultural operations. By integrating these measures, the Project aligns with the IAP's goal to protect agricultural land while enabling critical infrastructure development that supports regional economic growth. The coexistence of the Project with ongoing agricultural activities ensures that rural productivity and sustainability are maintained. Refer Section 6.4
Regional		
Hunter Regional Plan 2041 (DPE, 2022)	The <i>Hunter Regional Plan 2041</i> provides an overarching framework to guide development proposals, land use plans and infrastructure funding decisions for the Hunter Region. The Plan includes energy and climate related objectives such as: • Objective 1: Diversify the Hunter's mining, energy, and industrial capacity. • Objective 7: Reach net zero and increase resilience and sustainable infrastructure	The Project supports these objectives by providing assistance in stabilising the grid, fostering renewable energy leadership, and reducing reliance on fossil fuels in the Hunter region.

Strategy Document	Document Overview	Project Justification
Upper Hunter Land Use Strategy 2017 (Upper Hunter Shire Council, 2024)	The <i>Upper Hunter Land Use Strategy</i> (UHLUS) guides future development within the region, including areas identified for potential development for residential, retail, commercial, industrial, equine and tourism uses. The strategy also emphasises the importance of employment-generating projects, such as energy infrastructure, in creating sustainable job opportunities, fostering complementary industries, and providing additional income streams for landholders.	The Project is partially located on E4 General Industrial zoned land consistent with the UHLUS objective to accommodate employment-generating activities on appropriately zoned land, including energy infrastructure. The Former Abattoir site (Investigation Area 9) is identified as a priority investigation area for employment and mixed use, providing alternative employment land capacity for Aberdeen over the Project's life. The Project's siting on established industrial land east of the rail corridor also supports the UHLUS objective of improving the interface between industrial and residential areas with a minimally noisy or impactful use.

2.2 Project Benefits and Alternatives Considered

A number of alternative development options have been considered and are summarised in **Table 5**. Option 5 is the preferred option as discussed in **Section 2.2.1** to **Section 2.2.5**.

Table 5 Alternative Development Options

Alternative Option	Description
Option 1 - Do nothing	Do not proceed with the Project on the Site or an alternative Site.
Option 2 - Alternative Site	Proceed with the Project on an alternative site
Option 3 - Alternative Renewable Energy Technology	Install an alternative technology on the Site
Option 4 - Alternative Layouts and Design within Site	Explore internal design options to reduce environmental, noise, bushfire and community impacts. This option has been incorporated into the preferred option through iterative refinement.
Option 5 - Project (Preferred Option)	Proceed with the Project on the Site

2.2.1 Option 1 - Do Nothing

Option 5 is preferred over option 1 on the grounds that option 1 would not deliver the potential benefits of the Project and is inconsistent with the directions and strategies outlined in the policies discussed in **Section 2** being:

- *Australia's Long Term Emissions Reduction Plan* (Australian Government, 2021)
- *The Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP)* (AEMO, 2024)
- *The Electricity Strategy* (DPE, 2019)
- *AEMO's Guide to Ancillary Services in the National Electricity Market* (AEMO, 2015)
- *NSW Climate Change Policy Framework* (OEH, 2016)

- *Hunter Regional Plan 2041* (DPE, 2022)

Option 1 is also inconsistent with the main objectives of the Project, which have been developed with consideration to the above-mentioned policies:

- *“Increase the potential for additional renewable energy assets to be built in NSW.”* - Option 1 does not align with or contribute to the objective.
- *“Improve the security, resilience and sustainability of the NSW electricity grid.”* Option 1 does not align with or contribute to the objective.
- *“Help reduce the direct carbon emission of the NSW’s electricity grid by reducing reliance on traditional fossil fuel firming assets.”* Option 1 does not align with or contribute to the objective.

2.2.2 Option 2 - Alternative Site

Option 5 is preferred over Option 2 as the selected site offers significant advantages in minimising environmental and community impacts while optimising Project feasibility. The key benefits of the site include:

- **Biodiversity Considerations:** Preliminary assessments indicate some native vegetation on-site; however, impacts can largely be mitigated through careful Project design.
- **Heritage Protection:** A Historic Heritage Assessment confirmed no historic heritage items are present within the Subject Area and archaeological potential is low. An Aboriginal Cultural Heritage Assessment identified a small number of artefacts of low archaeological significance, with impacts manageable through standard construction controls.
- **Transport Access:** Located just 1 km from the New England Highway, with efficient access to the Port of Newcastle (130 km) and Port Botany (280 km), reducing transport and construction disruptions.
- **Optimised Land Use:** Currently underutilised, the site presents an opportunity for a sustainable energy infrastructure project, supporting NSW’s renewable energy goals.
- **Grid Connection Advantage:** The existing 330 kV TransGrid overhead cable provides a direct connection point, reducing the need for additional infrastructure, minimising visual impacts, and eliminating landholder easements.

This site selection ensures the Project is strategically positioned to deliver renewable energy storage with minimal environmental and community impact.

2.2.3 Option 3 - Alternative Technology

Option 5 is preferred over Option 3 on the grounds that the Project technology is relatively dense compared to other proven storage or generation technologies and is well suited for installation at the Site for the following reasons:

- **Battery technologies (storage capacity per area)** - A study of 44 utility-scale BESS found that Lithium-ion achieves the highest energy density before vertical scaling (Truong, 2023), supporting a compact footprint at the Site that minimises visual impacts:
 - Lithium-ion batteries: ~340 MWh/ha average; observed up to ~620 MWh/ha at large facilities
 - Sodium-sulfur batteries: ~300 MWh/ha average, broadly comparable but less modular and requiring elevated operating temperatures

- Vanadium flow batteries: ~150 MWh/ha average; up to ~500 MWh/ha in optimised vertical or large-tank designs
- Renewable generation technologies (energy produced per area)
 - Solar PV (ground-mounted) - Average 6.6 W/m², equating to ~1,330 MWh/ha per year. Generating ~335,000 MWh/y would therefore require roughly 250ha, compared with the Project's footprint (refer **Section 3.2**), and would also involve higher biodiversity and glare impacts
 - Onshore wind - Average 1.8 W/m², equating to ~360 MWh/ha per year. Generating ~335,000 MWh/y would therefore require roughly 1,000 ha, with potential visual and noise impacts from turbines up to 250 m in height
 - Coal and gas plants (for context) - ~500 - 1,000 MWh/ha per year, but with substantial greenhouse gas emissions and associated pollution impacts
 - The Project occupies 13 ha total operational footprint (incl BESS units, easement and switching station), delivering an annual storage throughput of approximately 335,000 MWh, equating to roughly 25,800 MWh/ha per year - significantly more land-efficient than any of the generation technologies above.

2.2.4 Option 4 - Alternative Layouts

Option 5 is preferred over Option 4 as the selected layout offers significant advantages in minimising environmental and community impacts while optimising Project feasibility. The Project has considered a range of alternative layouts and internal design refinements to avoid and minimise impacts in accordance with the avoid and minimise hierarchy. These alternatives were informed by site constraints, field investigations, and landowner negotiations, as summarised in **Table 6**.

Table 6 Alternative Layout Considerations

Consideration	BESS	Easement	Reference
Biodiversity Protection	Although the Proponent holds a lease over several lots, the BESS has been confined to Lots 37 and 38 on Plan DP1315668. This avoids areas of Central Hunter Valley eucalypt forest and woodland identified within Lots 36 and 39 during early biodiversity investigations.	Easement and switching station alignments were refined through multiple design iterations to avoid mapped biodiversity values. Several switching station locations were investigated to avoid areas of Central Hunter Valley eucalypt forest and woodland and Central Hunter Ironbark Grassy Woodland. The selected footprint and disturbance footprint, minimises impacts to these areas and their associated fauna habitats.	Biodiversity considerations are detailed in Section 6.2
Avoidance of Watercourses and Vegetation	Although the Proponent holds lease rights over northern Lots 35, 36, and 39, these areas were excluded from the BESS footprint to avoid mapped ephemeral watercourses and associated riparian vegetation.	The easement and switching station alignment was revised to avoid direct impacts to mapped watercourses and riparian vegetation along the easement.	Surface water details are provided in Section 6.8 .

Consideration	BESS	Easement	Reference
Noise	The BESS layout was designed to maintain separation from nearby sensitive residential receptors in Aberdeen by locating the project as far south as possible. The adopted BESS technology achieves a reduced unit footprint compared to earlier design iterations, enabling greater physical separation from northern residential receptors and strengthening the effectiveness of acoustic measures. Noise walls have been incorporated into the layout to mitigate potential operational noise impacts.	The easement was positioned to avoid proximity to residential receptors, with alignment options assessed to reduce construction and operational noise impacts.	Noise considerations are detailed in Section 6.6
Bushfire Risk Management	The BESS was relocated from areas identified as BAL-40 and Flame Zone to a location within BAL-29 or lower, reducing bushfire risk. The BESS unit layout also avoids mapped Category 1 vegetation (highest bushfire risk) to the south of the Site. Several BESS units were removed from the southern end of the Site in response to initial bushfire risk assessment findings.	The easement alignment avoids areas of high bushfire potential and mapped Category 1 vegetation south of the easement corridor. Fire access and maintenance requirements have also informed the final alignment.	Bushfire is considered in Section 6.9
Landowner and Infrastructure Constraints	The BESS footprint has been confined to Lots 37 and 38, consistent with areas of agreed tenure and landowner negotiations. The layout avoids encroachment into lots with unresolved access or constraints.	The easement alignment has been adjusted through ongoing negotiations with affected landholders, ensuring infrastructure placement aligns with agreed access arrangements and constructability constraints.	Engagement is detailed in Section 5

Through this refinement process, the Project has achieved a layout that reduces environmental impact, aligns with landowner expectations, and mitigates community and safety risks, while maintaining project viability and grid connection efficiency.

2.2.5 Option 5 - Project (Preferred Option)

The preferred option is to proceed with the Project. Option 5 provides the following benefits:

- Enhances energy storage capacity and grid reliability, supporting the transition to renewable energy sources
- Optimises existing infrastructure without requiring new land development, making use of the site's strategic location and transmission connectivity
- Aligns with the NSW Electricity Infrastructure Roadmap and the AEMO ISP, ensuring the integration of renewable energy while maintaining grid stability
- Supports the broader decarbonisation goals of NSW and Australia, facilitating the reduction of reliance on fossil fuel-based firming assets
- Provides a critical energy storage solution close to major electricity demand centres, ensuring efficient energy dispatch and grid resilience

The Project represents a balanced, sustainable, and future-focused solution to meeting the region's immediate and long-term energy needs.

2.2.5.1 Key Strategies to Avoid, Minimise or Offset Impacts

A range of strategies has been incorporated into the Project's design to avoid, reduce, and manage environmental, social, and economic impacts. These include:

Site Selection and Layout Optimisation

- The Project has been sited on historically cleared land, avoiding areas of high ecological or agricultural value
- The Project is sited within an industrial zone to minimise potential land use conflicts
- The Project location near existing infrastructure reduces the need for additional transmission corridors, minimising land disturbance
- The layout has been designed to avoid flood-prone areas and mitigate risks associated with extreme weather events

Bushfire and Safety Considerations

- A Bushfire Risk Assessment has guided site planning, helping to avoid high-risk areas
- Following technical specialist input, the Project design was minimised to avoid flame zones and excessive Bushfire Attack Level zones; for example, removing BESS units along the southern extremity of Site where bushfire hazards are higher (refer **Section 6.9**)
- Fire suppression systems, emergency response protocols, and asset protection measures have been incorporated to manage fire risks

Biodiversity and Habitat Protection

- Significant ecological areas, including ephemeral watercourses and hollow-bearing trees that may provide habitat for native fauna, have been identified and avoided where possible
- Habitat conservation measures and offset strategies will be implemented as needed to address any residual impacts (refer to **Section 6.2**)

Noise and Visual Amenity Impacts

- The Project layout (e.g. BESS orientation, placement towards the south of the Site and noise walls) have been designed to minimise noise impacts on nearby residential areas (refer **Section 6.6**)
- Selected a quieter battery model to reduce noise impacts on nearby residents
- Partial undergrounding of the transmission easement and refinement of the switching station design were adopted to reduce visual impacts

Community and Stakeholder Engagement

- A Community Engagement Plan has been implemented to ensure local residents, businesses, and Aboriginal stakeholders are consulted throughout the process (refer **Section 6.11**)
- Feedback has been used to refine the Project design and address community concerns (see **Section**

6.11 for further details).

Land Impacts

- Earthworks will be carefully planned to achieve a cut-and-fill balance where possible, minimising the need for material transport and reducing the Project's environmental footprint.
- While the Project is practically distanced from residential dwellings, a landscaping strategy has been developed and implemented to soften visual impacts from key viewpoints (refer **Section 6.5**).
- Maizewood acknowledges the importance of equestrian land surrounding the Project. As such, surveys for the Project were conducted with strict adherence to biosecurity measures, agreed upon by landowners. Further, construction methods will be planned to ensure minimal disturbance to nearby equine operations.

Traffic and Accommodation Impact Reduction

- Access routes have been designed to minimise disruptions to local traffic
- As outlined in **Appendix Q**, the workforce Preliminary Accommodation Strategy prioritises existing lodging in nearby towns to reduce impacts on local housing availability. To further minimise disruptions to the tourism economy, workforce accommodation planning will avoid tourist lodging during peak periods and major events.

3 Project

This section sets out a detailed description of the construction and operational phases of the project, identifying all components and activities for which approval is sought and the basis for the assessment of environmental impacts. An outline of the approach to decommissioning is also provided.

Detailed drawings are provided in **Appendix B**. An overview of the Project is provided in **Section 3.1**. **Section 3.2** describes the Project area and disturbance footprint with further detail on each of the Project components provided in **Section 3.3**. **Section 3.4** outlines how the Project will be constructed, with operations in **Section 3.5**, and decommissioning outlined in **Section 3.6**.

3.1 Project Overview

The Project involves the construction and operation of a lithium-ion BESS with a capacity of up to 400 MW / 920 MWh. Associated infrastructure includes a 330 kV overhead transmission line, underground cable and switching station to connect the BESS to the existing transmission grid, and development of Project access tracks and road upgrades (refer **Section 6.7**). Detailed drawings are provided in **Appendix B**.

The BESS facility draws electricity from the grid during periods of low demand (or high renewable production) and stores it within the enclosed lithium-ion units. When the demand for power increases, the stored energy is released back into the grid to ensure a stable and reliable electricity supply.

The Project is located south of the Aberdeen town centre, with the BESS, access road and a portion of the easement located within the Upper Hunter Shire LGA, with the remainder of the easement and the switching station within the Muswellbrook Shire LGA (refer **Figure 2**). The Site location and cadastral boundaries are shown on **Figure 7**.

Construction of the Project is anticipated to commence in June 2027 and span approximately 18- 24 months, including installation of all infrastructure, grid connection and commissioning. Operations are expected to begin in 2028 and continue for a period of 25 years.

3.2 Project Extent and Disturbance Footprint

The Project's land requirements are characterised at two levels:

- Disturbance Footprint - the land directly impacted by construction and operation, including vegetation clearing, earthworks, compounds and permanent infrastructure
- Project Extent - the total land area required for the development, including the BESS site, switching station, transmission line easement, associated access roads, and an asset protection zone (APZ) maintained around the BESS compound for bushfire protection and landscaping. Project Extent accommodates laydown areas, construction compounds, access tracks and cable stringing. Disturbance will be minimised where practicable, and following construction, land not required for ongoing operations will be rehabilitated.

These areas are summarised in **Table 7** and shown in **Figure 7**.

Table 7 Project Disturbance

Component	Project Extent Area (ha)	Disturbance Footprint Area (ha)
BESS Area	10.5	4.07

Component	Project Extent Area (ha)	Disturbance Footprint Area (ha)
BESS APZ/Landscaping	1.18	1.18
BESS Access Road	2.3	0.74
Easement	16.36	3.40
Access Tracks	1.75	1.75
Switching Station	1.77	1.77
Trenching	0.92	0.92
Total	34.78	13.83

3.3 Project Components

3.3.1 BESS

The BESS will contain enclosed lithium-ion batteries manufactured offsite and transported to site for installation. Batteries will be arranged in rows and comprise:

- BESS containers - each unit measures up to 6.058 m wide, 2.438 m deep and 2.896 m high, with 204 units proposed. These will be supported by 136 inverters and 68 MV transformers
- Power conversion system (PCS) to convert the power flow between battery and grid, including voltage sensing and monitoring functions
- Racks of batteries with a battery management system to protect cells from harmful excesses of voltage, temperature and current
- An energy management system to monitor the power grid, directing the batteries to store electricity when there is a surplus and release it when demand increases
- A thermal management system for enclosure heating, ventilation and cooling to maintain the desired operating temperature utilising fans and pumps
- Fire detection systems
- Noise walls incorporated within the BESS compound to manage operational noise emissions at surrounding sensitive receivers (refer **Section 6.6** and **Figure 12**).

The BESS will include a dedicated substation to convert electricity between the high voltage transmission network and BESS equipment. The substation will include:

- Two 330/33 kV transformer bays and associated switchgear
- Substation buildings accommodating indoor 33 kV switchgear, secondary protection systems, AC/DC distribution equipment, SCADA, system dispatch control, fire detection and intrusion detection systems
- Ancillary components including bundled transformers, harmonic filters, fencing, lightning protection, lighting poles, CCTV and cabling.

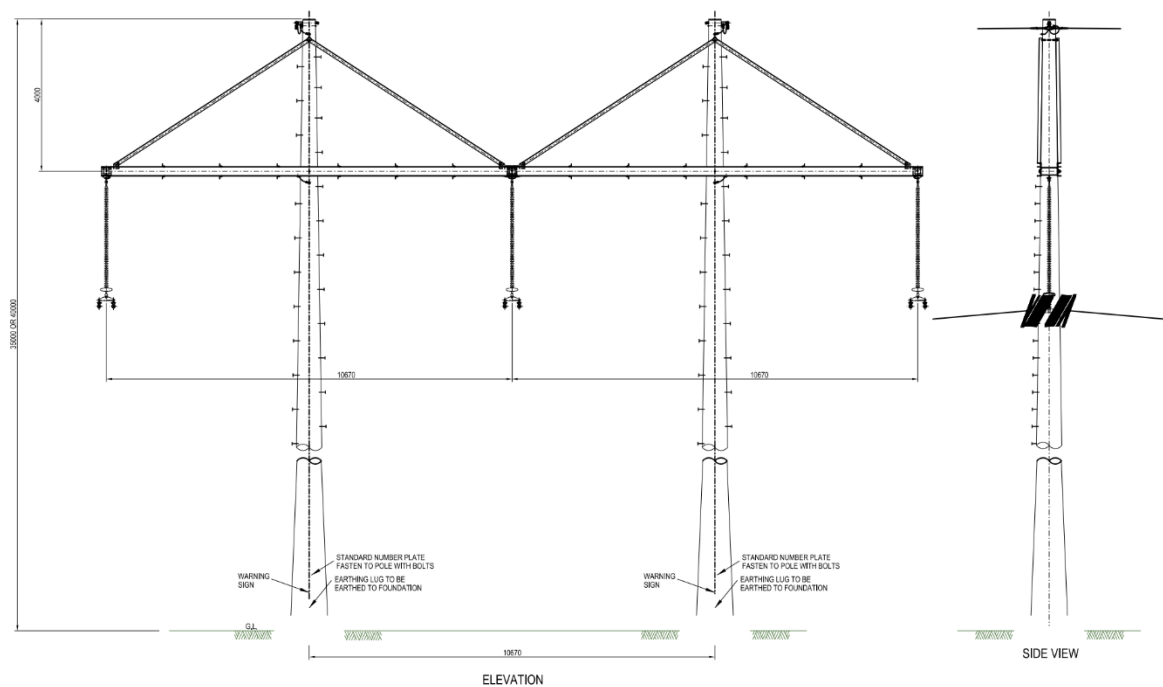
The substation will connect to infrastructure within the compound by underground 33 kV cables. Transformers will be separated and banded in accordance with manufacturer requirements and Australian Standards.

3.3.2 Transmission Line

The 330 kV transmission line will comprise high voltage electrical conductors supported on steel pole suspension structures with crossarms, as shown indicatively in **Figure 5**. Each pole will be supported on a concrete foundation with a permanent above-ground footprint of approximately 3–4 m in diameter at the base. Earthing lugs, number plates and safety signage will be attached in accordance with electrical safety requirements. Pole spacing will be determined during detailed design, considering electrical clearances, conductor loading, geotechnical conditions, topography and environmental constraints. Indicative design parameters are below:

- Voltage: 330 kV
- Structure type: Steel double-circuit portal frame comprising two poles connected by crossarms
- Structure height: ~35 m
- Crossarm width: ~10.7 m
- Footprint: Estimated <8m x 8m per pole base, including concrete footing
- Easement Width: ~60 m (registered on affected land titles)
- Transmission line length: ~3.9km
- Partial vegetation clearing, with ongoing management of regrowth beneath the line to reduce fire risk

An indicative portal frame design is shown on **Figure 5**. The final number, type and location of structures to be confirmed during detailed design.

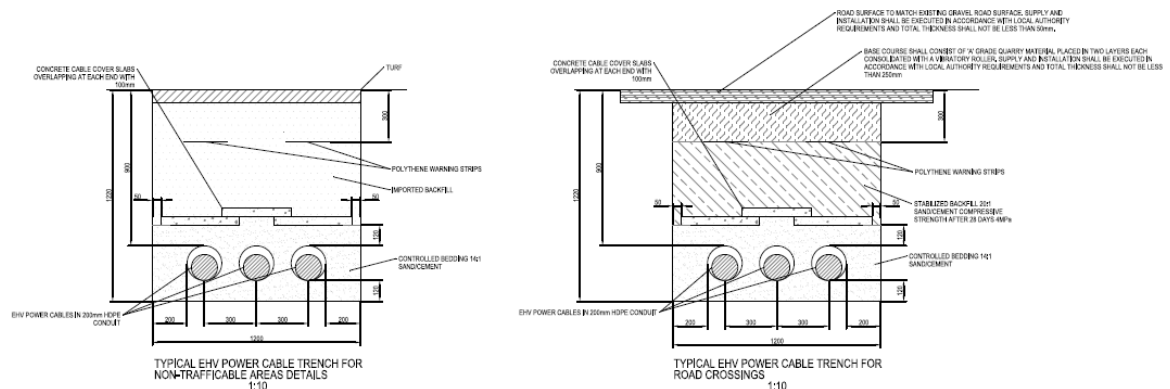
Figure 5 Indicative Transmission Pole

3.3.3 Underground Cable

The 330 kV underground cable component of the project will comprise high-voltage electrical cables installed within a buried cable trench. The cable system will include power cables, communications cables, cable joints, earthing systems and associated civil infrastructure required for installation, operation and maintenance. The cable system will design to accommodate electrical, thermal, geotechnical and operational requirements. Indicative design parameters are below:

- Voltage: 330 kV
- Cable type: Underground insulated high-voltage cable
- Installation method: Direct buried within a trench or installed within conduits, subject to detailed design
- Cable length: ~1 km
- Joint bays: Installed at intervals determined during detailed design
- Vegetation clearing: Clearing within the construction corridor, with reinstatement following construction where practicable. Ongoing vegetation management may be required to protect cable infrastructure.
- An indicative cable trench cross-sectional drawing is shown in **Figure 6**. The final cable alignment within the road reserve and applicable easements, together with the installation methodology and location of ancillary infrastructure, will be determined during detailed design.

Figure 6 Indicative Cable Trench



3.3.4 Switching Station

The Project will connect to the existing Transgrid 330 kV network via a switching station located on Lot 27 DP 752485 adjacent to Wells Gully Road. The switching station will be fenced and provide the grid interface for the BESS and transmission line.

Key infrastructure will include:

- High voltage switchgear and busbars
- Circuit breakers, disconnectors and protection systems
- A control building housing metering, communications and supervisory equipment
- Supporting infrastructure such as fencing, lighting, earthing and stormwater controls.

The switching station compound would be constructed on compacted fill material overlaid by crushed rock. Internal access roads would be similarly constructed but finished with an impervious two coat seal in lieu of crushed rock. Concrete would be limited to the foundations of electrical equipment, gantries and cable trenches where required.

The final layout and equipment specification will be determined during detailed design in consultation with Transgrid and in accordance with Australian Standards.

3.3.5 Access

Vehicle access to the Site will be provided by a combination of public roads and internal access tracks, including:

- BESS access - Access to the BESS compound will be provided by upgrades to Campbell Street, St Heliers Street and Railway Street, which will be sealed to an all-weather standard and connect to the western side of the Site. The road will generally follow the existing terrain, with the final level raised at the Site entry to match the compound bench. The upgraded road will be designed to accommodate the construction delivery of large components such as battery containers and transformers. Twin 900 mm diameter reinforced concrete pipes with headwalls will be installed beneath the raised road embankment to maintain watercourse serviceability during rainfall events. This will be supported by flood warning signage, depth markers and crossing signage to ensure vehicle safety.

- BESS Perimeter access road - a minimum 8 m wide perimeter road will be established around the BESS compound at the bushfire prone vegetation interface to support access by fully loaded Category 1 firefighting vehicles (refer **Section 6.9**).
- Switching station access - via a road connection from Wells Gully Road. This will involve site stripping, subgrade preparation, road base placement, drainage installation and sealing. Construction traffic is expected to include up to five semitrailer deliveries per day over a period of approximately nine months, along with light vehicle movements. Deliveries will consist of disassembled components transported on standard semitrailers for on-site assembly, with no over-size/over-mass (OSOM) vehicles required. During the construction of the switching station, vehicle movements will comprise five semi-trailers delivering materials, and up to five light vehicles arriving and departing each day for up to nine months. Operational traffic will involve occasional light vehicles or trucks access for inspection and maintenance and occasional heavy vehicles movement where large component requires replacement over the life of the asset. For the purpose of the traffic assessment, operational vehicle movements are assumed to be one per month on average.
- Transmission line easement access - an access track established within the 60 m easement to enable pole installation and stringing during construction. The track will be retained for long-term inspection and maintenance of transmission infrastructure, with the final alignment to be determined during detailed design to minimise disturbance
- Off-site road upgrades - minor upgrades are required at several locations along the OSOM haulage routes to facilitate transformer delivery. Further details are provided in **Section 6.7** and **Appendix K**.

3.3.6 Fencing And Landscaping

Security fencing and controlled access will be provided around the BESS and switching station compounds, consistent with utility and safety requirements. Landscaping will be established in accordance with the Landscape Plan to reduce visual impacts, particularly to the north and north-east close to residential areas. A Landscape Plan is provided in **Appendix H** with planting arrangements to be finalised during detailed design.

3.3.7 Other Supporting Infrastructure

The Project will require a range of supporting infrastructure including stormwater management, fire water storage, security cameras, and lighting, to be finalised during detailed design.

3.4 Construction

Construction is expected to commence in June 2027 and span approximately 18-24 months, with works covering installation of all infrastructure, grid connection and commissioning. A Construction Environmental Management Plan (CEMP) will be prepared in response to consent conditions.

Construction works will include:

- Site establishment, including access (refer **Section 3.3.5**), vegetation clearing, topsoil stripping and stabilisation for later reuse, earthworks, and establishment of a temporary compound with offices, amenities and laydown areas
- BESS works, including site levelling, hardstand installation, and delivery and installation of battery units and associated equipment
- Substation and switching station construction, including foundations, electrical equipment installation, and protection and control systems

- Transmission line works, including establishment of an access track along the easement, excavation and construction of steel pole foundations and earthing grids, erection of poles, and stringing of conductors to connect the BESS substation with the new switching station and the existing Transgrid 330 kV network
- Installation of permanent fencing and landscaping (refer Section 3.3.6)
- Testing and commissioning of all systems prior to energisation
- Removal of temporary construction facilities and rehabilitation of disturbed areas not required for operations.

3.4.1 Plant and Equipment

A range of plant and equipment will be required, including earth-moving machinery, trucks, cranes and diesel generators. Water will be used for dust suppression, vehicle washdown and worker amenities, and will be sourced locally where available or trucked to the Site if required. Temporary power during construction will be supplied by the Engineering, Procurement and Construction (EPC) contractor. Permanent power for operations will not require a local connection to the Ausgrid network, as the Project connects directly to the transmission network via an onsite auxiliary transformer.

3.4.2 Workforce

The workforce is expected to peak at approximately 100 full time equivalent (FTE) personnel. Local workers will be prioritised, although some specialist roles may need to be filled by external contractors. Temporary accommodation is expected to be sourced from Aberdeen (adjacent to Site), Muswellbrook (approx. 7.5 km south) and Scone (approx. 14 km north), with Singleton (approx. 60 km from Site) also considered if additional capacity is required (refer **Appendix Q**).

3.4.3 Hours

Construction will occur during standard hours:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No work on Sundays or public holidays

3.4.4 Transport and logistics

Delivery of Project components will require a combination of oversize/overmass (OSOM) vehicles for major equipment, standard freight for the switching station, and light vehicles for workforce and general supplies. See **Figure 8** for transport routes.

BESS

- Battery units will be delivered from Port Botany on Class 1 OSOM vehicles. These vehicles are compliant with the pre-approved OSOM network and will access the Site via New England Highway. Due to the lack of a dedicated right-turn bay at Perth Street, vehicles will continue north to Scone, use Kelly Street to turn around, and re-enter Perth Street southbound before continuing to Campbell Street. A swept path assessment has been undertaken in **Section 6.7**, with pilot vehicle assistance proposed at the Perth Street turn. Up to six battery deliveries may occur per day, scheduled outside peak and school bus periods

- Transformers (2 units) will be delivered from Port of Newcastle on high-risk OSOM vehicles up to 65 m in length and carrying loads of around 180 t. Deliveries will utilise the Port to REZ corridor with a detour around Muswellbrook, as detailed in the OSOM Route Assessment. If Port to REZ upgrades are not completed prior to delivery, an alternative route via Bell Street, Victoria Street and Market Street through Muswellbrook has been assessed as feasible (refer **Appendix K**). Minor works are required at several intersections to provide approximately 989 m² of additional trafficable area and temporary removal of one traffic sign. Pilot/escort vehicles and spotters will manage movements. If Port to REZ upgrades are completed prior to delivery, required works will be limited to the intersection of Perth Street and Campbell Street in Aberdeen.
- A Bridge Assessment by Aurecon (Ref. 528958, Rev A, June 2025) confirmed that OSOM vehicles can safely traverse the haulage route subject to specific operational controls. While the bridge capacity is marginally below standard, safe crossing is achievable at 10 km/hr with traffic control and speed management in place, as detailed in **Section 6.7** and **Appendix K**.

Switching Station

- Construction of the switching station will occur over approximately nine months. Components will be transported in disassembled form on standard semitrailers for on-site assembly, meaning no oversize/overmass (OSOM) vehicles are required. Deliveries will follow the indicative haulage route of New England Highway → Perth Street → Campbell Street → Andrews Street → Graeme Street → Wells Gully Road. Once operational, traffic to the switching station will be limited to approximately one light vehicle or truck per month for inspection and maintenance.

3.5 Operation

Commercial operation of the Project is expected to commence in 2028, following construction and commissioning, and will continue for approximately 25 years. The operational life may be extended if the facilities are repowered or upgraded at a later date.

The BESS will operate 24 hours a day, seven days a week, and will be monitored and controlled remotely with no permanent staff on site. Approximately 2-3 workers will be required throughout the life of the Project for maintenance and administration. The system is expected to be on standby for much of the time and undergo one full cycle of charging and discharging per day.

Over its operating life, the Project will:

- Collect and store energy from the grid during periods of low demand and release it during high demand, supporting efficient operation of the electricity network
- Provide stabilisation services such as rapid injection or reduction of electricity to manage grid frequency, referred to as frequency controlled ancillary services (FCAS)
- Undergo periodic maintenance, including vegetation management, pest control, inspection of electrical infrastructure, and replacement of BESS components as required.

Operations will involve intermittent access to the Site by light vehicles for inspection and maintenance, with occasional heavy vehicle movements where large components require replacement. These activities will be significantly less intensive than the construction works described in **Section 3.4**. Upgrade works may also provide additional generation capacity without increasing the disturbance area/impacts associated with the Project and will depend on technologies available at the time.

The operational footprint will remain limited to the infrastructure described in **Section 3.3** (BESS compound, switching station and transmission line easement). Operations and maintenance will require approximately five

full time equivalent (FTE) personnel on an intermittent basis.

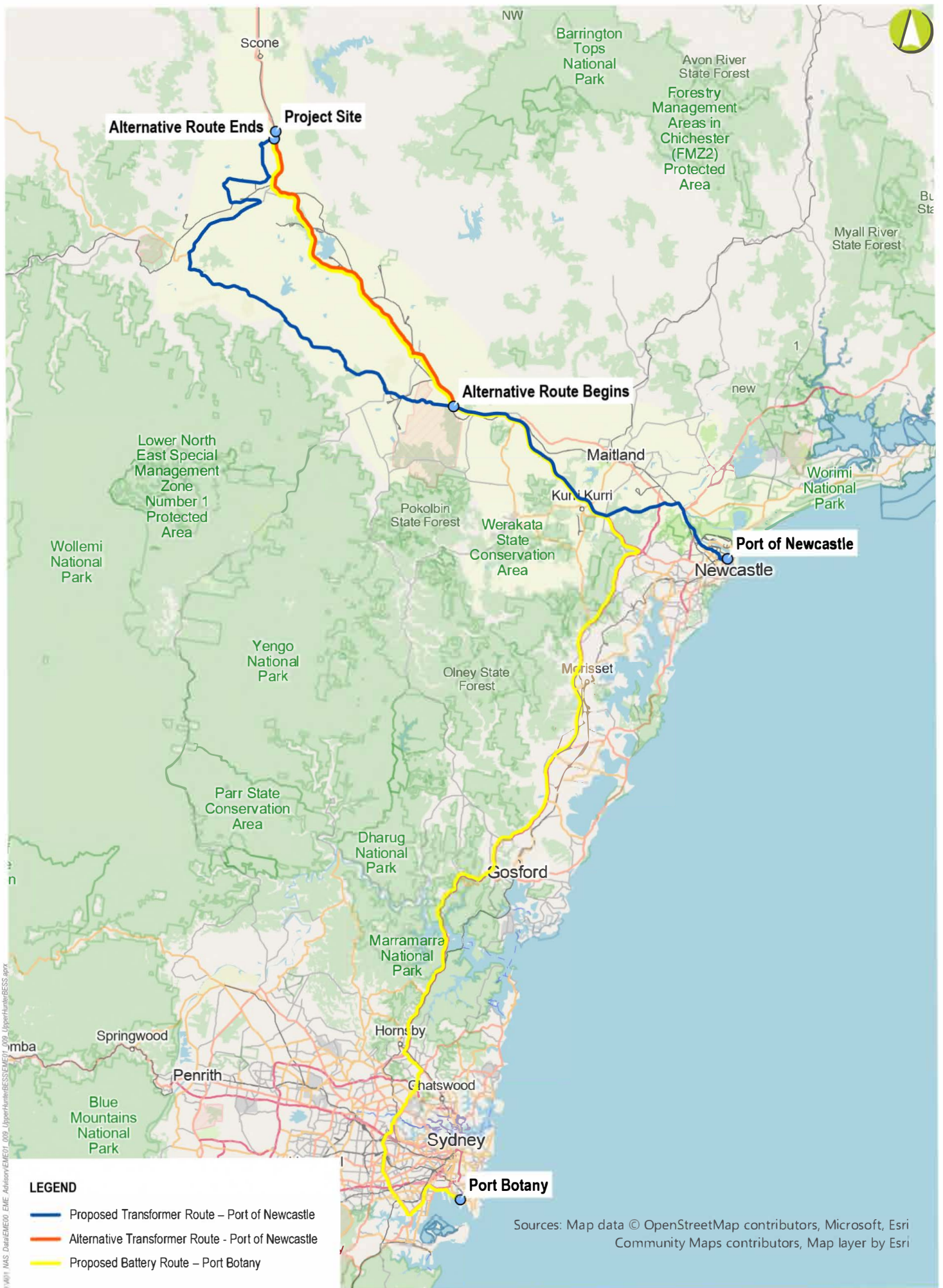
3.6 Decommissioning

At the end of the Project's operating life, all above-ground infrastructure will be removed and either recycled or reused where practicable. Key activities are expected to include:

- Removal of the BESS, substation, switching station and transmission infrastructure, including foundation posts
- Removal of site amenities and equipment
- Removal of fencing and associated footings
- Rehabilitation of disturbed soils in consultation with the landowner

At the end of the Project design life or agreed timetable, the batteries would either be disposed of and recycled at a suitably approved disposal facility or, subject to confirmation, returned to the original equipment manufacturer for refurbishment and recycling (refer **Section 6.12** for detail). Final rehabilitation of the Site will be undertaken in accordance with an agreed Decommissioning and Rehabilitation Plan (refer Appendix 4 of **Appendix G**).





Upper Hunter Battery Energy Storage System

Material Transport Routes

FIGURE 8

4 Statutory Context

This section describes the relevant Commonwealth and State legislation that applies to the Project and how these are addressed in the EIS.

4.1 Commonwealth

The key Commonwealth statutory requirements relevant to the Project are detailed in **Table 8**.

Table 8: Commonwealth Statutory Requirements

Legislation	Framework	Application to Project
Commonwealth		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	The Australian Government's primary legislation governing environmental protection and biodiversity conservation is the EPBC Act. This Act assesses any actions that could significantly impact Matters of National Environmental Significance (MNES). DCCEEW administers the EPBC Act. The EPBC Act's referral and assessment process determines whether the Act applies. Actions deemed to have a significant impact on MNES are classified as "controlled actions" and require approval from the Minister for Environment under the EPBC Act in addition to any State approval. In NSW, the Commonwealth and State governments operate under a bilateral assessment agreement, under which the NSW Environment Protection Authority (EPA) and other accredited State agencies can assess the environmental impacts of a Project on behalf of the Commonwealth. This arrangement allows the Project to satisfy both Commonwealth and NSW assessment requirements through a single coordinated process.	An EPBC referral was submitted in September 2025 under the accredited bilateral assessment agreement. The Project was determined to be a controlled action (EPBC 2025/10353) on 8 December 2025 in relation to the following MNES potentially affected by the Project: • Threatened Species and Ecological Communities • Migratory Species The Project is unlikely to have a significant impact on the following MNES: • World Heritage • National Heritage • Ramsar Wetland • Nuclear • Commonwealth Marine Area • Great Barrier Reef • Water resource in relation to large coal mining development or coal seam gas • Commonwealth Land • Commonwealth Heritage Places Overseas • Commonwealth or Commonwealth Agency
<i>Native Title Act 1993</i>	The <i>Native Title Act 1993</i> (NT Act) acknowledges the rights and interests of Aboriginal and Torres Strait Islander peoples in land and waters based on their traditional laws and customs. The NT Act aims to achieve four primary objectives: • Recognize and protect native title. • Establish procedures and standards for future dealings that may affect native title.	A search of the National Native Title Register found no determined native titles within the Project area. However, the Register of Native Title Claims identified two active claims in the Upper Hunter Shire and Muswellbrook Shire LGAs:

Legislation	Framework	Application to Project
	• Create a mechanism for resolving native title claims. • Validate past acts that may have been invalidated due to the existence of native title. While the specific native title rights recognized will vary with each determination, they may include the rights to maintain and protect sites, use the land for hunting or ceremonies, camp and live on the land, and take resources from the land and waters. A grant of freehold land generally extinguishes or suppresses native title rights whereas native title may exist over areas of Crown land or water. Native Title determinations are made by the Federal Court of Australia. These determinations legally recognize native title rights and interests that existed before European settlement. A successful determination grants traditional owners' rights and interests in land and waters.	• NC2018/002 - Warrabinga-Wiradjuri #7 • NC2011/006 - Gomeroi People - accepted for registration on 24 July 2023 (NC2011/006-2), but it does not extend to the Project area. Neither claim extends to the Project area, including the Crown Reserve over Lot 162 DP257347. The remainder of the Site is freehold land, over which native title is presumed extinguished. Accordingly, native title does not constrain the Project.

4.2 New South Wales

The assessment of the NSW statutory context is grouped under the headings as recommended under the EIS Guidelines.

4.2.1 Power to Grant Consent

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the accompanying EP&A Regulation establish the legal framework for granting development consent in NSW. The power to grant consent for the Project under the relevant legislation is detailed in **Table 9**.

Table 9 Power to Grant Consent

Statutory Reference	Consideration
Section 4.36 of the EP&A Act	This section requires SSD to be assessed and determined under the specific provisions of Part 4, Division 4.7 of the EP&A Act. The NSW Minister for Planning and Public Spaces is the consent authority for SSD unless this function is delegated.
Section 2.6 of the Planning Systems SEPP	Section 2.6 declares development listed in Schedule 1 as SSD. The Project qualifies as SSD as electricity generating works with a capital investment value in excess of \$30 million as per Clause 20 of Schedule 1.
Section 4.5 of EP&A Act	Section 4.5 provides that the Minister for Planning and Public Spaces is the consent authority for SSD, except where the Independent Planning Commission (IPC) is declared to be the consent authority.

4.2.2 Permissibility

Permissibility is based on the categories of development identified in relevant Environmental Planning Instruments (EPIs) as being permissible in the relevant zone. The Project can be defined as electricity generating works, defined in the Standard Instrument Local Environmental Plan as:

electricity generating works means a building or place used for the purpose of-

(a) making or generating electricity, or

(b) electricity storage.

The transmission line is considered as ancillary to the electricity generating works as its purpose is to facilitate the electricity generating works by providing a grid connection. It does not have an independent purpose in its own right and separate from the electricity generating works.

The permissibility of the Project under the relevant legislation is detailed in **Table 10**.

Table 10 Permissibility

Statutory Reference	Consideration
<i>Upper Hunter Local Environmental Plan 2013</i> (Upper Hunter LEP)	The BESS is located on land zoned as E4 General Industrial with the transmission easement located on land zoned as R1 General Residential and RU4 Primary Production Small Lots. Electricity generating works are not permissible on any of the zones based on the land use tables in the Upper Hunter LEP.
<i>Muswellbrook Local Environmental Plan 2009</i> (Muswellbrook LEP)	The Project is partially located on land zoned as RU1 Primary Production under the Muswellbrook LEP. Electricity generating works are not permissible these land use zones based on the land use tables in the Muswellbrook LEP.
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i> (TI SEPP)	Section 2.36 of the TI SEPP provides that electricity generating works are permissible with consent on any land in a prescribed rural, industrial or special use zone which includes E4, RU1, and RU4 but does not include R1 - the Project is therefore partly prohibited. S. 4.38(3) of the EP&A Act provides that development consent may be granted despite the development being partly prohibited by an environmental planning instrument.

4.2.3 Other Approvals

In accordance with Sections 4.41 and 4.42 of the EP&A Act, certain approvals under other legislation are not required for approved SSD, while others must be granted in a manner consistent with the SSD approval.

As per section 4.41 of the EP&A Act, **Table 11** lists the environmental approvals that are not required for SSD, but which have been considered in the preparation of this EIS.

Table 11 Approvals not required for SSD

Legislation	Application to Project
A permit under section 201, 205 or 219 of the <i>Fisheries Management Act 1994</i> (FMA)	The Project would not require a permit under the FMA as it does not involve: • dredging and reclamation work • temporarily or permanently obstructing fish passage • using explosives and other dangerous substances • harming marine vegetation.

Legislation	Application to Project
An approval under Part 4, or an excavation permit under section 139, of the <i>Heritage Act 1977</i>	A Historic Heritage Assessment (HHA) was undertaken for the Project. No heritage items or archaeological relics were identified within the Subject Area, and the Site was assessed as having low historical significance. While an excavation permit under section 139 of the <i>Heritage Act 1977</i> would ordinarily be required where relics are present, no such findings were made. Refer Section 6.3
An Aboriginal heritage impact permit under section 90 of the <i>National Parks and Wildlife Act 1974</i>	An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared for the Project and identified a small number of artefacts within the Site. These were determined to be of low archaeological significance and are situated in areas where potential impacts can be avoided or appropriately managed. Ordinarily, such findings may necessitate an Aboriginal heritage impact permit under section 90 of the <i>National Parks and Wildlife Act 1974</i> . However, section 4.41 of the EP&A Act specifies that approvals under this Act are not required for SSD. As such, while the findings have been documented and management measures proposed, a formal permit under the <i>National Parks and Wildlife Act 1974</i> is not required for the Project. Refer Section 6.3
A bushfire safety authority under section 100B of the <i>Rural Fires Act 1997</i>	The Project is located on land mapped as bushfire-prone, including Category 3 and Category 1 vegetation. A Bushfire Assessment Report has been prepared following <i>Planning for Bushfire Protection 2019</i> (PBP 2019), and appropriate mitigation measures-such as Asset Protection Zones, fire-compatible landscaping, emergency access, and water supply-have been incorporated. Refer to Section 6.9 and Appendix M for further details. A bushfire safety authority applies to certain high risk development including subdivision of land and special fire protection purpose development and does not apply to electricity generating works.
A water use approval (section 89), a water management work approval (section 90) or an activity approval (other than an aquifer interference approval) (section 91)) of the <i>Water Management Act 2000</i>	Although water use, water management works, or activity approvals under sections 89, 90 or 91 of the <i>Water Management Act 2000</i> (Water Management Act) would typically be required, these approvals were not triggered, as the Project is assessed as SSD under Division 4.7 of the EP&A Act. Specifically, under section 4.41(g) of the EP&A Act, water use approvals under the Water Management Act do not apply to SSD. Nonetheless, a detailed assessment of potential impacts to waterfront land was undertaken in accordance with DPI's Guidelines for Controlled Activities on Waterfront Land to demonstrate that the Project posed no significant risk to watercourses, riparian vegetation, or bank stability. Water use associated with the Project was expected to be minimal, with negligible impact on the availability or quality of surface water or groundwater resources relied upon by local landholders. Refer Section 6.8 for further details.

In addition to development consent under Part 4, Division 4.7 of the EP&A Act, Section 4.42 specifies that certain approval cannot be refused if it is necessary for carrying out State significant development that is authorised by a development consent and is to be substantially consistent with the consent. These are presented in **Table 12**.

Table 12: Approvals That Cannot Be Refused for SSD

Legislation	Type of Authorization	Application to Project
<i>Fisheries Management Act 1994</i>	Aquaculture permit under section 144	Not applicable. The Project does not involve aquaculture activities or impact aquatic habitats requiring such a permit
<i>Coal Mine Subsidence Compensation Act 2017</i>	Approval under section 22	Not applicable. The Project does not involve coal mining or activities within areas subject to subsidence requiring approval under this Act
<i>Mining Act 1992</i>	Mining lease	Not applicable. The Project does not involve mining operations or extraction of mineral resources that would require a mining lease under this Act.
<i>Petroleum (Onshore) Act 1991</i>	Production lease	Not applicable. The Project does not involve petroleum exploration or production that would necessitate a production lease under this Act.
<i>Protection of the Environment Operations Act 1997</i>	Environment protection licence under Chapter 3 (section 43)	Not applicable. The operation of a BESS is not classified as a scheduled activity under Schedule 1 of the POEO Act. As such, the Project does not require an environment protection licence
<i>Roads Act 1993</i>	Consent under section 138	Not Applicable. The Project involves construction of road works on public roads. Works of this nature would ordinarily require consent under section 138 of the Roads Act 1993. However, under section 4.41 of the EP&A Act, this consent is not required for approved SSD.
<i>Pipelines Act 1967</i>	Licence	Not applicable. No pipeline infrastructure exists on the Site, and the Project does not involve the construction, operation or alteration of pipelines for petroleum or prescribed substances as defined under the <i>Pipelines Act 1967</i>

Environmental planning related legislation and regulations that may still be applicable to approved SSD projects are identified in **Table 13**.

Table 13: Other Relevant State Legislation

Legislation	Framework	Application to Project
<i>Contaminated Land Management Act 1997</i>	The <i>Contaminated Land Management Act 1997</i> (CLM Act) regulates the identification, assessment, and remediation of contaminated land to protect human health and the environment. It empowers the EPA to oversee contamination risks, issue investigation and remediation orders, and manage contaminated sites. Under the CLM Act a Site may be listed on the Contaminated Land Record where the EPA identifies a significant risk to human health or the environment, requiring action. This can occur through Preliminary Investigation Orders, Remediation Orders, or accepted Voluntary Management Projects.	The Site is not listed under the CLM Act on the NSW EPA Contaminated Land Record. No evidence of contamination has been identified, and the Project is not expected to disturb previously unidentified contamination.

Legislation	Framework	Application to Project
<i>Biodiversity Conservation Act 2016</i>	The <i>Biodiversity Conservation Act 2016</i> (BC Act) administers matters relating to the listing of threatened species, threatened ecological communities, key threatening processes, biodiversity impact assessment, offsetting and related offences. The BC Act seeks to: • Conserve biological diversity at the bioregional and State scale • Maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations • Assess the extinction risk of species and ecological communities and identify key threatening processes through an independent and rigorous scientific process • Establish a framework to avoid, minimise and offset the impacts of Project and land use change on biodiversity. Projects assessed under Part 4 of the EP&A Act are required to address the requirements of the BC Act which includes provisions for offsetting once certain thresholds are met.	The Project triggers the NSW Biodiversity Offsets Scheme. A BDAR has been prepared in accordance with the BAM to address residual impacts on threatened ecological communities and species. Refer to Section 6.2 and Appendix D.
<i>Heritage Act 1977</i>	The <i>Heritage Act 1977</i> regulates activities that may impact heritage-listed sites and buildings. It provides a framework for managing heritage items, including approvals for alterations, development, and conservation works. The <i>Heritage Act 1977</i> requires approvals for works that affect the heritage significance of a place or object, as well as permits for excavation or disturbance of archaeological relics. Section 146 requires individuals who discover a relic during activities to promptly notify the Heritage Council of NSW in writing to ensure its proper assessment and protection.	Heritage surveys undertaken for the Project identified no historic heritage items within the Site. If relics are discovered during construction, the Heritage Council of NSW will be notified in accordance with section 146 of the Act, unless it is reasonably believed the Council is already aware of the location
<i>National Parks and Wildlife Act 1974</i>	The <i>National Parks and Wildlife Act 1974</i> (NPW Act) protects Aboriginal objects and places in NSW. Under Section 90, an Aboriginal Heritage Impact Permit (AHIP) is required to harm or disturb an Aboriginal object, unless exempt. Section 86 outlines offences for harming Aboriginal objects without approval. SSD projects assessed under the EP&A Act are generally exempt from requiring a separate AHIP.	Aboriginal artefacts have been identified within the Site and assessed in an ACHAR (refer Section 6.3). As the Project is SSD and assessed under the EP&A Act, no AHIP is required under Section 90 of the NPW Act. Artefacts will be managed in accordance with the ACHAR.
<i>Protection of the Environment Operations Act 1997</i>	The <i>Protection of the Environment Operations Act 1997</i> (POEO Act) is the primary legislation for environmental protection in NSW, administered by the EPA. It regulates water, air, and land pollution, and waste management. • Section 120 – Prohibition of water pollution • Sections 124–128 – Requirements to minimise and manage air pollution • Part 5.6 – Offences and obligations relating to land pollution and waste • Protection of the Environment Operations (Waste) Regulation 2014 – Requirements for waste storage, transport and disposal	The Project does not involve any scheduled activities under Schedule 1 of the POEO Act and therefore does not require an EPL. Nonetheless, the Project will be managed to prevent pollution and minimise environmental harm in accordance with the general environmental protection provisions of the POEO Act.

Legislation	Framework	Application to Project
	While activities listed in Schedule 1 require an Environment Protection Licence (EPL), non-scheduled activities must still comply with general environmental duties under the Act.	
<i>Biosecurity Act 2015</i>	The <i>Biosecurity Act 2015</i> establishes a risk-based framework for managing pests, diseases, weeds and contaminants that pose a threat to the environment, agriculture and the community. Under Section 22, all individuals and organisations have a general biosecurity duty to prevent, eliminate or minimise biosecurity risks as far as is reasonably practicable. This duty applies to any dealing with biosecurity matter (e.g. plants, soil, pests) and to activities that might give rise to a biosecurity risk.	Vegetation clearing will be required, which may present a risk of spreading weeds or other biosecurity threats. The Project will implement mitigation measures-including weed hygiene protocols, equipment cleaning and material handling controls-to ensure compliance with the general biosecurity duty under Section 22 of the Act.
<i>Water Management Act 2000</i>	The <i>Water Management Act 2000</i> (WM Act) regulates the sustainable use and management of NSW's water resources. It establishes requirements for water access licences, water supply work approvals, and controlled activity approvals for works within 40 m of a watercourse under Section 91. Under Section 60A, SSD projects are exempt from requiring separate approvals under the WM Act, provided impacts are assessed through the EIS.	The Site includes or is adjacent to minor watercourses. While no water extraction or in-stream works are proposed, the Project will maintain recommended buffer distances and implement erosion and sediment controls. As SSD, no separate approval is required under the WM Act. As the access road crossing is located within 40 m of a watercourse, which would ordinarily trigger a Controlled Activity approval under Section 91 of the WM Act. As SSD, this approval is not required, with impacts assessed through the EIS
<i>Rural Fires Act 1997</i>	The <i>Rural Fires Act 1997</i> seeks to reduce bushfire risks to life, property and the environment. Section 100B requires development consent to be accompanied by a Bush Fire Safety Authority. However, under Section 4.41 of the EP&A Act, SSD projects are exempt from this requirement but must comply with <i>Planning for Bush Fire Protection 2019</i> .	The Site is located in a bushfire-prone area. Bushfire risk has been addressed in accordance with <i>Planning for Bush Fire Protection 2019</i> (refer Section 6.9). No Bush Fire Safety Authority is required under Section 100B of the <i>Rural Fires Act 1997</i>. A bushfire safety authority under Section 100B does not apply to electricity generating works (refer Section 4.2.3)
<i>Crown Land Management Act 2016</i>	The <i>Crown Land Management Act 2016</i> (CLM Act) governs the use, management and occupation of Crown land in NSW. Under Section 2.20, the Minister may grant short-term licenses for purposes such as access and investigation. Section 2.6 requires that use of Crown land aligns with authorised purposes, while Section 5.11 provides for the long-term authorisation of activities via licences, leases or easements granted by the Crown Lands Division.	Lot 162 DP 257347 is Crown land. A short-term licence (RN 675820) was issued under Section 2.20 of the CLM Act to facilitate access and site investigations on this lot. A separate tenure arrangement (such as a licence, lease or easement) will be secured under Section 5.11 of the CLM Act to authorise the construction and ongoing occupation of Crown land for the Project.

Legislation	Framework	Application to Project
<i>Fisheries Management Act 1994</i>	The <i>Fisheries Management Act 1994</i> (FM Act) protects aquatic habitats and native fish species in NSW. Section 199 prohibits the harming of fish habitat without authorisation, while Section 218 requires approval for dredging or reclamation works in natural water bodies.	While the Site is located near minor watercourses, no works are proposed within these features. Buffer distances will be maintained, and no approvals are required under Sections 199 or 218 of the FM Act.

4.2.4 Pre-conditions to Exercising Permissibility

Before the consent authority may grant approval for the Project, specific mandatory conditions must be satisfied. These pre-conditions ensure compliance with relevant statutory requirements and guide the decision-making process. A summary of these pre-conditions is provided in **Table 14**.

Table 14: Pre-Conditions

Legislation and Section	Pre-condition	Application to Project
Environmental Planning Instruments		
<i>State Environmental Planning Policy (Planning Systems) 2021</i>	Development must meet the criteria for SSD. The Planning Systems SEPP sets out the framework for land use planning and development in NSW. Chapter 2 of the Planning Systems SEPP aims to identify development that is: • State Significant Development (SSD) • State Significant Infrastructure (SSI) and Critical SSI • Regionally Significant Development (RSD) Development that is specified in Schedule 1 or Schedule 2 is declared to be SSD.	Clause 20 of Schedule 1 identifies electricity generating works (including battery storage systems) with an estimated development cost (EDC) over \$30 million as SSD. The Project has an EDC exceeding this threshold and is therefore appropriately classified as SSD. Refer to Section 4.2.1
<i>Standard Instrument – Principal Local Environmental Plan</i>	The <i>Standard Instrument – Principal Local Environmental Plan</i> (Standard Instrument) provides the zoning framework and land use definitions that local councils must adopt in their LEPs. It does not independently establish permissibility but ensures consistency in how land uses, including electricity generating works, are defined across NSW.	The Standard Instrument provides the template for zoning and land use definitions used in the Upper Hunter LEP and Muswellbrook LEP. Electricity generating works are a defined land use under the Dictionary of the Standard Instrument and are defined as a building or place used for the purpose of making or generating electricity, or electricity storage. The Project is zoned as per Table 2. Electricity generating works are not permissible in any of these zones under the applicable LEPs. However, Section 2.36 of the TI SEPP provides that electricity generating works are permissible with consent in prescribed rural, industrial and special use zones, which captures E4, RU1 and RU4, but not R1.

Legislation and Section	Pre-condition	Application to Project
		As the Project is partly located on R1 zoned land, it is partly prohibited. Section 4.38(3) of the EP&A Act provides that development consent may be granted notwithstanding that the development is partly prohibited by an EPI.
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>	The <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i> manages environmental risks and resilience across NSW. It applies to developments that fall within the definitions of 'potentially hazardous industry' or 'potentially offensive industry', which involve the handling, storage or processing of substances that may pose a risk or cause offence without appropriate controls. - Chapter 3 requires the consent authority to consider whether a development is potentially hazardous or offensive and whether sufficient information has been provided to enable the imposition of appropriate conditions. - Chapter 4 restricts consent on contaminated land unless the consent authority is satisfied the land is suitable for the proposed development or would be suitable following appropriate remediation.	A Preliminary Hazard Analysis (PHA) was prepared for the Project in accordance with Chapter 3 of the Resilience and Hazards SEPP (refer Section 6.10). The PHA confirmed that the Project is not considered potentially hazardous with respect to the storage and transport of dangerous goods. While the Project involves lithium-ion batteries, appropriate controls and separation distances are in place to ensure no significant off-site impacts are expected. The Project is not classified as a potentially offensive industry, the Site is not significantly contaminated, and remediation requirements under Chapter 4 are not triggered.
<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>	The <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i> (Biodiversity and Conservation SEPP) key objectives are to protect, manage, and enhance NSW's natural environment and biodiversity while allowing for sustainable development. Chapter 2 of the Biodiversity and Conservation SEPP aims to protect and preserve trees and other vegetation in non-rural areas of the State. Section 2.3 of the Biodiversity and Conservation SEPP identifies the land to which Chapter 2 applies. Section 2.6 requires that a person must not clear vegetation without a permit from the relevant local council unless exempt under the SEPP or another environmental planning instrument.	The Project is zoned as per Table 2. Chapter 2 of the Biodiversity and Conservation SEPP applies only to land that is not zoned as rural and is therefore relevant to areas zoned E4 and R1, but not to RU1 or RU4. Some vegetation clearing may be required across all zones, including in areas where Chapter 2 applies. As the Project is SSD, the clearing of vegetation will be assessed as part of the development application under Division 4.7 of the EP&A Act. A separate vegetation permit under Section 2.6 of the SEPP is therefore not required. Potential impacts and any necessary mitigation measures are addressed in the biodiversity impact assessment provided in Section 6.2.
<i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i>	The <i>State Environmental Planning Policy (Transport and Infrastructure) 2021</i> supports the development of essential infrastructure and utility services across NSW. Section 2.36 of the TI SEPP permits electricity generating works with consent on land in a prescribed non-residential zone.	The Project is zoned as per Table 2 .

Legislation and Section	Pre-condition	Application to Project
	Section 2.7 provides that where there is any inconsistency between this SEPP and another environmental planning instrument, the provisions of this SEPP prevail to the extent of the inconsistency.	The TI SEPP establishes permissibility for electricity generating works across the majority of the Project's zones. As the Project traverses R1 zoned land, it is partly prohibited. Section 4.38(3) of the EP&A Act provides that development consent may be granted notwithstanding that the development is partly prohibited by an environmental planning instrument.
Upper Hunter LEP, Clause 6.10 – Essential Services	Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required: (a) the supply of water (b) the supply of electricity (c) the disposal and management of sewage (d) stormwater drainage or on-site conservation (e) suitable vehicular access	Adequate arrangements are in place or being progressed for each essential service: • Water - refer Section 6.8.3.7 and Section 5.5.2 • Electricity – refer Section 3.4.1 • Sewage - Minimal generation expected. In discussion with UHSC, sewer connection is not available (refer Appendix R), so private contractors will be utilised (refer Section 6.12.3 and Section 5.5.2) • Stormwater - refer Section 6.8.3.2 • Vehicular access – refer Section 6.7

4.2.5 Development Coordination Authority

The DCA has been established to coordinate and centralise state agency advice and approvals within the development assessment process. Its role is to help resolve conflicting department requirements, reduce requests for additional information, and address post consent housing issues.

From 1 July 2026, DCA will also:

- bring together experts from a broad range of disciplines so conflicts can be resolved quickly
- be able to issue concurrences and general terms of approval, allowing a single, coordinated response to be issued to consent authorities
- provide specialised expertise and coordinated agency advice on development applications, modification applications or planning proposals.

4.2.6 Mandatory Matters for Consideration

The matters to be considered by a consent authority when determining a development application are provided in **Table 15**.

Table 15: Matters for consideration by a consent authority

Assessment Requirements	Application to Project
EP&A Act Section 4.15(1)	
<i>(1) Matters for consideration-general In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application-</i> <i>(a) the provisions of-</i> <i>(i) any environmental planning instrument, and</i>	The Project has been assessed against the relevant EPIs, as discussed in Section 4.2.2 and Section 4.2.4
<i>(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and</i>	There are no proposed instruments of relevant to the application.
<i>(iii) any development control plan, and</i>	Clause 2.10 of the Planning Systems SEPP provides that development control plans (DCPs) do not apply to SSD. Therefore, the UHSC and MSC DCPs do not apply to the Project.
<i>(iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and</i>	The Proponent issued letters of offer to enter into Voluntary Planning Agreements (VPAs) to both UHSC and MSC on 22 December 2025. UHSC accepted the offer through Council resolution on 26 February 2026. The terms of the letter of offer outline the VPA will be executed if the project received development consent. At the time of lodgement, MSC are still considering the letter of offer. The Proponent will continue to engage with both councils, and will provide evidence of in-principle support from MSC when available.
<i>(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),</i>	The Project has been prepared in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2021, which outlines the form and content requirements of an EIS. Refer also to the EIS Declaration by a Registered Environmental Assessment Practitioner (REAP) at the start of the EIS
<i>(v) (Repealed)</i> <i>that apply to the land to which the development application relates,</i>	Not applicable
<i>(b) the significant likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,</i>	An assessment of potential impacts and mitigation measures has been undertaken in Section 6.

Assessment Requirements	Application to Project
<i>(c) the suitability of the Site for the development,</i>	The Site is considered suitable for the Project as discussed in Section 1.5.3 , Section 2.2.2 , and Section 6.4
<i>(d) any submissions made in accordance with this Act or the regulations,</i>	Submissions can be made in response to the exhibition of this Application.
<i>(e) the public interest</i>	The Project is consistent with State and national policy objectives for energy reliability and transition to renewables. It will contribute to grid stability and decarbonisation targets and is therefore considered to be in the public interest (refer Section 7)

4.2.6.1 EP&A Act Objectives

Objectives of the act and how this Application has addressed them are provided in **Table 16**.

Table 16: Objectives of the Act

Assessment Requirements	Application to Project
EP&A Act Section 1.3	
<i>(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources</i>	The Project supports grid reliability, clean energy integration and regional economic benefits while managing environmental impacts through mitigation and offset strategies.
<i>(b) to promote the supply, delivery and maintenance of housing, including affordable housing</i>	Not applicable. The Project does not involve residential development.
<i>I to promote productivity through the development and management of the State and its resources</i>	The Project contributes to energy security and productivity by providing dispatchable storage capacity to support the transition to renewable energy in the NEM (refer Section 2.1).
<i>(d) to protect the environment, including the conservation of threatened species of native animals and plants and ecological communities and their habitats</i>	Biodiversity values have been assessed and addressed in accordance with the BC Act and EPBC Act, with mitigation and offsets proposed (refer Section 6.2)
<i>I to promote resilience to climate change and natural disasters through adaptation, mitigation, preparedness and prevention</i>	The Project supports emissions reduction by enabling greater renewable energy penetration and reducing reliance on fossil fuel firming assets (refer Section 2.1). Bushfire risk has been addressed through site design and mitigation measures (refer Section 6.9).
<i>(f) to promote the sustainable management of built and cultural heritage, including Aboriginal cultural heritage</i>	Heritage assessments have been undertaken with no significant historic heritage impacts identified. Aboriginal cultural heritage sites have been identified and will be managed in accordance with the ACHMP (refer Section 6.3).

Assessment Requirements	Application to Project
<i>(g) to promote good design, amenity and the proper construction and maintenance of built environments, including the protection of the health and safety of the occupants of buildings</i>	The Project layout incorporates visual mitigation, setbacks and landscape screening to reduce amenity impacts. The Project will comply with relevant design and safety standards including fire and hazard management (refer Section 6.5 and Section 6.10).
<i>(h) to provide opportunities for participation in environmental planning and assessment</i>	Community engagement has been undertaken in line with statutory requirements. Further participation will occur during the public exhibition period (refer Section 5).
<i>(i) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment</i>	ESD principles have been incorporated through site selection, impact minimisation, emissions reduction and sustainable design (refer Section 7).
<i>(j) to promote a proportionate and risk-based approach to environmental planning and assessment</i>	The EIS adopts a risk-based approach to impact assessment, with the level of technical assessment scaled to the likelihood and consequence of potential impacts as identified through the scoping process (refer Section 6.1).
<i>(k) to promote the orderly and economic use and development of land</i>	The Project makes efficient use of available land adjacent to existing major transmission infrastructure, minimising the need for new grid connections and land disturbance.

4.2.7 Landowner's consent

Written landowner's consent has been obtained from all landowners relevant to the Project. The exception is Crown Lands as Section 69A of the *Crown Land Regulation 2018* exempts State significant development applications from the requirement to obtain written landowner's consent for development on Crown Lands.

Landowner's consent has also been obtained from MSC including specific reference to the section of the transmission easement located in Wells Gully Road. Councillors recently considered the Draft Private Infrastructure in Road Reserves Policy, which would enable private infrastructure to be located within road reserves such as Wells Gully Road. Council resolved unanimously to place the Policy on public exhibition for 28 days. If no submissions are received, Council has resolved to adopt the Policy immediately following the exhibition period. If submissions are received, Council staff will prepare a further report for Council's consideration before the Policy is finalised. The Draft Policy enables Council to provide landowner's consent for the Project include the section of easement in Wells Gully Road.

4.2.8 Planning Agreements

Section 7.4 of the EP&A Act enables a developer to enter into a planning agreement with a planning authority to provide public benefits, including the dedication of land, monetary contributions, other material public benefits, or a combination of these, for a public purpose.

In accordance with this provision, the Proponent has made offers of material public benefit to UHSC and MSC in December 2025 (refer **Appendix S**). UHSC accepted the offer through unanimous Council resolution on 25 February 2026 - the letter of acceptance is included in **Appendix S**. Negotiations are continuing with MSC, and the letter of acceptance will be provided to DPHI as soon as an agreement is reached. The proposed benefit sharing arrangements are consistent with the *NSW Energy Policy Framework Benefit Sharing Guidelines* (DPHI, 2024), which provides guidance on the expected scale and form of benefit sharing for large-scale renewable energy projects.

5 Engagement

This section provides an overview of engagement undertaken to date, outcomes, and proposed ongoing engagement.

5.1 SEARs

SEARs	Details
Engagement	Consult with relevant local, State and Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence/mineral title holders
	Undertake detailed consultation with affected landowners surrounding the development
	Undertake detailed consultation with the owners of all exploration licences across the proposed development
	Undertake detailed consultation with all relevant government agencies including the relevant local Council
	Detail how engagement was consistent with the Undertaking Engagement Guidelines for State Significant Projects (DPHI, 2024)
	Describe the consultation process and issues raised, and identify where the design has been amended in response. Where amendments have not been made, provide an explanation

This section provides an overview of engagement undertaken to date in accordance with the North Harbour Clean Energy (NHCE) Community and Stakeholder Engagement Standard, the Undertaking Engagement Guidelines for State Significant Projects (DPHI, 2024), Practice Note: Engaging with Aboriginal Communities (DPHI, 2024a) and the Social Impact Assessment Guideline (DPHI, 2025a). It also summarises the engagement outcomes, planning and design refinements incorporated in response to community and stakeholder feedback and proposed ongoing engagement.

5.2 Objectives

The Project's engagement objectives for the EIS stage were to:

- Inform and consult with the community and stakeholders in relation to the Project
- Enable community and stakeholder input into Project design, planning and development
- Identify perceived impacts and strategies to avoid or mitigate negative impacts and enhance positive opportunities
- Build on relationships established during the scoping phase and establish relationships with a broader range of stakeholders.

5.3 Stakeholder Identification

As part of developing the Community and Stakeholder Engagement Plan (CSEP; refer **Appendix R**), the Proponent undertook a stakeholder identification process to identify parties with a direct or indirect interest in the Project, or those who may be affected by it, including potentially vulnerable or marginalised groups. Additional stakeholders were identified for consideration upon review of the CSEP and during the EIS engagement process. Key stakeholder groups are identified in **Table 17**.

Table 17 Potentially Affected or Interested Stakeholders

Stakeholder Group	Stakeholders	Basis for Engagement
Government Agencies	• Upper Hunter Shire Council • Muswellbrook Shire Council • Department of Planning Housing and Infrastructure (DPHI) • NSW Crown Land • Department of Climate Change Energy Environment and Water (DCCEEW – Commonwealth and NSW) • Transport for NSW (TfNSW) • NSW Environment Protection Authority (EPA) • Water NSW • Australian Rail Track Corporation (ARTC) • EnergyCo • NSW Rural Fire Service (RFS) • Fire and Rescue NSW (FRNSW) • NSW Resources Regulator • Mining Subsidence Advisory NSW • Heritage NSW • Conservation, Programmes, Heritage and Regulation group (CPHR) • Department of Primary Industries and Regional Development	Local government and State and Commonwealth agencies with regulatory, advisory or policy interest in the Project. Some parties hold landowner or hosting interest in the Project
Elected Representatives	• Federal Member for New England • State Member for Upper Hunter • Mayor and Deputy Mayor of Upper Hunter Shire Council • Mayor of Muswellbrook Shire Council	Parliamentary and local government representatives for the Project area.
First Nations Stakeholders	• Wanaruah Local Aboriginal Land Council (WLALC) • Wonnarua Nation Aboriginal Corporation (WNAC) • 23 Registered Aboriginal Parties identified by the Heritage Consultant	Aboriginal organisations and registered parties with cultural heritage and land interests in the Project area.
Adjacent and Proximal Residents	• Landholders and residents in close proximity to the Project site, proposed switching station and easement corridor, including adjacent landholders on Wells Gully Road, Perth Street and surrounding streets in Aberdeen.	Adjacent and proximal residents who may be impacted by and have an interest in the Project.
Local Community	• Residents of Aberdeen ~900 households	Community members who may be impacted by and have an interest in the Project.
Broader Community	• Residents of Upper Hunter Shire and Muswellbrook Shire Local Government Areas (LGA).	
Local Community Groups and NGOs	• Aberdeen Community Advisory Committee (ACAC) • Aberdeen Rifle Club • Aberdeen Lions Club • Aberdeen Primary School P&C • Blackroo • Aberdeen Highland Games • Aberdeen Men's Shed	Community advisory bodies, resident groups, advocacy organisations and NGOs with interest in the Project or local community outcomes including benefit sharing opportunities.

Stakeholder Group	Stakeholders	Basis for Engagement
	• Aberdeen Rugby League Football Club • Aberdeen Ex-Servicemen's Club • Aberdeen Golf Club • Aberdeen Bowling Club • Country Women's Association (Scone branch) • Scone & Upper Hunter Historical Society • Upper Hunter Community Services	
Environmental Groups	• Australian Youth Climate Coalition • NSW Farmers for Climate Action • Australian Parents for Climate Action • Hunter Community Environment Centre • Hunter Environment Lobby • The Knitting Nannas • Yes 2 Renewables • First Nations Clean Energy Network	Advocacy and community organisations with an interest in renewable energy development, climate policy and environmental outcomes in the region.
Education and Training Providers	• Aberdeen Primary School • Aberdeen Catholic School • St Joseph's High School • Aberdeen Pre-School • NSW Tafe – Scone and Muswellbrook • Hunter Jobs Alliance • Youth Express • Yalagan Registered Training • Huntlee Academy • Indigenous Skills and Employment Program • Indigenous Allied Health Australia (IAHA) • Speaking in Colour	Education and training providers relevant to employment, procurement and benefit sharing outcomes
Local Business and Industry	• Dartbrook • Godolphin • Newgate Farm • McCallum and Co • JTS Realty • Warburton Real Estate • ICN Hunter and Central Coast • Scone Chamber of Commerce • Regional Development Australia – Hunter • CJP Vending Machine • Scone and Upper Hunter Historical Society	Local businesses and industry groups with interest in Project-related employment, procurement and economic impacts

Stakeholder Group	Stakeholders	Basis for Engagement
Accommodation Providers	• Aberdeen Motel, Kelly's Top Pub • Muswellbrook motels and hotels (e.g. Wayfarer, Remington, Hermitage, Red Cedar) • Muswellbrook Riverside Cabin & Van Park • Scone motels and caravan parks (e.g. Colonial Motor Lodge, Scone Motor Inn, Airlie House, Scone Caravan Park) • Singleton motels and caravan parks (e.g. Quest, Charbonnier, Caracourt) • Short-stay/Airbnb-style accommodation providers across Aberdeen, Muswellbrook, Scone and Singleton	Accommodation operators identified through the Preliminary Accommodation Strategy (Appendix Q) as potential providers of construction workforce accommodation; relevant to consideration of cumulative workforce accommodation demand.
Health Services	• Aberdeen Surgery • Muswellbrook District Hospital • Scone Memorial Hospital	Health service providers relevant to consideration of community health and wellbeing impacts, social infrastructure capacity and emergency response coordination.
Local Media	• Aberdeen Whisper Newspaper • Community Notice Page (Facebook) • Hunter Valley News • PowerFM 98.1 • The Scone Advocate • Upper Hunter ABC Radio	Local media outlets relevant to Project communications, public notices and broader community awareness throughout the engagement program.
Exploration Licence Holders and Pipeline Operators	• Nil – searches of MinView confirmed no exploration licences or gas pipelines exist on or adjacent to the Site.	Considered in accordance with SEARs requirements. No consultation required (refer Section 6.13.3)

5.4 Engagement Program

Engagement has been ongoing since May 2023 and covers both the scoping and EIS preparation phases. A range of engagement mechanisms have been employed to reach different stakeholder groups and provide accessible, timely information about the Project. These are summarised in **Table 18**.

Table 18 Engagement Mechanisms

Mechanism	Target Stakeholders	Description	Timing
Project Website	Broader community, interested parties	Establish and maintain a dedicated project website providing project information, FAQs, copies of the latest community newsletters, key contacts and engagement opportunities.	Ongoing from May 2023

Mechanism	Target Stakeholders	Description	Timing
Phone & Email	Broader community, interested parties	A company email address and telephone line has been monitored throughout the planning process providing an accessible way for stakeholders to ask questions, raise concerns or provide feedback.	Ongoing from May 2023
Proximal landholder notification letters	Proximal landholders	Project information letters and information sheets distributed in May 2023 to adjacent and proximal landholders to introduce the Project, provide updates and invite participation in the engagement process	May 2023
Community Information Sheets	Proximal landholders, local community members, community groups, government agencies, First Nations stakeholders	Hardcopy community information sheets distributed to ~900 businesses and residences in Aberdeen in October 2024, March 2025 and March 2026. The purpose of the Community Information Sheets were to provide clear, plain-English information about the project, including the assessment process, timelines, potential impacts and benefits, and ways to get involved including invites to community information sessions and a link to the online community survey.	October 2024, March 2025 and March 2026.
FAQ document	Proximal landholders, local community members, community groups, government agencies, First Nations stakeholders	A document providing clear plain English answers to common questions about the project, helping stakeholders quickly access key information and better understand technical information, potential impacts, timelines, and engagement opportunities.	October 2024, updated August 2025
EIS Summary Booklet	Proximal landholders, local community members, community groups, government agencies, First Nations stakeholders	A plain English summary of the technical assessment methodology, key findings, and recommendations was provided at the final CIS to support understanding of the EIS prior to lodgement. This summary has also been uploaded to the website.	June 2026
Email Correspondence	Government agencies, community groups, elected representatives, local businesses, First Nations stakeholders	Written correspondence to notify stakeholders of the Project, provide information and seek input. Used across all stakeholder groups to distribute project information and survey links.	Ongoing from May 2023
Mailing List	Proximal landholders, community groups, elected representatives, local businesses, government agencies, First Nations stakeholders	Stakeholders and community members could opt in to the mailing list to stay informed throughout the project lifecycle through regular updates on key milestones, upcoming engagement opportunities, and important announcements.	Ongoing from May 2023

Mechanism	Target Stakeholders	Description	Timing
Phone Calls	Adjacent residents, local community groups, government agencies, First Nations stakeholders	Direct outbound contact to introduce the Project, respond to queries and arrange face-to-face meetings.	Ongoing from May 2023
Face-to-face Meetings	Local government, adjacent residents, First Nations stakeholders, community groups, local business	Structured meetings to provide project briefings, discuss impacts and opportunities, and develop ongoing relationships with adjacent residents and key stakeholders. Targeted meetings were held with the landholders closest to the switching station to discuss mitigation and offset options for visual impacts.	March 2025 – ongoing
Video Calls	State and Commonwealth government agencies	Online meetings with regulatory agencies to discuss technical assessment requirements, project description, and EIS process.	April 2025 – ongoing
Newspaper Advertisements	Proximal landholders, local community members, community groups	Project information and upcoming Community Information Sessions advertised in The Aberdeen Whisper on four occasions with a community information session invitation, online survey link and project team contact details.	Early August 2025; early September 2025; May 2026 and June 2026
Radio announcements	Proximal landholders, local and broader community members, community groups	Project information provided and upcoming Community Information Sessions advertised via an interview with the Maizewood CEO on ABC Hunter.	June 2026
Community Information Session (CIS)	Proximal landholders, local community members, community groups	Townhall and Drop-in style public information sessions to present the Project to the general community, display technical assessment findings, and receive community feedback/answer questions. Held at Aberdeen Public School Hall and Aberdeen Bowling Club	17 September 2025 & 9–10 June 2026
CIS Flyer Hand-Delivery	Proximal landholders, local community members, community groups,	Individual community information session flyers hand-delivered to ~900 businesses and residences in Aberdeen to ensure near neighbours received direct notification ahead of information sessions.	Early September 2025, March, May and June 2026
Community Survey	Proximal landholders, local community members, community groups	Online and hardcopy survey to obtain community input on the Project, assess impacts and perceptions, and gather baseline social data for the Social Impact Assessment.	Established March 2025

Mechanism	Target Stakeholders	Description	Timing
Social Impact Assessment (SIA) Interviews	Local government, local businesses, real estate agents, community groups, Aboriginal organisations	Semi-structured interviews with key stakeholders to understand social impacts, employment and accommodation needs, and community priorities.	April – June 2025
Aberdeen Community Advisory Committee (ACAC) Briefings	ACAC members (elected Councillors and community representatives)	Formal presentations to the ACAC providing project updates, EIS lodgement timelines, and technical assessment findings.	May 2025; November 2025; May 2026
Aberdeen Highland Games	Proximal landholders, local community members, community groups	Maizewood will attend the Aberdeen Highland Games on the 4 th of July 2026. The marquee set up will include a 'build a BESS' model to show attendees what a BESS looks like and how it operates.	July 2026
Photomontages	Proximal landholders, local community members	Visual photomontages that show how the project is expected to appear within the surrounding landscape and views from public and private viewpoints, helping proximal residents and stakeholders understand potential visual impacts.	May & June 2026
Social Media Posts	Proximal landholders, local community members, community groups	Community information session information shared on community Facebook page.	Early September 2025, June 2026

5.4.1 Phases of Engagement

Engagement has been implemented across two phases:

- **Phase 1 – Scoping and Project Introduction (May 2023 to approximately August 2025):** The initial round of engagement focused on notifying key stakeholders of the Project, establishing the project website and email address, distributing a hardcopy community information letters to businesses and residences surrounding the Project site and the broader residents of Aberdeen, and obtaining early community and agency feedback to inform the Project design and scoping of technical assessments. This phase included the initial UHSC project briefing, First Nations organisation meetings, SIA stakeholder interviews, and commencement of the community survey.
- **Phase 2 – EIS Preparation and Community Engagement (August 2025 to June 2026):** The second phase of engagement occurred while technical assessments for the EIS were underway and focused on providing community members and key stakeholders with updates on assessment progress and findings, responding to emerging concerns and enabling community and stakeholder input into the Project design, planning and development. This phase included the Community Information Sessions, community drop-in sessions in June 2026, ACAC briefings, agency meetings on technical matters (hazards, traffic, water, subsidence), face-to-face meetings with adjacent landholders, and ongoing engagement with First Nations stakeholders and community groups.

5.4.2 Community Information Sessions

The Project team hosted an in-person Community Information Session on 17 September 2025 between 6:00pm and 7:30pm at the Aberdeen Public School Hall. The session presented Project details and received community feedback. Maizewood, EME and the SIA Lead were in attendance. The session was widely advertised via the project mailing list, hardcopy flyers hand-delivered to Aberdeen households, print advertisements in The Aberdeen Whisper and the NHCE website.

A second round of community drop-in sessions was held at Aberdeen Bowling Club, Jefferson Park, New England Highway on 9 June 2026 (2:00pm–4:00pm and 5:00pm–7:00pm) and 10 June 2026 (10:00am–12:00pm and 5:00pm–7:00pm). Sessions presented the final project design, environmental and technical study outcomes and planning process next steps, with Q&A with the project team.

5.4.3 Community Survey

An online community survey was established in March 2025 to obtain community views on the Project and identify community values and priorities. The survey was distributed via the community information letter, project website, stakeholder email database and Council communications channels. The survey responses provided qualitative data informing the SIA (refer **Section 6.11**).

5.5 Participation Summary

Table 19 summarises the stakeholder and community groups engaged during the scoping and EIS preparation phases, the mechanisms used, and the number of contacts made.

Table 19 Stakeholders Consulted by Phase

Stakeholder Group	Mechanism(s)	Phase 1 – Scoping		Phase 2 – EIS preparation	
		No. Contacted	No. Engaged	No. Contacted	No. Engaged
Government Agencies	Project briefings, phone calls and emails	7	5	21	21
Local Government	Project briefings, phone calls and emails	2	2	2	2
First Nations Stakeholders	Project briefings, phone calls and emails	2	2	2	2
	ACHAR Consultation Process	0	0	NA	23 RAPs

Stakeholder Group	Mechanism(s)	Phase 1 – Scoping		Phase 2 – EIS preparation	
		No. Contacted	No. Engaged	No. Contacted	No. Engaged
Adjacent, Proximal Residents and local community	Meetings, phone calls and emails – Proximal residents	0	0	NA	14 households
	Letters and Project information sheets	NA	63	NA	922 households
	Community information session #1	NA	NA	922 households	53 attendees
	Community information session #2	NA	NA	922 households	29 attendees
	Online survey	NA	NA	922 households	9 individuals
	Online mailing list	NA	NA	NA	57 individuals
	Newspaper advertisements: The Aberdeen Whisper	NA	NA	NA	~1,100 residents • August 2025 • September 2025 • May 2026 • June 2026
Broader Community	ABC Upper Hunter radio broadcast	NA	NA	NA	Unknown-broadcasted across the Upper Hunter area
Community Groups and NGOs	Project briefings, phone calls and emails	1	1	6	5
Environmental groups	Project briefings, phone calls and emails	0	0	6	0
Elected representatives	Email, community information sheet	0	0	3	2
Local Business and Industry	Project briefings, phone calls and emails	0	0	6	3
Education and Training Providers	Project briefings, phone calls and emails	0	0	11	8

5.5.1 Community Views

Table 20 summarises key issues raised through engagement and how each has been addressed, including where the Project design has been amended in response.

Table 20 Community Views and Project Design

Theme	Community View	Project Design
Landscape and Visual Impact	Nearby residents raised concerns about the visual impact of the proposed switching station and transmission infrastructure on residential properties. Concerns were also raised by Muswellbrook Shire Council regarding visual impacts of the Wells Gully Road switching station. UHSC Councillors requested consideration of underground cables as an alternative to overhead transmission lines.	Visual impact assessed in Section 6.5. Landscaping and vegetation screening measures incorporated into Project design. BESS siting has occurred as far south as possible to reduce amenity impacts on residential areas to the north (refer Section 2.2.5.1). The Project has incorporated partial underground cabling. Mitigation or offset discussions are ongoing with the two landowners adjacent to the switching station regarding visual impacts. Impacts assessed from key receptor viewpoints as part of the Visual Impact Assessment (Appendix H).
Noise	Adjacent residents raised concerns about operational noise from the Project. UHSC noted noise as a common issue raised with DPHI for similar projects.	Noise assessment completed in Section 6.6. Noise walls incorporated into Project design. Operational noise demonstrated to comply with the NSW Noise Policy for Industry at all assessed receivers. Selection of a quieter BESS unit during design development further reduced noise emissions.
Fire Risk and Battery Safety	Community members, nearby residents and ACAC raised questions about fire risk from lithium-ion batteries, fire response capability, and impacts on surrounding properties in the event of a fire.	Hazard assessment completed in Section 6.10 and Bushfire Assessment in Section 6.9, which used conservative fire weather inputs (FDI 100/GFDI 130) that account for severe wind conditions and provide a buffer against future climate variability. FRNSW and RFS engaged throughout the EIS process. The Project design was also amended in response to bushfire risk, with infrastructure sited to avoid BAL Flame Zone and BAL 40 areas.

Theme	Community View	Project Design
Community Benefit and Benefit Sharing	Multiple stakeholders including ACAC, Aberdeen Primary School P&C, the Aberdeen Lions Club, the Aberdeen Rifle Club, WLALC and WNAC raised interest in how the Project would benefit the local community. Topics included a Community Benefit Sharing Fund, education and training initiatives, employment opportunities and cultural support programs.	Community Benefits Strategy (CBS) developed and Voluntary Planning Agreements (VPAs) offered to both UHSC (accepted by Council resolution February 2026) and MSC (response under consideration). Benefit sharing discussions ongoing with WLALC, Aberdeen Primary School P&C, Aberdeen Lions Club and other community groups (Section 6.11).
Grid Stability and Renewable Energy Transition	CIS attendees, local community members and community groups raised positive views regarding the Project's contribution to grid stability and the transition to renewable energy.	The Project's role in supporting grid reliability, frequency control ancillary services and the integration of renewable energy is discussed in Section 2.1 . This is also recognised as a positive social impact (refer Section 6.11.3.2).
Property Values	Nearby residents and community information session attendees raised concerns that the Project may negatively affect residential property values and home insurability.	Visual impact mitigation including landscaping and screening is detailed in Section 6.5 . Photomontages have been prepared and shared with affected landholders to allow an accurate assessment of the likely visual impact on surrounding properties. The Project has also undergone multiple iterations to avoid and minimise impacts to nearby landowners (refer Section 2.2), with extensive consultation with individual property owners closest to the Project. Meetings were offered to residents who raised concerns to discuss potential impacts, including insurance considerations, on a case-by-case basis.
Employment and Procurement	Community members, local businesses, and First Nations organisations expressed interest in local employment and procurement opportunities during construction and operation.	Workforce Recruitment Strategy to be developed targeting local employment across Aberdeen, Muswellbrook, Scone and the wider Upper Hunter upon receipt of planning consent. The Preliminary Accommodation Strategy (Appendix Q) has assumed a blended workforce with local workers filling the majority of civil and general construction roles, with specialist roles sourced from outside the region where required (Section 6.11).
Project Design, Site Selection and Cumulative Impacts	Nearby residents and UHSC raised questions about site selection rationale, the extent of the BESS footprint, and potential cumulative impacts from other renewable energy developments in the region.	Alternatives considered in Section 2.2 . Cumulative social impacts assessed in Section 6.11 . Cumulative development impacts assessed in Section 6.14 .

Theme	Community View	Project Design
Planning Process and Timeline	Community members and ACAC expressed interest in the planning process, EIS timeline, and opportunities to provide formal submissions during the exhibition period.	Planning process summarised in Section 4 . Community information sessions held in September 2025 and June 2026 prior to lodgement. Exhibition notification will be provided in accordance with DPHI requirements.
Traffic and Construction Impacts	UHSC, MSC, nearby residents and the Aberdeen Rifle Club raised concerns about construction traffic, access arrangements and OSOM vehicle impacts on local roads. MSC specifically raised OSOM movements through Muswellbrook and the need to consider multiple route options.	Traffic and transport assessment completed in Section 6.7 . Multiple OSOM route options (EnergyCo detour and Bell/Victoria/Market Street route) assessed and included in EIS. Construction Traffic Management Plan to be prepared post-approval.
Aboriginal Cultural Heritage	WLALC and WNAC raised the importance of cultural heritage, land claims, ongoing care for Country, transparent engagement, decommissioning and rehabilitation, and employment and training opportunities. WLALC noted an Aboriginal land claim on Crown land associated with the easement.	Aboriginal cultural heritage assessed in Section 6.3 including input from Aboriginal cultural heritage knowledge holders. Easement alignment discussed with WLALC. ACHMP to be prepared in consultation with RAPs prior to construction. Cultural training course with Wanaruah Elder undertaken.
Future Residential Land Use	UHSC raised concern that development on land to the north and east of the Site could be sterilised by the Project, given those areas are identified as subdivision targets.	The Project has been sited and designed having regard to future residential development potential in the surrounding area (Section 1.5.3).
Stormwater and Aquatic Ecosystem	A nearby resident raised concerns about site runoff entering the waterway system, noting the site is located in a gully that drains to the river. UHSC also raised separation from watercourses during the initial project briefing.	Surface water and flooding assessment completed in Section 6.8 . Retention pond, bunding and drainage controls incorporated into Project design in accordance with relevant guidelines.
Equine Industry	A nearby resident raised concern that the Project may interfere with the equine industry, noting the proximity of Godolphin Stud, and suggested Godolphin would be opposed to the Project.	Godolphin notified of the Project in March 2025. Biosecurity measures incorporated into site investigation. After extensive consultation with Godolphin, Project has been sited to avoid impacts to their land.

5.5.2 Agency Consultation

The Proponent has undertaken ongoing engagement with local, State and Commonwealth government agencies throughout the planning and environmental assessment process. Agency consultation has been undertaken to understand regulatory requirements, provide project briefings, discuss the scope of specialist assessments, and confirm approval pathways. A summary of government agency consultation is provided in **Table 21**.

Table 21 Summary of Agency Engagement

Agency	Date(s)	Key Discussion Points	EIS Section
Biodiversity and Conservation Division (BCD) / Hunter Central Coast Regional Planning Team	January 2025; April 2025	Phone and email correspondence regarding fauna species surveys, survey methodologies, and the process for submission of the Biodiversity Development Assessment Report (BDAR) prior to targeted surveys.	Section 6.2
DCCEEW (Commonwealth)	April 2025; December 2025	Online meeting to discuss ecological survey requirements, habitat assessment methodology, EIS timing and updated biodiversity offset liability. Project determined to be a controlled action under the EPBC Act (EPBC 2025/10353) in December 2025.	Section 6.2
DCCEEW – Water Knowledge Division (NSW)	August 2025; September 2025	Email correspondence regarding regulatory requirements for works on waterfront land. Guidance provided on watercourse crossing design, buffer requirements, and compliance with CAA Guidelines.	Section 6.8
Heritage NSW	April 2025	Email correspondence. Heritage NSW confirmed they do not require a pre-EIS meeting and will review the ACHA following EIS lodgement.	Section 6.3
Transport for NSW (TfNSW)	June 2025	Online meeting to discuss transport and infrastructure matters including the Muswellbrook Bypass, OSOM requirements, access treatments at Perth Street, and coordination requirements with ARTC.	Section 6.7
ARTC	May 2023; March 2025; June 2025	Initial email notification and online meeting to discuss engagement requirements related to the rail corridor. Topics included boundary fencing, underground cable locations, hydrology, vehicle access risk assessment, and noise complaints data.	Section 6.7
DPHI – Hazards and Planning Teams	August 2025	Online meeting to discuss hazard-related matters including fire safety study progress, BESS separation distances, zoning considerations, hydrogen fluoride emissions modelling, and noise assessment.	Section 6.10
Fire and Rescue NSW (FRNSW)	May 2023; September 2025; October 2025	Email correspondence confirming FRNSW engagement process for pre-approval matters. Subsequent face-to-face meeting with local FRNSW representatives to discuss fire safety assessment, emergency response planning, and potential training arrangements.	Section 6.9; Section 6.10
NSW Rural Fire Service (RFS)	May 2023; September 2025	Email correspondence seeking early consultation in accordance with SEARs. RFS confirmed the enquiry was logged and that inputs will be provided during the EIS assessment phase. Engagement with the Aberdeen NSW RFS unit	Section 6.9
NSW Resources Regulator (Subsidence Engineering)	September 2025	Email correspondence following revision to the proposed easement alignment. Regulator confirmed the BESS is outside the zone of subsidence affectation from Dartbrook Mine.	Section 6.4

Agency	Date(s)	Key Discussion Points	EIS Section
Mining Subsidence Advisory NSW	May 2023; October 2025	Initial project notification during scoping phase. Formal correspondence confirming the project site is within the Muswellbrook Mine Subsidence District but is not undermined. Design to account for future mine subsidence not required.	Section 6.4
Upper Hunter Shire Council	March 2025 (project briefing); April 2025 (SIA interview invitations); July 2025 (project update); October 2025 (Councillor briefing); November 2025 (ACAC); February 2026 (easement correspondence); May 2026 (request to review Preliminary WMP)	Multiple engagement touchpoints across the planning period. Topics included project overview, noise, fire risk, future residential development, community engagement, easement alignment, underground cables feasibility, waste, and planning agreement. Council confirmed VPA offer accepted by resolution in February 2026. Maizewood has also engaged with Council regarding water and sewer servicing with preliminary advice provided in relation to capacity to extend the water main to the site, along with the process required to facilitate that connection (refer Appendix R).	Section 6.11
Muswellbrook Shire Council	March 2025; July 2025; October 2025; May 2026 (request to review Preliminary WMP)	Phone, meeting and correspondence engagement across the planning period. Topics included EIS preparation, cumulative impacts, temporary worker accommodation, traffic and OSOM routes, easement alignment, waste, planning agreement, and SSD Committee briefing process.	Section 6.11
Department of Primary Industries and Regional Development	March 2025	Email notification sent with project information and survey link.	Section 6.4

5.5.3 Aboriginal Community Consultation

Notifications were sent to relevant agencies and organisations between 27 September and 22 October 2024, with a newspaper advertisement placed in the Muswellbrook Chronicle on 15 November 2024. In total, 23 organisations registered as Registered Aboriginal Parties (RAPs), representing Aboriginal interests across the Wonnarua, Geawegal, Gomeroi, and other connected peoples of the region. Project information and a draft assessment methodology were distributed to all RAPs on 9 December 2024, with six RAPs providing formal feedback.

Aboriginal cultural heritage surveys were conducted over five days (20 February, 2 and 3 April, 6 November 2025 and 10 April 2026) with nine representatives attending from various organisations including the Wonnarua Nation Aboriginal Corporation, Wanaruah LALC, Mura Gadi Aboriginal Corporation, Hunter Valley Aboriginal Corporation, Nunawanna Aboriginal Corporation and Gomery Cultural Consultants. Full details are provided in **Appendix E**. WLALC has also been engaged separately regarding Project-related community benefit initiatives, including an Indigenous nursery and cultural training (refer **Section 6.11**).

5.6 Ongoing Engagement

Maizewood will use a variety of engagement mechanisms to notify that the EIS has been lodged and will be

placed on public exhibition. Engagement activities during the exhibition and response to submission period will include community newsletters and project briefings to summarise key feedback themes and issues raised in submissions, along with how these will be addressed. Updates will also be provided via the Project website to ensure ongoing access to information.

If the Project is approved, Maizewood will continue to engage with community stakeholders in accordance with the Engagement Guidelines (DPHI, 2024) throughout the construction, operation and decommissioning phases. Ongoing engagement will include:

- Targeted consultation with stakeholders to support the development and implementation of management plans outlined in the EIS
- Updates to proximal neighbours outlining construction activities, including timing, working hours, traffic movements and outlining the complaints and grievance process
- Regular updates to the Project website and distribution of information sheets and fact sheets to the local community
- Face-to-face meetings and project briefings with key stakeholders as required
- Capturing and responding to complaints and grievances in a timely manner and adapting project activities and management strategies where appropriate to address issues raised attendance at community events and educational initiatives, including in local schools
- Post-approval consultation with the Aberdeen Community Advisory Committee and relevant community groups
- Implementation of the ACHMP in consultation with the RAPs, including project updates to all RAPs at minimum every six months in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)
- Delivery of commitments under the CBS and VPAs with UHSC and MSC
- Ongoing engagement with the WLALC and WNAC regarding employment, training and cultural initiatives, including cultural training with a Wanaruah Elder
- Detailed planning for engagement during the decommissioning phase will begin at least two years prior, with the plan updated as needed. If repowering is pursued, a dedicated engagement plan will be developed to communicate this and guide ongoing operational engagement

Community and stakeholder concerns and appropriate mitigation and management measures are addressed in further detail in **Section 6.11**.

6 Assessment and Mitigation of Impacts

This section identifies the issues that require further assessment in the EIS and the level of detail of the assessment based on the risk of the Project generating an impact on one or more aspects of the environment of the Site and surrounds.

6.1 General Assessment Approach

The Scoping Report submitted in support of a request for SEARs identified the assessment matters requiring further assessment in the EIS based on a preliminary understanding of the nature and significance of potential impacts, taking into consideration the scale and duration of the impact and the sensitivity of the receiving environment. The SEARs confirmed the matters to be assessed in the EIS including any consultation requirements.

The environmental impact assessment presented in this Section has been prepared in accordance with the SEARs issued by DPHI for the Project. Each technical discipline has been assessed by suitably qualified specialists, with specialist reports appended to this EIS. Full technical details are provided in the appendices, with key findings and mitigation measures summarised in this Section.

The impact assessments are a summary of the specialist studies provided in the appendices in addition to a small number of impact assessments for which a specialist study was not prepared. The impact assessment summaries follow a standard structure:

- The SEARs to be addressed
- A description of the existing environment relevant to the assessment matter to understand the values that could be impacted by the Project
- An assessment of the Project impacts with reference to approved assessment methods and guidelines
- Identification of measures to mitigate and manage impacts including an assessment of residual impacts.
- Detailed impact assessment methodologies are provided in the relevant specialist studies.

A consolidated summary of all environmental mitigation, management and monitoring measures is provided in **Appendix C**. All management plans referenced in this Section, including the CEMP and Operational Environmental Management Plan (OEMP), will be prepared prior to or during construction in accordance with consent conditions.

The Project is a controlled action under the EPBC Act 1999 (EPBC 2025/10353), with controlling provisions relating to listed threatened species and communities. The biodiversity assessment (**Appendix D**) addresses all Schedule 4 EPBC Regulation requirements and Commonwealth guidelines, conservation advice and recovery plans relevant to the identified protected matters.

6.2 Biodiversity

6.2.1 SEARs

SEARs	Details
Key Issues – Biodiversity	A Biodiversity Development Assessment Report (BDAR) prepared in accordance with Section 7.9 of the BC Act 2016 and the Biodiversity Assessment Method (BAM) 2020, using the approved BDAR template, documenting the avoid, minimise and offset framework and assessing all direct, indirect and prescribed impacts
	The BDAR must assess impacts associated with all ancillary infrastructure including transport route road upgrades
	The BDAR must include an assessment for serious and irreversible impacts (SAIL) in accordance with Section 9.1 of the BAM
	The BDAR must include a strategy to offset any residual impacts in accordance with the BC Act
	The BDAR must be finalised by an accredited assessor as BAM-compliant within 14 days of submission
	Assessment of likely impacts on listed aquatic threatened species, populations or ecological communities scheduled under the <i>Fisheries Management Act 1994</i> , and description of measures to minimise and rehabilitate impacts
	Cumulative impact assessment of biodiversity values in the region from nearby developments
	If an offset is required, details of measures proposed to address the offset obligations
Supplementary SEARs	
EPBC Act – EPBC 2025/10353	On 8 December 2025, the proposed action was determined a controlled action under s.75 of the EPBC Act 1999. Controlling provisions: listed threatened species and communities (ss.18 and 18A). The EIS must address all matters in Schedule 4 of the EPBC Regulations and the requirements below.
General Requirements – Project Description	The title of the action, background to the action and current status
	The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on Matters of National Environmental Significance (MNES)
	How the action relates to any other actions that have been, or are being taken, in the region affected by the action
	How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES
General Requirements – Impacts	A description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long-term relevant impacts on matters protected by the controlling provisions
	A statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible

SEARs	Details
	Analysis of the significance of the relevant impacts
	Any technical data and other information used or needed to make a detailed assessment of the relevant impacts
General Requirements – Avoidance, Mitigation and Offsetting	A description, and an assessment of the expected or predicted effectiveness of the mitigation measures
	Any statutory policy basis for the mitigation measures
	The cost of the mitigation measures
	An outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing
	The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program
	Where a significant residual adverse impact to a relevant protected matter is considered likely: information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy
	For each relevant matter likely to be impacted: reference to and consideration of relevant Commonwealth guidelines and policy statements including any conservation advice or recovery plan, relevant threat abatement plan, wildlife conservation plan, and any strategic assessment
Key Issues – Biodiversity (EPBC Act)	Identify each EPBC Act listed threatened species, community and migratory species likely to be impacted. For likely impacts, provide a description of the nature, quantum and consequences. For species potentially located in the project area or vicinity that are not likely to be impacted, provide evidence why
	For each EPBC listed threatened species, community and migratory species likely to be impacted, provide a separate description of the habitat including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival, with consideration of and reference to relevant Commonwealth guidelines, conservation advice and recovery plans
	Details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements
	Description of the relevant impacts of the action having regard to the full national extent of the species or community's range
	Description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action
	Identification of significant residual adverse impacts likely to occur after proposed avoidance and mitigation activities are taken into account
	A description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established

SEARs	Details
	Details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts
	Details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites
	Any significant residual impacts not addressed by the BAM must be addressed in accordance with the EPBC Act 1999 Environmental Offsets Policy
Other Approvals and Conditions	Information in relation to any other approvals or conditions required, including the information prescribed in Schedule 4 Clause 5(a)(b)(c) and (d) of the EPBC Regulations
Environmental Record	Information in relation to the environmental record of the person proposing to take the action, including details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations
Information Sources	For information given in the EIS, state the source of the information, how recent the information is, how the reliability of the information was tested, and what uncertainties (if any) are in the information
Protected Matters (Appendix A – EPBC 2025/10353)	The following protected matters have been identified as likely to be significantly impacted, requiring a further assessment of significance and assessment of proposed avoidance, mitigation and offset measures: Central Hunter Valley eucalypt forest and woodland ecological community – Critically Endangered • Hunter Valley Delma (<i>Delma vescolinata</i>) – Endangered • Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>) – Endangered • Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) – Vulnerable • Brown Treecreeper (south-eastern) (<i>Climacteris picumnus victoriae</i>) – Vulnerable
	Key risks from the Commonwealth perspective: • Likely and potential direct and indirect impacts to EPBC listed threatened species and ecological communities from clearing • Likely potential prescribed impacts related to clearing of Category 1 – Exempt lands and non-native vegetation • Likely and potential direct and indirect impacts (including prescribed impacts) to EPBC listed threatened species from ongoing operation and maintenance

A Biodiversity Development Assessment Report (BDAR) (**Appendix D**) has been prepared by Niche Environment and Heritage Pty Ltd (Niche) in accordance with section 7.9 of the *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method 2020 (BAM). The BDAR was prepared by an accredited BAM assessor (BAAS24036) and requires certification and finalisation within 14 days of EIS lodgement in accordance with BAM obligations.

6.2.2 Existing Environment

The assessment area extends across approximately 38.05 ha of the Site, defined as the area directly subject to development activity. A 1,500 m buffer around the Site constitutes the broader Assessment Area for desktop and contextual review purposes.

6.2.2.1 Native Vegetation and Plant Community Types

The Site is located within the Hunter Interim Biogeographic Regionalisation for Australia (IBRA) subregion. One Plant Community Type (PCT 3431 – Central Hunter Ironbark Grassy Woodland) was identified comprising three vegetation condition classes, as summarised in **Table 22** and shown in **Figure 9**.

Table 22 Vegetation Zones – PCT 3431

Vegetation Zone	Condition Description	Area (ha)
3431_Moderate	Open forest with canopy and mid-storey, moderate native diversity, habitat features including hollows and leaf litter present at moderate values	4.43
3431_Low	Open forest with scattered trees and predominantly native ground layer; hollows present; exotic species prevalent but at lower cover than Very Low condition	1.35
3431_Very Low	Native/exotic grassland dominated by exotic species; tree canopy largely absent; limited habitat function	18.70
Total		24.49

6.2.2.2 Threatened Ecological Communities

PCT 3431 is associated with the threatened ecological communities (TECs) summarised in **Table 23**.

Table 23 TECs Associated with PCT 3431

TEC	Listing	Area within Site (ha)	Condition Classes
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions	Endangered - BC Act	5.78	Moderate (3.59 ha) and Low (2.19 ha) only
Central Hunter Valley eucalypt forest and woodland	Critically Endangered - EPBC Act	6.91	Moderate and Low condition classes, plus Very Low condition patches within 30 m of these

Note: Very Low condition vegetation of PCT 3431 within the Site does not align with either TEC listing.



LEGEND

- BESS Area
- BESS Easement
- Switching Station
- Railway
- Roads
- Electricity Transmission Lines

Vegetation Zone

- Non-native
- 3431 Moderate
- 3431 Low
- 3431 Very low
- Non-native (Road)
- 9997 Non-native

Scale 1:14,000

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 17/06/2026

Upper Hunter Battery Energy Storage System

Vegetation Zones

FIGURE 9

6.2.2.3 Flora and Fauna Assessment

The BAM Calculator (BAM-C) identified 34 ecosystem credit species (assumed present following application of habitat constraints) and 40 species credit species for assessment. Following targeted surveys conducted across the Site between November 2024 and April 2026, no threatened flora or fauna species were detected during fieldwork. However, the threatened flora and fauna species that could not be fully surveyed within project timelines have been conservatively assumed present as summarised in **Table 24**. Targeted surveys or species expert reports for these species will be completed and reported as part of the Response to Submissions (RtS).

Table 24 Species Assumed Present Due to Survey Limitations

Common Name	Scientific Name	Kingdom	BC Act Status	EPBC Act Status	Reason Assumed Present
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Animalia	Endangered	Endangered	Targeted surveys not completed across all areas due to project timeline; species assumed present in unsurveyed suitable habitat
Pine Donkey Orchid	<i>Diuris tricolor</i>	Plantae	Vulnerable	-	Targeted surveys incomplete in portions of Site
Pine Donkey Orchid - Muswellbrook Shire LGA population	<i>Diuris tricolor</i> - endangered population	Plantae	Endangered Population	-	As above
Tarengo Leek Orchid	<i>Prasophyllum petilum</i>	Plantae	Endangered	Endangered	As above
-	<i>Prasophyllum</i> sp. <i>Wybong</i>	Plantae	-	Critically Endangered	As above
-	<i>Pterostylis chaetophora</i>	Plantae	Vulnerable	-	As above

6.2.2.4 Matters of National Environmental Significance

A total of 10 Matters of National Environmental Significance (MNES) were identified for assessment. Based on targeted survey outcomes and habitat suitability analysis, the BDAR determined that the Project is likely to result in a significant impact on one MNES – the Central Hunter Valley eucalypt forest and woodland TEC (Critically Endangered, EPBC Act). All other assessed MNES were determined unlikely to be significantly impacted by the Project. Refer **Appendix D** for full significant impact assessments.

6.2.2.5 Aquatic Species and Key Fish Habitat

Aquatic surveys were conducted across four watercourses intersecting the Site on 4 – 5 November 2024 and 2 – 3 April 2025. All drainage lines assessed were classified as Class 3 – Minimal Key Fish Habitat under the Fairfull (2013) classification, reflecting their intermittent flow regimes, absence of aquatic vegetation, and limited refuge potential. No threatened aquatic species were recorded during field surveys.

One FM Act listed threatened aquatic species was identified for assessment: Darling River Hardyhead (*Craterocephalus amniculus*) – Endangered Population (Hunter River catchment). This species was assessed as having a Low likelihood of occurrence within the Site, given the absence of suitable habitat (slow-flowing, clear

pools with aquatic vegetation), no records since 2003, and its absence during fish sampling. One EPBC Act listed threatened aquatic species – Hunter Galaxias (*Galaxias sp.* Nov. “Hunter”) – was similarly assessed as unlikely to occur, given the absence of suitable permanent habitat within the Site. No impacts to listed aquatic species or key fish habitat are anticipated. Refer to **Section 6.8** for surface water management measures.

6.2.3 Impact Assessment

Two clearing scenarios have been applied to quantify biodiversity impacts within the Site:

- Total Clearing Zone (TCZ): Complete removal of vegetation, applied to the BESS pad, switching station, access roads and transmission tower pads
- Easement Clearing Zone (ECZ): Clearing of trees and shrubs only (canopy and mid-stratum over 2 m), with limited to no ground disturbance, applied to the transmission line easement.

Table 25 summarises the direct impacts by vegetation zone and clearing scenario, as assessed in the BDAR.

Table 25 Direct Impacts to Native Vegetation

Vegetation Zone	PCT	TEC / EEC	TCZ (ha)	ECZ (ha)	Total (ha)
3431_Moderate	PCT 3431	BC Act EEC and EPBC Act CEEC	0.84	3.59	4.43
3431_Low	PCT 3431	BC Act EEC and EPBC Act CEEC	0.48	0.87	1.35
3431_Very Low	PCT 3431	No TEC alignment	10.24	8.46	18.70
Total			11.56	12.93	24.49

Indirect impacts may arise from edge effects on retained adjacent vegetation, including altered light conditions, dust deposition during construction, spread of weed species, and light spill during nighttime operations. These are assessed as minor in likelihood and consequence following implementation of the mitigation measures detailed in **Section 6.2.4**.

Prescribed impacts identified include human-made structures, non-native vegetation, habitat connectivity, waterbodies and hydrological processes, and vehicle strike. All prescribed impacts are assessed as having low to moderate likelihood and minor consequence following mitigation, and no prescribed impacts are considered to require offsetting.

6.2.3.1 Serious and Irreversible Impacts

A Serious and Irreversible Impact (SAIL) assessment has been undertaken in accordance with Section 9.1 of the BAM. Only one threatened flora species assumed present within the Site (*Prasophyllum sp. Wybong*) was identified as potentially meeting the SAIL threshold. However, requirements under clause 6.7 of the *Biodiversity Conservation Regulation 2017* do not apply to EPBC Act-only listed entities. As *Prasophyllum sp. Wybong* is listed solely under the EPBC Act and is not listed under the BC Act, it does not meet the criteria for a SAIL entity under NSW legislation. No other TECs, threatened flora or fauna, or biodiversity values present or assumed present within the Site meet the SAIL criteria, nor have characteristics that would place them at risk of a serious or irreversible population-level decline from the proposed works. A SAIL determination is therefore not required for this Project.

6.2.3.2 Cumulative Impacts

The BDAR identifies a number of projects in the Upper Hunter Shire and Muswellbrook Shire LGAs with potential for cumulative biodiversity impacts, most notably the Muswellbrook Solar Farm and BESS (IPC approval May 2025), Muswellbrook Battery (AGL, approved 2023), and Bells Mountain BESS (EIS preparation). The key cumulative risks are:

- Combined loss of approximately 38.6 ha of Central Hunter Valley eucalypt forest and woodland (EPBC Act CEEC) across the Upper Hunter BESS and Muswellbrook Solar Farm and BESS projects, representing approximately 0.056% of the TEC's estimated area of occupancy (AOO) of 68,000 ha in NSW
- Combined loss of approximately 203.7 ha of Central Hunter Grey Box-Ironbark Woodland (BC Act EEC) across the same two projects, representing approximately 0.43% of the TEC's estimated AOO of 46,920 ha in NSW
- Potential cumulative impacts to *Diuris tricolor* – Muswellbrook Shire LGA endangered population, which is a species credit species common to both the Upper Hunter BESS and Muswellbrook Solar Farm and BESS projects

Whilst the cumulative losses represent a small proportion of each TEC's total extent, the fragmented distribution and reduced condition of these communities across the Hunter region means that incremental loss from multiple projects warrants active management through robust offsetting and mitigation. Offset strategies for each project are required to be independently compliant with BOS requirements, and the avoidance and minimisation measures detailed in **Section 6.2.4** are designed to limit the Project's contribution to these cumulative pressures.

6.2.4 Mitigation and Management

Biodiversity mitigation and management measures are summarised in **Table 26**. Full details are provided in the BDAR (**Appendix D**).

Table 26 Biodiversity Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Biodiversity			
B-1	Impacts to native vegetation and fauna	Pre-construction Construction	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW and approved by NSW DPHI prior to construction. The BMP will be prepared with input from a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the BDAR.
B-2	Impacts to native vegetation and fauna	Pre-construction Construction	All relevant Project personnel involved in vegetation clearance, including relevant sub-contractors, will be trained on biodiversity management protocols and the requirements for the Project through inductions, toolbox talks and targeted training. All relevant Project personnel will be provided with sensitive area maps (showing clearing boundaries and exclusion zones), and mapping will be updated as required.

Ref	Potential Impact	Phase	Mitigation measures
B-3	Impacts to hollow-bearing trees (HBTs)	Pre-construction Construction	Manage impacts on HBTs by conducting pre-clearance surveys and implement mitigation measures such as marking no-go zones and two-staged habitat removal process. Include procedures to record the effort and outcomes of the habitat removal process.
B-4	Impacts to native vegetation and fauna	Construction	Pre-clearing surveys will be completed by a suitability qualified and experienced ecologist. The proposed clearing extents will be marked out on site prior to the pre-clearing surveys. During the surveys, the ecologist will: • Survey the proposed clearing extent. • Identify any fauna habitat and fauna that will require relocation prior to clearing, document location of any fauna release sites. • Confirm the location and mark out the extents of any biodiversity exclusion zones including locations of unexpected finds (threatened species or threatened species habitat). • Confirm that HBTs to be retained within and adjacent to the clearing extents are clearly marked/tagged . Confirm that nest boxes are in place (where required) in suitable locations.
B-5	Impacts to native vegetation and fauna	Pre-construction Construction	A Vegetation and Habitat Clearance Protocol for the Project will be prepared. The Protocol for the Project would include, but not be limited to: • Staff and contractors involved in vegetation clearance works would be made aware of clearing limits via the ground disturbance process. • Clear delineation of the areas to be disturbed prior to clearing activities; disturbance boundaries would be digitally captured and displayed within the Subject Land survey and GIS databases. This data would be made available either digitally or in map format. • Locate potential habitat features within the Subject Land that may require special management/ salvaging during clearing (such as the 57 HBTs identified as part of this BDAR, fallen logs and any other habitat feature). • Identify habitat features that can be salvaged (where practicable) for reuse in adjoining non-disturbed native vegetation areas. • Temporary or permanent protective fencing must be erected around all areas identified for retention (retained areas). • Works for clearing and construction of access tracks will be carried out in such a manner that the least practicable disturbance to actual ground cover and contours is caused. • A two-staged clearing process will be implemented after the pre-clearance assessment: ○ Stage 1 clearing will include the removal of non-habitat vegetation within a minimum of 48 hours of Stage 2 clearing; this will allow unassisted exodus of native fauna from remaining habitat. ○ Stage 2 clearing can commence under ecological supervision. • Ecological supervision:

Ref	Potential Impact	Phase	Mitigation measures
			○ A suitably trained and qualified ecologist or wildlife handler would be present during the clearing of identified habitat features to manage animals that may be encountered/displaced during the process ○ Options to minimise harm to fauna by modifying the clearance method may include shaking or nudging tree trunks to evacuate mobile fauna or lowering trees with suspected tree hollows being used by fauna with the hollow facing upwards to enable fauna to exit. If an animal is injured during these works, the fauna ecologist will ensure that they receive the appropriate level of care. Depending on the level of injury and status of the injured fauna, WIRES and/or the nearest veterinary clinic are to be contacted to retrieve the animal into care or to determine whether the veterinary staff can care for injured native animals. ○ Preparation and implementation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.
B-6	Impacts to native vegetation and fauna	Construction	Logs and tree hollows that could provide fauna habitat (the total length of wood at least 10 cm in diameter and at least 0.5 m long) would be relocated to adjacent woodland and/or suitable woodland locations where available/feasible.
B-7	Impacts to native vegetation and fauna	Pre-construction Operation Post-operation	Preparation of a Soil and Water Management Plan (SWMP) as part of the BMP to manage water quality impacts to surface water, and groundwater and soils during construction of the Project. A SWMP would enable surface flow, groundwater and associated ecosystem functions to be monitored and managed through a structured approach that includes regular monitoring, impact assessment, and adaptive management. The SWMP will include a combination of the following: • Erosion and Sediment Control Plans (ESCPs) • Emergency Spill Procedure • Unexpected Contaminants Finds Protocol Hygiene protocols and construction staging to reduce pathogen and weed spread.
B-8	Indirect impacts to native vegetation and fauna	Pre-construction, construction	Preparation of an ESCP by a certified professional in erosion and sediment control: • Preparation of an ESCP as part of the SWMP to manage erosion and sedimentation impacts during construction of the Project • Regularly inspect and clean sediment control devices to ensure they are functioning properly and to prevent system failure during heavy rainfall events • Consideration of sediment controls (e.g. coir logs, sediment fencing, revegetation) to avoid indirect sedimentation into sensitive habitats (e.g. swamps and riparian areas)

Ref	Potential Impact	Phase	Mitigation measures
			• Site specific erosion and sediment controls to be developed and implemented across construction areas, particularly at waterway crossings • The ESCPs will be developed for the activities and areas that are considered higher risk. The plans will detail the processes, responsibilities and measures to manage potential soil and water quality impacts in accordance with the principles and requirements in: • Emergency Spill Plans • Unexpected Contaminants Finds Protocol. • An ESCP will only be required for the Subject Land. The plan will detail the processes, responsibilities and measures to manage potential soil and water quality impacts in accordance with the principles and requirements in: ○ Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volumes 2A (DECC 2008a) and Volume 2C (DECC 2008b), commonly referred to as the 'Blue Book' ○ Best Practice Erosion and Sediment Control (International Erosion Control Association [IECA] 2012) Guidelines for Controlled Activities on Waterfront Land (Natural Resources Access Regulator [NRAR] 2018).
B-9	Indirect impact to native vegetation and fauna	Pre-construction and construction	Mitigation measures would be implemented to manage and reduce bushfire risk. They would focus on education and training, annually assessing the bushfire hazards, minimising and controlling ignition sources (e.g. by appropriate engineering design, where relevant) and revising existing responses and evacuation strategies for the Subject Land. Standard bushfire protection measures include (Cool Burn 2025): • Asset Protection Zone (APZ) and landscape management actions required to protect assets and prevent the spread of fire (including, but not limited to slashing and mowing, potential agricultural activities for fuel management, landscaping and maintenance, property fire breaks) • Building and construction requirements, commensurate with the purpose/use and construction of the structures • Access provisions (e.g. public access, property access, construction access) • Water supply and utilities (power/electricity) Emergency management arrangements.
B-10	Indirect impacts due to light spill, noise and dust	Pre-construction, Construction	Light spill would be managed as follows: • Wherever possible, artificial light impacts during construction would be managed through shielding/directing light spill away from sensitive areas. Noise and vibration would be managed as follows: • All feasible and reasonable measures would be applied to reduce the potential noise, and vibration impacts from the Project. Dust suppression would be addressed as follows: • Reduced vehicle speeds during the construction phase

Ref	Potential Impact	Phase	Mitigation measures
			- No dust generating work would be conducted during high winds - Stockpiles will be kept covered with material to prevent the generation of dust - Application of water as dust suppression during dust generating activities including access tracks where practicable
B-11	Indirect impact to native vegetation and fauna due to biosecurity risk	Pre-construction Construction Operation	A Biosecurity Management Plan will be developed as a part of the BMP, to be implemented during construction. The plan will include: - Biosecurity protocols for plant and equipment movement between sites, including species specific measures - Protocols for the identification of priority weed species, relevant pests and diseases of concern, mandatory reporting obligations and management of Emergency, Control and Biosecurity zones as per the NSW <i>Biosecurity Act 2015</i> - Weed and pest animal management and monitoring requirements, where relevant - Inclusion of a Trigger Action Response Plan (TARP) for key biosecurity threats including known biosecurity threats to threatened species and populations - Locations, timing and methods for removing soil and plant matter from vehicles and machinery and sourcing clean soil and materials free of contaminants for construction work - Implement a weed hygiene protocol for all machinery and vehicles entering the Subject Land, including cleaning stations to remove soil and plant material - Clean down stations (water or air, dependent on the identified biosecurity risk) will be provided at suitable locations to clean down vehicles and the shoes of all site personnel to stop the spread of weeds and pathogens (e.g. Myrtle Rust, <i>Phytophthora cinnamomi</i>, KoRV and Chlamydia, Psittacine Circoviral Disease, and Chytrid Fungus) - Consult with relevant agencies and groups involved with pest management in order to contribute to existing or future monitoring and management programs A weed control strategy would be developed and implemented during the operational stage of the Project to manage existing or emerging issues.
B-12	Indirect impacts to native fauna due to vehicle collision	Construction	Education of construction teams will be provided regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.
B-13	Indirect impacts to avifauna	Pre-construction, Construction, Post-construction	Assess collision risk to fauna and aves from transmission infrastructure, and investigate installation of deterrent devices (e.g., flapper devices) to increase line visibility and reduce injury or mortality from collisions. Adaptive management may be required to manage impacts. To determine where design measures are warranted, a monitoring protocol is to be developed to guide the placement of deterrent devices and other design measures:

Ref	Potential Impact	Phase	Mitigation measures
			- Pre-construction monitoring in areas identified as moderate to high risk - Post-construction seasonal monitoring in areas identified as moderate to high, where deterrent devices have been installed and adjacent to nearby raptor nests. Adaptive management measures must be instated, if high risk flyway areas are identified during pre and post construction monitoring.
B-14	Residual direct impacts to biodiversity values	Prior to construction	Offset 285 ecosystem credits and 483 species credits through the NSW Biodiversity Offsets Scheme (BOS) in accordance with credit profiles specified in the BDAR

6.2.5 Biodiversity Offset Strategy

The Project is required to enter the NSW BOS to offset residual direct impacts to biodiversity values that cannot be avoided or minimised. The offset obligations, as determined by the accredited BAM assessor and calculated through the BAM-C, are summarised below.

6.2.5.1 Ecosystem Credits

285 ecosystem credits are required to offset the loss of 24.49 ha of PCT 3431 - Central Hunter Ironbark Grassy Woodland, as detailed in **Table 27**.

Table 27 Ecosystem Credit Obligations

Vegetation Zone	PCT	TEC/EC Alignment	TCZ (ha)	ECZ (ha)	VI Score (Current)	VI Score (Future)	Credits Required
3431_Moderate	Central Hunter Ironbark Grassy Woodland	BC Act EEC and EPBC Act CEEC	0.84	3.59	45.0 (TCZ) / 11.9 (ECZ)	0	78 (19 TCZ + 59 ECZ)
3431_Low	Central Hunter Ironbark Grassy Woodland	BC Act EEC and EPBC Act CEEC	0.48	0.87	42.7 (TCZ) / 14.2 (ECZ)	0	23 (10 TCZ + 13 ECZ)
3431_Very Low	Central Hunter Ironbark Grassy Woodland	None	10.24	8.46	25.3 (TCZ) / 12.6 (ECZ)	0	184 (130 TCZ + 54 ECZ)
Total			11.56	12.93			285

6.2.5.2 Species Credits

483 species credits are required to offset habitat loss for six threatened species assumed present within the Site, as detailed in **Table 28**.

Table 28 Species Credit Obligations

Common Name	Scientific Name	BC Act Status	EPBC Act Status	Habitat Loss (ha)	Biodiversity Risk Weighting	Credits Required
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Endangered	Endangered	3.60	2	62
Pine Donkey Orchid	<i>Diuris tricolor</i>	Vulnerable	—	2.65	1.5	32
Pine Donkey Orchid - Muswellbrook Shire LGA population	<i>Diuris tricolor - endangered population</i>	Endangered Population	—	2.65	2	42
Tarengo Leek Orchid	<i>Prasophyllum petilum</i>	Endangered	Endangered	2.65	2	105 (42 + 63)
Prasophyllum sp. Wybong	<i>Prasophyllum sp. Wybong</i>	—	Critically Endangered	—	3	TBC pending post-submission survey
Pterostylis chaetophora	<i>Pterostylis chaetophora</i>	Vulnerable	—	2.65	2	42
Total						483

Note: Species credit obligations for *Prasophyllum sp. Wybong* are subject to finalisation following post-submission targeted surveys and will be reported as part of the RtS. Species credit obligations for the five flora species assumed present will similarly be confirmed or revised.

No indirect or prescribed impacts are considered to require offsetting. Ecosystem and species credits will be sourced from the BOS in accordance with the credit profiles specified in the BDAR (**Appendix D**, Tables 63 and 64). Offset credit matching must be finalised by the accredited assessor within the BOAMS system prior to EIS lodgement.

6.3 Heritage

6.3.1 SEARs

SEARs	Details
Key Issues – Heritage	An Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), identifying, describing and assessing impacts to Aboriginal cultural heritage sites or values (including earthworks, construction works and road upgrades) including results of archaeological test excavations (where required), undertaken in accordance with the relevant standards and requirements
	Evidence of adequate consultation with Aboriginal communities in determining and assessing impacts, identifying avoidance options and appropriate mitigation measures, having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)
	An assessment of historic heritage (including archaeological impacts) in accordance with the Guidelines for Preparing a Statement of Heritage Impact

An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared by Niche Environment and Heritage Pty Ltd (Niche) (refer **Appendix E**) as well as a Historical Heritage Assessment (HHA) (refer **Appendix F**) to identify, assess and manage potential impacts to Aboriginal and historic heritage values within the Site.

6.3.2 Existing Environment

6.3.2.1 Aboriginal Cultural Heritage

The Site is located in the southern portion of the traditional lands of the Geawegal people, within the broader Wonnarua Country. The Geawegal territory is understood to have extended along the northern tributaries of the Hunter River to Murrurundi, and encompassed the areas of Muswellbrook, Aberdeen, Scone and the Mount Royal Range. The Project is located within the boundaries of the Wanaruah Local Aboriginal Land Council (LALC).

A search of the Aboriginal Heritage Information Management System (AHIMS) was conducted on 17 October 2024, identifying 24 previously registered Aboriginal cultural heritage sites within the broader search area. No previously registered sites were identified within the Site.

Searches of statutory heritage registers and planning instruments confirmed no Aboriginal cultural heritage items are listed within the Site. A search of the National Native Title Register identified no determined native titles within the Project area. Two active claims exist within the Upper Hunter Shire and Muswellbrook Shire LGAs (NC2018/002 – Warrabinga-Wiradjuri #7; NC2011/006 – Gomeroi People); however, neither extends to the Project area, including the Crown Reserve over Lot 162 DP257347. The remainder of the Site is freehold land over which native title is presumed extinguished. No areas warranting invocation of the were identified.

The Site is characterised by gently undulating terrain, two ephemeral creek lines draining westward toward the Hunter River, and soils extensively cleared for grazing and pastoral use. Desktop assessment and survey results are consistent with regional predictive models, indicating sparse open artefact scatters and isolated finds associated with drainage lines as the most likely site types.

6.3.2.2 Historic Heritage

The Site falls within the Parish of Russell and County of Durham along the Hunter River floodplains. No heritage items are located within the Site. Several items of local significance are situated in the vicinity, the closest being The Grange (Upper Hunter LEP 2013, Item #189), a historically significant stone house approximately 180 metres

to the west, separated from the Site by the Main Northern Railway and New England Highway. The archaeological potential of the Site was assessed as low across all historical phases due to extensive historical disturbance from farming and land clearing.

6.3.3 Aboriginal Community Consultation

Notifications were sent to relevant agencies and organisations between 27 September and 22 October 2024, with a newspaper advertisement placed in the Muswellbrook Chronicle on 15 November 2024. In total, 23 organisations registered as Registered Aboriginal Parties (RAPs), representing Aboriginal interests across the Wonnarua, Geawegal, Gomeroi, and other connected peoples of the region. Project information and a draft assessment methodology were distributed to all RAPs on 9 December 2024, with six RAPs providing formal feedback.

Aboriginal cultural heritage surveys were conducted over five days (20 February, 2 and 3 April, 6 November 2025 and 10 April 2026) with nine representatives attending from various organisations including the Wonnarua Nation Aboriginal Corporation, Wanaruah LALC, Mura Gadi Aboriginal Corporation, Hunter Valley Aboriginal Corporation, Nunawanna Aboriginal Corporation and Gomery Cultural Consultants. Full details are provided in **Appendix E**.

6.3.4 Impact Assessment

6.3.4.1 Aboriginal Cultural Heritage

A total of 21 new Aboriginal cultural heritage sites were identified during the ACHAR survey program, comprising 14 isolated finds, five artefact scatters, one artefact scatter with a Potential Archaeological Deposit (PAD), and one modified tree. The artefact assemblage consisted predominantly of silcrete flakes with some basalt, mudstone and chert.

Of the 21 sites identified, 11 are located within the Site. Ten will be subject to direct impacts from the proposed works, and one (NICHE-BESS-AS5) is located outside the impact area and will not be harmed. The remaining ten sites are located outside the Site and will not be directly impacted. All sites are summarised in **Table 29** and shown in **Figure 10**.

Table 29 Summary of Identified Aboriginal Cultural Heritage Sites

AHIMS ID	Site name	Site type	Location relative to Site	Impact
ACH Locations within Site – impacted by proposed works				
37-2-6651	NICHE-BESS-IF5	Isolated find	Within Site	Direct – total loss of value
37-2-6652	NICHE-BESS-IF6	Isolated find	Within Site	Direct – total loss of value
37-2-6653	NICHE-BESS-IF7	Isolated find	Within Site	Direct – total loss of value
37-2-6654	NICHE-BESS-IF8	Isolated find	Within Site	Direct – total loss of value
37-2-6655	NICHE-BESS-IF9	Isolated find	Within Site	Direct – total loss of value

AHIMS ID	Site name	Site type	Location relative to Site	Impact
37-2-6656	NICHE-BESS-IF10	Isolated find	Within Site	Direct – total loss of value
37-2-6658	NICHE-BESS-IF12	Isolated find	Within Site	Direct – total loss of value
37-2-6661	NICHE-BESS-AS1	Artefact scatter	Within Site	Direct – total loss of value
37-2-6659	NICHE-BESS-AS2	Artefact scatter / PAD	Partially within Site	Direct – partial loss of value (PAD extent unknown pending test excavation)
37-2-6660	NICHE-BESS-AS3	Artefact scatter	Within Site	Direct – total loss of value
Sites within Site – not impacted				
37-2-6663	NICHE-BESS-AS5	Artefact scatter	Within Site but outside impact area	None – to be avoided and conserved
Sites outside Site – no impact				
37-2-6647	NICHE-BESS-IF1	Isolated find	Outside Site	None
37-2-6648	NICHE-BESS-IF2	Isolated find	Outside Site	None
37-2-6649	NICHE-BESS-IF3	Isolated find	Outside Site	None
37-2-6650	NICHE-BESS-IF4	Isolated find	Outside Site	None
37-2-6657	NICHE-BESS-IF11	Isolated find	Outside Site	None
37-2-6761	NICHE-BESS-IF13	Isolated find	Outside Site	None
37-2-6762	NICHE-BESS-IF14	Isolated find	Outside Site	None
37-2-6662	NICHE-BESS-AS4	Artefact scatter	Outside Site	None
37-2-6763	NICHE-BESS-AS6	Artefact scatter	Outside Site	None
37-2-6664	NICHE-BESS-ST1	Modified tree (subject to arborist inspection)	Outside Site	None – to be avoided and conserved

All 21 sites were assessed as having low to moderate scientific significance due to their common site type, disturbed context, and limited research potential. All sites hold high social and cultural value as part of the broader Wonnarua cultural landscape. The exception is NICHE-BESS-AS2, whose scientific value is unknown pending subsurface investigation of the associated PAD.

Ground surface visibility was approximately 5-10% due to dense grass cover. The survey achieved 100% coverage

of the 76-hectare Site over five days, with primary focus on drainage lines, exposures, and vehicle tracks.

6.3.4.2 Historic Heritage

Site inspections identified significant prior disturbance including vegetation clearance, prolonged pastoral use, localised earthworks, historical rubbish dumping, and demolition of at least one building. No archaeological relics or physical links to colonial-era settlement were identified. The Project is therefore unlikely to result in direct impacts on known heritage items or significant historical archaeological resources.

6.3.4.3 Findings and Conclusion – Aboriginal Cultural Heritage

As SSD, the Project is exempt from an Aboriginal Heritage Impact Permit (AHIP) under the NPW Act. Heritage management will instead be governed by an Aboriginal Cultural Heritage Management Plan (ACHMP), to be prepared in consultation with the RAPs prior to construction commencement.

Ten sites will be directly impacted by the proposed works, all assessed as having low scientific significance and high social and cultural value. The ACHMP will prescribe surface salvage of all impacted sites and, where subsurface disturbance may be proposed, test excavation of the PAD at NICHE-BESS-AS2 to determine its subsurface nature and extent. Recovered artefacts will be subject to a Care Agreement with the RAPs and may be reburied on-site or transferred to the Wanaruah LALC.

Site avoidance was considered but is not warranted given the limited spatial extent, common site type, high representativeness, and disturbed context of the impacted sites. The ACHMP approach, combined with ongoing RAP consultation, is consistent with the applicable conservation hierarchy.

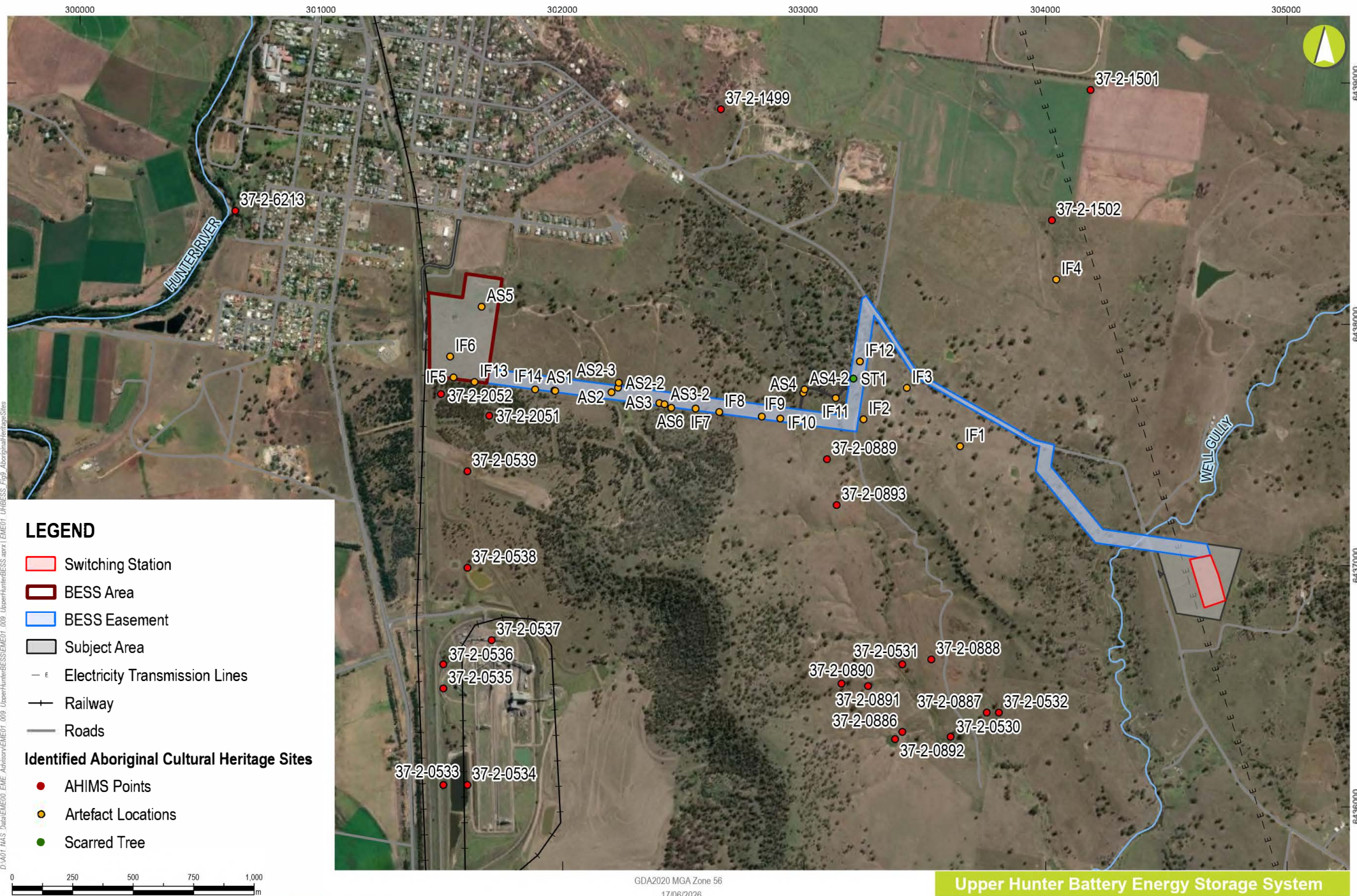
6.3.5 Mitigation and Management

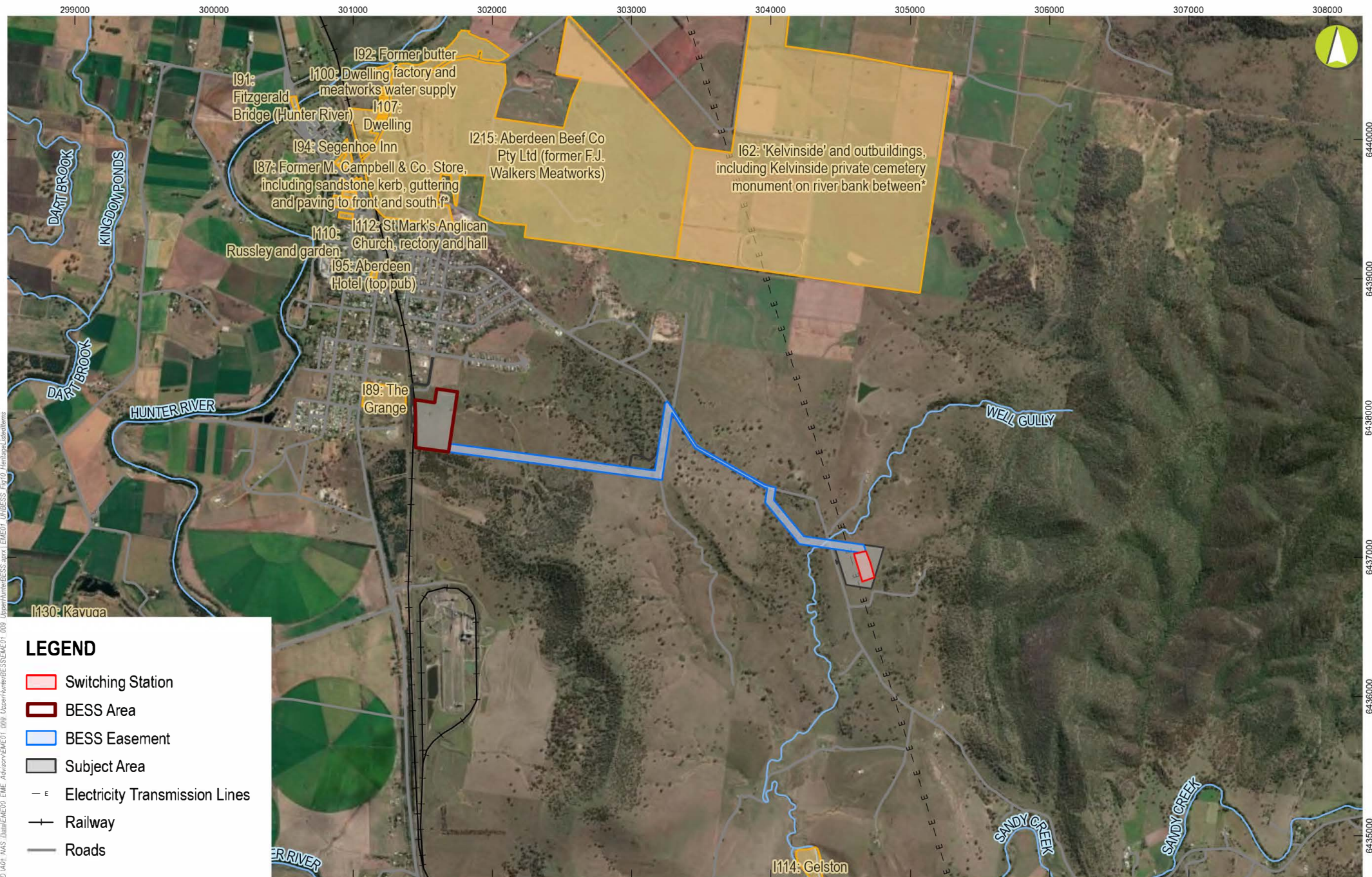
Aboriginal and cultural heritage and historic heritage mitigation and management measures are summarised in **Table 30**. Full details are provided in the ACHAR (**Appendix E**) and HHA (**Appendix F**).

Table 30 Heritage Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Aboriginal Cultural Heritage			
A-1	Harm to identified Aboriginal cultural heritage sites within the impact area	Pre-construction Construction	As the project is classified as a State Significant Development, an Aboriginal Heritage Impact Permit will not be required to impact Aboriginal cultural heritage sites. Instead, management of the sites within the Subject Area should be conducted by formulating an Aboriginal Cultural Heritage Management Plan (ACHMP) to manage the archaeological resources present. If any Aboriginal heritage sites identified within the Subject Area will be impacted by the proposal, the management measures to be implemented would be outlined in the ACHMP. These management and mitigation measures can be finalised once the nature of the impacts is known following the finalisation of the design and layout of the proposed works.

Ref	Potential Impact	Phase	Mitigation measures
A-2	Harm to identified Aboriginal cultural heritage sites within the impact area	Ongoing	Ongoing consultation with the RAPs in regard to the Project in accordance with the Aboriginal cultural heritage consultation requirements for Proponents 2010. • Consultation may include, but is not limited to: • Finalisation of ACHA. • RAP monitoring during future works. • Unexpected finds. Note: Throughout the life of the project, project updates should be sent to all RAPs every 6 months at a minimum to ensure the consultation associated with this ACHA remains active.
A-3	Harm to identified Aboriginal cultural heritage sites within the impact area	Pre-construction Construction	Prior to works commencing, all workers should be inducted into the Subject Area, so they are made aware of their obligations under the NPW Act and any conditions of unexpected finds procedures prior to and during and after construction activities.
A-4	Harm to identified Aboriginal cultural heritage sites within the impact area due to unexpected finds	Construction	During any future works, in the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop, and an appropriately qualified archaeologist be contacted to assess the nature, extent, and significance of the identified sites and notification is provided to Heritage NSW. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.
A-5	Harm to human remains due to unexpected finds	Construction	During any future works, in the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact must cease immediately and: • The location, including a 20 metre (m) curtilage, should be secured using barrier fencing to avoid further harm. • The NSW Police must be contacted immediately. • No further action is to be undertaken until the NSW Police provide written notification. • If the skeletal remains are identified as Aboriginal, the Proponent or their agent must contact Heritage NSW's Enviroline on 131 555 and representatives of the RAPs. No works are to continue until Heritage NSW provides written notification to Maizewood or their Agent.
Historic Heritage			
HH-1	Unexpected archaeological finds	Construction	Implementation of an Unexpected Finds Procedure. If suspected archaeological material is encountered, work must stop within a 10 m area until assessed by a qualified archaeologist.





01401_NAS_DraftEMEO01_EME_AdvisoryEMEO01_009_UpperHunterBESSandLME01_UHBESS_Fig10_HeritageListedItems

LEGEND

- Switching Station
- BESS Area
- BESS Easement
- Subject Area
- Electricity Transmission Lines
- Railway
- Roads

0 375 750 1,125 1,500
 Scale: 1:35,000

6.4 Land

6.4.1 SEARs

SEARs	Details
Key Issues - Land	Detailed justification of site suitability having regard to potential environmental impacts, land contamination, permissibility, strategic context and existing site constraints
	Assessment of potential impacts on existing land uses on the site and adjacent land including: agricultural land, flood prone land, nearby drinking water catchments, Crown lands, mining, quarries and mineral/petroleum rights (if relevant)
	A soil survey to determine soil characteristics and consider potential for salinity, acid sulfate soils (ASS) and erosion
	A cumulative impact assessment of nearby developments
	Assessment of compatibility with existing land uses during construction, operation and after decommissioning including: consideration of zoning provisions and subdivision; a Land Use Conflict Risk Assessment (if required); and assessment of impact on agricultural resources and production
	A preliminary contamination investigation across the site in accordance with the Hazards SEPP 2021 (as required)

A Soil, Land and Agricultural Impact Assessment (SLAIA) has been prepared by Minesoils Pty Ltd (Minesoils) (refer **Appendix G**) for the Project. The assessment was undertaken in accordance with the *Large-Scale Solar Energy Guidelines* (LSSE Guidelines) (DPIE, 2022). The site verification of land and soil capability (LSC) determined that a Level 3 - Detailed assessment was required under the LSSE Guidelines. **Appendix G** contains a Land Use Conflict Risk Assessment (LUCRA; Appendix 1) prepared in accordance with the *NSW Department of Primary Industries Land Use Conflict Risk Assessment Guide* (DPI, 2022); a Decommissioning and Rehabilitation Strategy (DRS; Appendix 4), and a Preliminary Site Investigation (PSI; Appendix 5) under the Hazards SEPP 2021.

6.4.2 Existing Environment

6.4.2.1 Zoning and Regional Agricultural Context

The Site spans land zoned E4 General Industrial, R1 General Residential, RU4 Primary Production Small Lots and RU1 Primary Production under the UHLEP and MLEP. Agriculture applies only to the RU1 and RU4 areas (approximately 16.9 ha); the BESS area and portions of the easement are zoned E4 and R1 which do not permit primary production. The Project is permissible under clause 2.36(1)(b) of the TISEPP and is located within the Hunter-Central Coast REZ. The prevailing regional land use is low-intensity cattle grazing. **Table 31** summarises agricultural land use across the two LGAs (ABS, 2022a).

Table 31 Regional Agricultural Land Use by Type – 2020-2021

Agricultural land use	Upper Hunter Shire LGA (ha)	Upper Hunter Shire LGA (%)	Muswellbrook Shire LGA (ha)	Muswellbrook Shire LGA (%)
Grazing	408,492	90	113,959	96
Cropping	27,852	6	3,341	3
Forestry	15,064	3	1,129	<1

Agricultural land use	Upper Hunter Shire LGA (ha)	Upper Hunter Shire LGA (%)	Muswellbrook Shire LGA (ha)	Muswellbrook Shire LGA (%)
Other	877	<1	5	<1
Total	452,285	100	118,434	100

The Site represents approximately 0.005% of the Upper Hunter Shire LGA and 0.007% of the Muswellbrook Shire LGAs total areas. No Biophysical Strategic Agricultural Land (BSAL) or State Significant Agricultural Land (SSAL) is mapped within the Site. The nearest BSAL and SSAL are located approximately 580 m southwest of the Site.

6.4.2.2 Soil Survey and Land Capability

Minesoils conducted a soil survey across the Site in April and October 2025 (eight assessment sites at approximately one per 5 ha). Two soil mapping units were identified, as summarised in **Table 32**.

Table 32 Soil Mapping Units

Soil mapping unit	Classification	Area (ha)	Key characteristics	Erodibility
Unit 1	Sodosols	13.4	Sandy loam to clay loam topsoil; medium to heavy clay subsoil; non-sodic surface trending to strongly sodic at depth; non-saline surface trending to highly saline at depth; moderately well to imperfectly drained; moderately low fertility	High to moderate dispersion risk - EAT Class 2-3 recorded at depth
Unit 2	Sodic Dermosols	19.4	Clay loam to light-medium clay topsoil with moderate to strong structure; non-sodic surface trending to strongly sodic at depth; non-saline surface trending to moderately saline at depth; moderately well drained; moderately high fertility; consistently deep profiles	Negligible dispersion risk at surface - EAT Class 4 recorded

Both units are characterised by moderately low inherent fertility (Class 2). No ASS are mapped within the Site and ASS risk is considered very low based on-site elevation, distance from coast, and absence of field indicators during survey. Verified LSC classes are summarised in **Table 33**.

Table 33 Verified Land and Soil Capability

LSC class	Description	Area (ha)	Key constraints
Class 3 – High capability	Capable of high-impact land uses including cropping with cultivation under intensive management	20.9	Water erosion, wind erosion, soil structure decline, soil acidification
Class 4 – Moderate capability	Restricts regular high-impact land uses; specialised management required	9.2	Soil acidification, waterlogging, soil depth
Class 5 – Moderate-low capability	Largely restricted to grazing, some horticulture, forestry and nature conservation	2.7	Soil acidification
Total		32.8	

6.4.2.3 Agricultural Productivity

The estimated annual productivity of the Site is summarised in **Table 34**, modelled conservatively using NSW DPI Gross Margin Budgets (DPI, 2025) and LGA-wide productivity ratios LGAs (ABS, 2022a); (ABS, 2022b).

Table 34 Estimated Potential Productivity

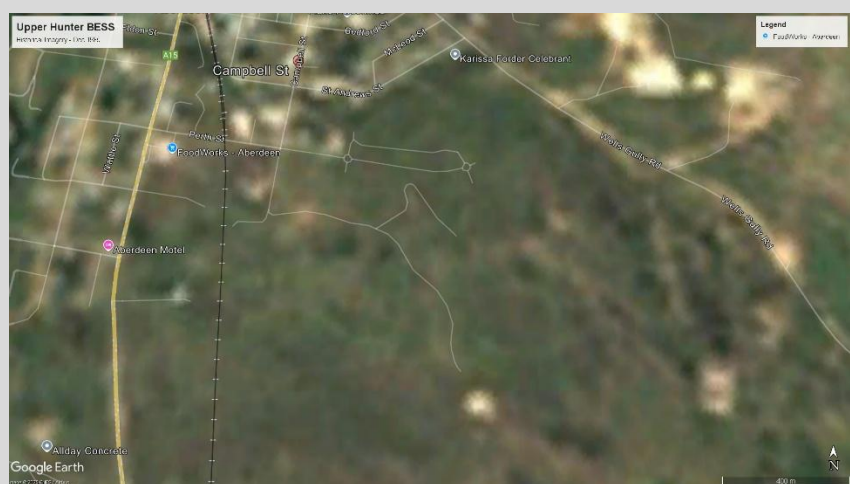
Method	Enterprise / basis	Estimated annual productivity
DPI Gross Margin (upper)	Growing-out steers on improved pasture	\$18,205
DPI Gross Margin (lower)	Merino ewes – Merino rams	\$9,383
LGA productivity ratio	Upper Hunter Shire LGA (\$288/ha × 24.7 ha) + Muswellbrook Shire LGA (\$294/ha × 8.1 ha)	\$9,495

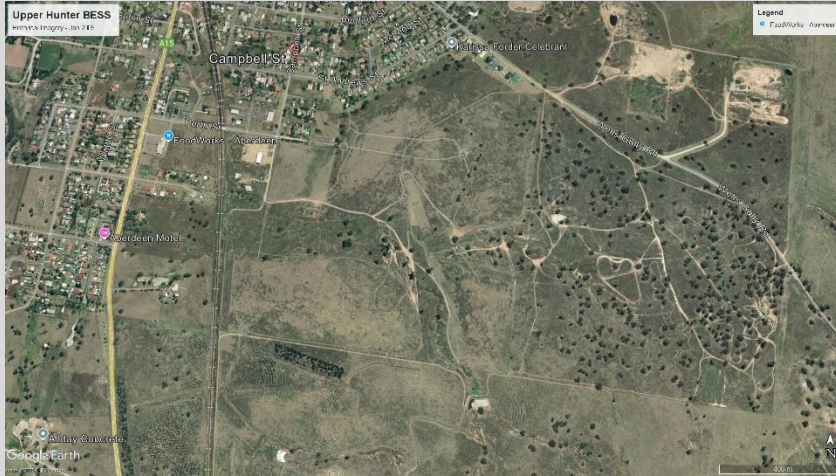
6.4.2.4 Historical Land Use Summary

A review of historical imagery (1985–2023) confirms the Site and surrounds have remained largely undeveloped and cleared for several decades. Land use has primarily consisted of low-intensity or informal activities, such as occasional grazing and unregulated trail bike use, with no evidence of formal structures or agricultural intensification. Residential development to the north of the Site occurred progressively from 2014 onward, following the construction of road infrastructure and subdivision layout. Throughout the reviewed timeframe, the Site has maintained a visually open character with intermittent groundcover and consistent disturbance from vehicle paths and surface erosion. These changes suggest the area has long been perceived as transitional land on the urban-rural fringe.

Table 35 provides a chronological summary of land use and visual changes across the Site and easement corridor, informed by a review of historical imagery.

Table 35 Land Use Historical Imagery and Visual Condition Summary

Historical Aerial Image	Observations
	Dec 1985 Site appears as open pastureland with sparse vegetation No visible infrastructure or formal access Township boundary clearly defined to the west

Historical Aerial Image	Observations
	Jan 2009 Evidence of informal track use across Site Early surface disturbance; no built infrastructure Easement area shows cleared and unformed alignment
	Jan 2014 Subdivision road network under construction Cleared pads visible near Campbell Street Track density increases across Site
	Dec 2015 First residential dwellings appear along subdivision Ongoing informal trail use visible within Project area

Historical Aerial Image

Observations

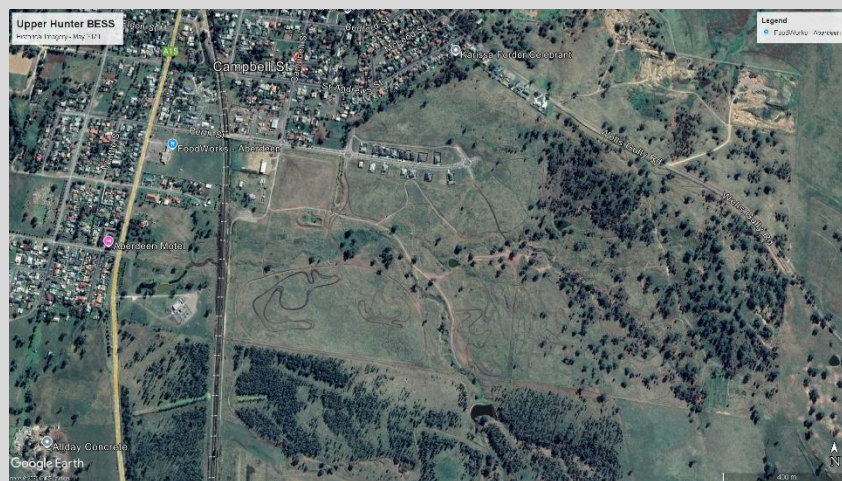


Sept 2018

Residential development
nearing completion

Trail use patterns persistent

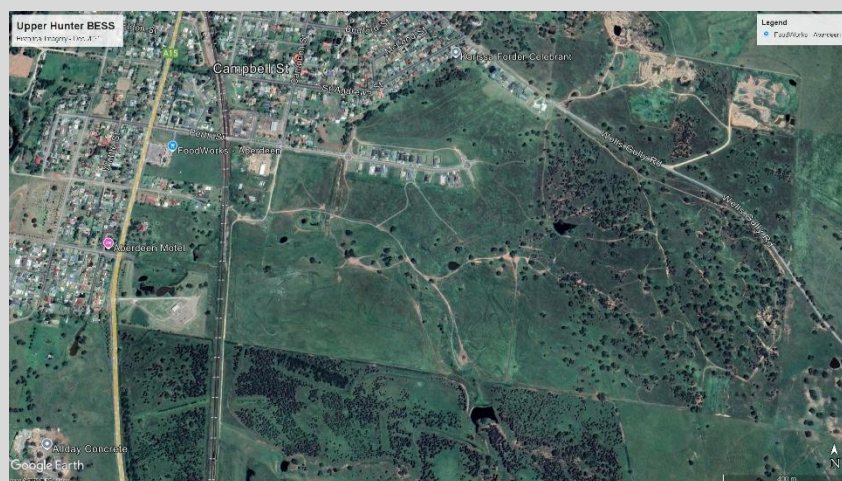
No built infrastructure within
Site



May 2020

Vegetation cover improved
following dry conditions

Tracks visible but reduced in
sharpness



Dec 2021

Scattered water bodies
appear, possible wet year

Increased grass cover across
Site

Easement remains open and
unutilised

Historical Aerial Image	Observations
	May 2023 Area remains cleared and undeveloped Subdivision fully established to the north No recent trail use or formal activity observed

The historical imagery demonstrates that the Project area has remained largely undeveloped and subject to informal use since at least 2009. While adjacent residential development has occurred progressively from the north since 2014, activity within the Site has been limited to intermittent low-intensity use, including unregulated trail bike activity. The easement corridor has remained consistently open and cleared since at least 1985, with no formal agricultural or structural land use evident over the past four decades. Based on the long-term absence of land management, permanent infrastructure or ecological sensitivity visible in imagery, the area is considered to have low land use sensitivity.

6.4.2.5 Contamination

A PSI was completed for the Site by Minesoils in accordance with Chapter 4, Clause 4.6 of the *State Environmental Planning Policy (Resilience and Hazards) 2021* (Hazards SEPP) and the *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land Sites* (EPA, 2020) (refer **Appendix G**, Appendix 5). The PSI comprised a desktop review of publicly available records (via Lotsearch, 2025) and a visual site inspection conducted in October 2025. The key findings of the PSI are summarised in **Table 36**.

Table 36 Preliminary Site Investigation Key Findings

Assessment element	Finding	Preliminary risk
NSW EPA contaminated land registers	No properties within the Site listed on contaminated land registers. One property in the locality - 87-89 St Andrews Street, Aberdeen (former transport depot, 363 m north) - is listed on the NSW contaminated sites notified to EPA. No clean-up or penalty notices recorded within or near the Site	Very low
Licensed activities (on-site)	No current licensed activities within the Site. Three former herbicide application licences identified within the footprint (Licences 4653, 4838, 6630)	Very low
Licensed activities (off-site)	EPL 3142 (ARTC rail corridor, 33 m west); EPL 4885 (Dartbrook coal operations, 575 m south); EPL 4449 (Walfertan Processors - tannery, 824 m north). No identified contamination pathway to the Site	Low
Historical land use	Predominantly cleared for agricultural use (livestock grazing) since at least 1938. No evidence of industrial activity, imported fill or controlled waste disposal within the Site	Very low

Assessment element	Finding	Preliminary risk
Potentially contaminating businesses	Motor garages and service stations identified in the historical record - all located 351-363 m west of the Site. No businesses identified within the footprint	Very low
Dartbrook Coal Mine	Located 575 m south, down gradient. Potential contaminants include heavy metals, acid mine drainage and Polycyclic Aromatic Hydrocarbon (PAHs). No identified pathway to the Site	Very low
Ausgrid Aberdeen substation	Located approximately 85 m west, down gradient. Potential contaminants include hydrocarbons, heavy metals, Polychlorinated Biphenyl (PCBs) and asbestos. No identified pathway to the Site	Very low
Visible signs of contamination	None observed during site inspection. No plant stress, waste, odours or surface contamination indicators identified	-
Acid sulfate soils	Extremely low to low probability of occurrence (1-70%) per regional mapping. No field indicators observed during soil survey	Very low
Dangerous goods	No dangerous goods search required - predominant agricultural use with no industrial activities on site	-
Overall site suitability	Land within the Site is considered suitable for the proposed development in accordance with Clause 4.6(1b) of the Hazards SEPP. No contamination identified. Further assessment or remediation not required	-

Contaminants of potential concern (COPCs) identified through the conceptual site model include pesticides (OCP/OPP), heavy metals, total recoverable hydrocarbons (TRH), PAHs, Benzene, Toluene, Ethylene and Xylene (BTEX), PCBs and asbestos. Identified transport mechanisms include soil, surface water and groundwater migration and vapour volatilisation. The likelihood of significant contamination within the Site is assessed as very low given the absence of contamination in databases, the distant proximity of current licensed activities, and the absence of visible contamination indicators during the site inspection.

6.4.3 Impact Assessment

6.4.3.1 Land Use Conflict Risk Assessment

Twenty-one potential conflict items were assessed across construction, operation and decommissioning phases. Nineteen were rated low risk following mitigation. The items remaining at moderate residual risk are summarised in **Table 37**.

Table 37 LUCRA Moderate Risk Items

Potential conflict	Phase	Residual risk	Reference
Biosecurity breach - introduction or spread of weeds, plant pests, diseases or feral animals through increased vehicle, machinery and personnel movements	Construction	Moderate	Section 6.2.4; Appendix D
Fire risk - potential for fire originating at Site to spread to surrounding land, residences, infrastructure or livestock	Operation	Moderate	Section 6.9; Section 6.10; Appendix M; Appendix N

6.4.3.2 Agricultural Impacts

Table 38 summarises the assessed impacts on agricultural land, soil capability, productivity and enterprises.

Table 38 Agricultural Impact Assessment Summary

Impact	Extent	Assessment	Basis
Agricultural land temporarily removed from use	16.9 ha (RU1 and RU4 only)	Negligible - represents 0.006% of Muswellbrook Shire LGA and 0.002% of Upper Hunter Shire LGA agricultural land	No fragmentation or displacement of existing enterprises; grazing on portions of the easement to continue during operation
LSC Class 3 land temporarily impacted	20.9 ha	Negligible - represents 0.03% of LSC Class 3 in Muswellbrook Shire LGA and 0.01% in Upper Hunter Shire LGA	Sporadic, localised landform modification only; no permanent LSC reduction anticipated
LSC Class 1 or 2 land impacted	None	No impact	Absent from Site
BSAL or SSAL impacted	None	No impact	Nearest BSAL/SSAL approximately 580 m southwest
Agricultural productivity loss	\$9,383–\$18,205/year (primary)	Negligible relative to LGA gross commodity values of \$166.4M (UHSC) and \$40.9M (MSC)	No impact on critical mass thresholds, support services or regional agricultural infrastructure
Soil resources	Moderate to high dispersion risk under construction disturbance	Low with mitigation - manageable through ESCP, gypsum treatment and progressive revegetation	Gently undulating landform limits off-site erosion risk
Cumulative agricultural impacts	Multiple renewable energy and infrastructure projects in the region	Low - regional industry is low-intensity grazing with established interface to extractive industries; no cumulative impacts on critical mass thresholds anticipated	Assessed in the context of LGA-wide agricultural land use coverage

6.4.3.3 Contamination

The PSI identified no evidence of contamination within the Site. The Site is not listed on any contaminated land database. COPCs identified through the preliminary Conceptual Site Model (CSM) are considered very low risk given the historical agricultural land use, the absence of industrial activity on site, and the down-gradient position of the nearest potentially contaminating activities. Land within the Site is assessed as suitable for the proposed development in accordance with Clause 4.6(1b) of the Hazards SEPP. No further investigation or remediation is required. Contamination impacts are assessed as negligible.

6.4.4 Mitigation and Management

Land and soil mitigation measures are summarised in **Table 39**. Full details are provided in the SLAIA (**Appendix G**).

Table 39 Land and Soil Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Land			
L-1	Temporary loss of agricultural land	Decommissioning	Agricultural land use would be re-established over 16.9 ha of RU1 and RU4 land removed from agriculture by the Project at the time of decommissioning or sooner unless otherwise agreed with the landowner and/or regulatory authorities
L-2	Soil capability and soil handling	Construction Operation Decommissioning	All soil that is proposed to be disturbed during the Project will be handled in accordance with a site soil management plan that includes soil management measures relating to soil stripping, stockpiling, respread/reuse, and land rehabilitation.
L-3	Land and soil capability	Decommissioning	Return all disturbed land to an equivalent Land and Soil Capability (LSC) class following the end of life for the Project, i.e. the reinstatement of 20.9 ha of LSC class 3 land through site rehabilitation and good soil management practices.
L-4	Soil erosion and sedimentation	Construction Operation Decommissioning	All soil resources are to be managed throughout construction, operation and decommissioning phases of the Project in accordance with an Erosion and Sedimentation Control Plan (ESCP).
L-5	Weed and pest management	Construction Operation Decommissioning	Preparation of a weed and pest management protocol for the management of pest and weed species.
L-6	Biosecurity	Construction Operation Decommissioning	Preparation of an Agricultural Biosecurity Management Plan for the management of biosecurity risk.
L-7	Unexpected contamination encountered during construction	Construction	Prepare and implement an Unexpected Finds Procedure (UFP) as part of the CEMP detailing the procedures to be followed if contamination is encountered including the classification of contaminated soil in accordance with the NSW EPA Waste Classification Guidelines (2014) prior to removal

6.5 Visual

6.5.1 SEARs

SEARs	Details
Key Issues - Landscape and Visual	Detailed assessment of likely visual impacts on surrounding residences (including approved developments, lodged DAs and dwelling entitlements), key locations, scenic quality of significant vistas and road corridors in the public domain
	Details of measures to mitigate and/or manage potential impacts including a draft landscaping plan for on-site perimeter planting developed in consultation with affected landowners

A Landscape Character and Visual Impact Assessment (LCVIA) has been prepared by IRIS Visual Planning + Design (IRIS) (refer **Appendix H**) for the Project. The assessment was guided by the *Large-Scale Solar Energy Guideline Technical Supplement for Landscape and Visual Impact Assessment* (DPHI, 2022) and *Guidance Note EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment* (TfNSW, 2023), as no specific guidance exists for stand-alone BESS projects in NSW.

6.5.2 Existing Environment

The Site is located on mostly cleared, undeveloped land south of Aberdeen town centre, with the Main Northern Railway immediately to the west. The site occupies a low-lying position within the broader Hunter River valley, with landform rising gradually to the north toward Aberdeen, to the southeast toward Browns Mountain (approximately 3 km), and to the east and west where larger hills enclose the valley.

The Site is surrounded by a mix of land uses (refer **Section 1.5.3.1**) including existing general residential areas to the north and northeast (including the developing Aberdeen Heights subdivision), light industrial uses and unimproved industrial-zoned land to the north, the Ausgrid Aberdeen Sub Transmission Station approximately 150 m to the west, and plantation forestry and environmental management land to the south. Existing 330 kV transmission lines are a characteristic feature of the broader landscape, extending east of the BESS site and south and west from the Aberdeen substation. Mining infrastructure, including the Dartbrook coal handling facility approximately 1 km to the south, is also visible from the site and surrounding areas.

The Switching Station site is located approximately 3 km east of the BESS site on Wells Gully Road, within the Muswellbrook Shire LGA. The site is on undulating, largely cleared grazing land, with Colonel Mountain and associated densely vegetated ridgelines at McCullys Gap providing a prominent backdrop to the east. The existing 330 kV transmission line passes through the Switching Station site, and the broader landscape includes scattered rural dwellings, farm dams, rural sheds and agricultural infrastructure.

The BESS and western portion of the transmission corridor are characterised by a low scenic quality landscape, reflecting the existing presence of industrial, railway and electricity infrastructure, cleared vegetation and the proximity of suburban development. The Switching Station site and eastern corridor have a similarly low scenic quality, with a moderate absorption capacity reflecting the undulating rural landform and presence of existing transmission infrastructure.

6.5.3 Impact Assessment

6.5.3.1 Landscape Character

Landscape character impacts have been assessed across two landscape character areas: the BESS and surrounding area; and the Switching Station and surrounding area. The assessment framework combines landscape sensitivity (derived from scenic quality and absorption capacity) with magnitude of change to determine a landscape character impact level. Results are summarised in **Table 40**.

Table 40 Summary of Landscape Character Impacts

Landscape character area	Landscape sensitivity	Magnitude of change	Landscape character impact
BESS and surrounding area	Low	Low	Low
Switching Station site and surrounding area	Low	Moderate	Low

The BESS landscape has a low sensitivity reflecting the existing presence of electricity infrastructure, railway, mining activity and cleared vegetation, with a moderate-high absorption capacity. The magnitude of change is assessed as low, as the BESS units would be a relatively minor element in the broader landscape at a scale consistent with adjacent light industrial uses. Noise walls (up to 7 m) and the substation (10 m or more) are taller components but would be contextually consistent with the existing industrial character of the locality.

The Switching Station has a low sensitivity and moderate absorption capacity. The magnitude of change is moderate, as the Switching Station infrastructure would increase the scale of transmission infrastructure in the valley and involve earthworks creating cut and fill batters that contrast with the rolling landform. Notwithstanding this, the landscape character impact remains low given the existing presence of large-scale transmission infrastructure and rural modification of the area.

Potential visibility of transmission poles and lines reduces substantially with distance, given their grey- colour; the narrow columnar form of the poles; and thin, linear profile of the overhead lines. Due to the small scale of the power poles, a visual catchment for the transmission line has not been prepared. However, this transmission line has been considered in the viewpoint assessment.

6.5.3.2 Visual Impact - Public Domain (Daytime)

Seven representative public viewpoints were assessed across the study area. Visual sensitivity was determined by combining viewpoint sensitivity with scenic quality. Results are summarised in **Table 41**.

Table 41 Summary of Representative Public Viewpoint Assessment - Daytime

Viewpoint	Location	Visual sensitivity	Magnitude (no mitigation)	Visual impact	Magnitude (with screening vegetation)	Visual impact
1	View east from the New England Highway	Very low	Low	Very low	Low	Very low
2	View south from Perth Street bridge over railway	Very low	Low	Very low	Very low	Very low
3	View south from Perth Street	Very low	Moderate	Low	Low	Very low
4	View southwest from St Andrews Street	Very low	Low	Very low	Low	Very low
5	View southeast from Perth Street	Very low	Very low	Very low	Very low	Very low
6	View southeast along Wells Gully Road	Low	Moderate	Low	Moderate	Low

Viewpoint	Location	Visual sensitivity	Magnitude (no mitigation)	Visual impact	Magnitude (with screening vegetation)	Visual impact
7	View northwest along Wells Gully Road	Very low	Low	Very low	Very low	Very low

No scenic or significant vistas were identified within the visual catchment of the Project. Browns Mountain is privately owned with no visitor facilities; Colonel Mountain is similarly inaccessible. The New England Highway is not identified as a tourist or scenic route. Visual impacts from all assessed public viewpoints during operation are low or very low, primarily due to viewing distances, the context of existing infrastructure, and the low profile of the BESS relative to surrounding industrial and infrastructure land uses. Screening vegetation would reduce residual impacts at Viewpoints 3 and 7 to very low.

During construction, the Project would be slightly more prominent in views due to the presence of cranes, construction vehicles, earthworks and laydown areas, resulting in temporarily higher visual impacts across all viewpoints. These impacts would be temporary and limited to the construction period.

6.5.3.3 Visual Impact - Night-time

Night-time visual impacts have been assessed in accordance with AS4282:2023 *Control of the Obtrusive Effects of Outdoor Lighting*. The BESS and western transmission corridor are located on the fringe of suburban development and are assigned a low night-time visual sensitivity (A3: medium district brightness). The Switching Station and eastern transmission corridor are in a sparsely inhabited rural area with no streetlighting, assigned a moderate night-time sensitivity (A2: low district brightness). Results are summarised in **Table 42**.

Table 42 Summary of Night-time Visual Impact - Public Domain

Location	Visual sensitivity	Magnitude	Visual impact
BESS site and surrounds – construction	Low	Very low	Very low
BESS site and surrounds – operation	Low	Low	Low
Switching Station site and surrounds – construction	Moderate	Low	Low
Switching Station site and surrounds – operation	Low	Low	Low

Lighting during operation will be limited to low-intensity security, maintenance and emergency lighting, directed inwards and downwards in accordance with AS4282:2023. No direct light spill on private dwellings is anticipated. Night construction works are not proposed.

6.5.3.4 Visual Impact - Private Dwellings

Eleven representative dwellings within approximately 1 km of the Site were assessed. Visual sensitivity for residential viewers was determined by combining viewpoint sensitivity (based on zoning and primary/secondary view classification) with scenic quality. Results are summarised in **Table 43**.

Table 43 Summary of Visual Impacts from Private Dwellings

Location	Visual sensitivity	Magnitude (no mitigation)	Visual impact	Magnitude (mitigation)	Residual Visual impact
981 New England Highway, Aberdeen	Moderate	Very low	Low	Very low	Low
4 Jean O'Bryan Close	Moderate	Very low	Low	Very low	Low
204 Macqueen Street	Moderate	Very low	Low	Very low	Low
86–90 Perth Street	Moderate	Low	Low	Very low	Low
73 Perth Street	Moderate	Low	Low	Very low	Low
149 Graeme Street	Moderate	Very low	Low	Very low	Low
Upper St Andrews Street	Moderate	Very low	Low	Very low	Low
Upper Campbell Street	Moderate	Very low	Low	Very low	Low
322 Wells Gully Road, McCullys Gap	Moderate	High	Moderate	High	Moderate
376 Wells Gully Road, McCullys Gap	Moderate	High	Moderate	Moderate	Moderate
210 Wells Gully Road, McCullys Gap	Low	Low	Low	Very low	Low

The most significant visual impacts are from the two dwellings nearest to the Switching Station (322 and 376 Wells Gully Road), where the Switching Station would be prominent in primary views from elevated positions overlooking the Site. These impacts are assessed as moderate and would not be materially reduced by the proposed screening vegetation in the near term, as the taller elements of the Switching Station would remain visible above screening plantings.

For all assessed dwellings in the vicinity of the BESS, visual impacts are low, reflecting the viewing distances involved, the low profile of BESS infrastructure, and the contextual screening provided by the plantation forest backdrop, existing railway, substation and transmission lines. Proposed screening vegetation along the northern and eastern boundaries of the BESS would progressively reduce impacts over time to very low at most receivers.

Land to the north and east of the BESS is zoned R1 General Residential and is progressively being developed as part of the Aberdeen Heights subdivision. Future dwellings in this area may have views to the BESS. The BESS is zoned E4 General Industrial, and future residential development would be expected to be set back accordingly.

6.5.4 Mitigation and Management

Visual impact mitigation and management measures are summarised in **Table 44**. A Landscape Concept Plan has been prepared as part of the LCVA (**Appendix H**, Appendix B).

Table 44 Visual Impact Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Landscape and Visual			
LV1	Amenity impacts due to intrusive lighting	Construction and operation	Lighting during construction and operation would be designed and operated in accordance with AS4282-2023 Control of the obtrusive effects of outdoor lighting.
LV2	Amenity impacts due to scale of noise walls	Construction	Noise walls and buildings (excluding electrical facilities such as MVPS and BESS containers) to be painted a colour that blends with the local landscape (such as Colorbond Cottage Green, Woodland grey, Pale Eucalypt or similar) to reduce their prominence of these structures in views from surrounding areas.
LV3	Amenity impact to residences in close proximity to infrastructure	Pre-construction	Prior to finalising design, explore options to reduce visual impact to the residences close to the switching station
LV4	Amenity impacts to residences in close proximity to infrastructure	Pre-construction	Develop and implement the concept landscape plan in consultation with the residences closest to the Switching Station (322 and 376 Wells Gully Road) and adjoining landholder of land zoned for Residential near the BESS site.

6.6 Noise

6.6.1 SEARs

SEARs	Details
Key Issues - Noise	Assessment of construction noise impacts per the ICNG, operational noise per the <i>NSW Noise Policy for Industry (2017)</i> , traffic noise per the <i>NSW Road Noise Policy</i> (DECCW, 2011) and cumulative noise impacts
	Identification of impacts at noise-affected sensitive receivers including operational noise contours
	Details of noise monitoring survey, background noise levels and amenity noise levels at the most-affected residential receivers
	Details of likely daily charging/discharging load profile, manufacturer specifications for plant and equipment and noise source inventory (including intensity, quantity, location, directivity and frequency)
	Assessment of 'worst case' noise emission scenarios during periods of discharging and charging
	Consideration of annoying noise characteristics and prevailing meteorological conditions in the study area
	Details and analysis of effectiveness of proposed management and mitigation measures, including residual impacts following mitigation and details of any proposed compliance monitoring programs

SLR Consulting Pty Ltd (SLR) has been engaged to undertake a Noise Impact Assessment (NIA) (refer **Appendix I**) for the Project. The predicted noise levels at the closest noise sensitive receivers during the construction and operation of the BESS were assessed against the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017) and the *Interim Construction Noise Guideline* (ICNG) (NSW DCCEW, 2009).

6.6.2 Existing Environment

6.6.2.1 Noise Monitoring

SLR conducted unattended and operator-attended noise monitoring at one location (L01), approximately 50 m east of residential receiver R3 at 14 Shannon Cl, Aberdeen, selected as representative of the most-affected receivers to the west of the Site.

Long-term unattended monitoring was conducted from 26 June to 4 July 2025 using an environmental noise logger. Weather data was obtained from Scone Airport Bureau of Meteorology station (~16 km north-east). Data recorded during excess rainfall or wind speeds above 5 m/s were excluded in accordance with NPfI methodology.

The attended monitoring confirmed the local acoustic environment is dominated by rail and road traffic, with contributions from birdsong and passing trains. Background noise monitoring results are summarised in **Table 45**.

Table 45 Background Noise Monitoring Results

Monitor Logger ID	Period	Measured Noise Level (dBA)	
		Rating Background Level (RBL)	Average Noise (LAeq)
L01	Day	53	65
	Evening	43	63

Monitor Logger ID	Period	Measured Noise Level (dBA)	
		Rating Background Level (RBL)	Average Noise (LAeq)
	Night	33	60
Note: Weekdays; Day 7 am - 6 pm; Evening 6 pm - 10 pm; Night-time 10 pm - 7 am; Sundays and Public Holidays, Daytime 8 am - 6 pm; Evening 6 pm - 10 pm; Night-time 10 pm - 8 am			

6.6.2.2 Project Noise Trigger Levels

Surrounding receivers have been classified as Suburban Residential based on land use zoning and existing background noise levels. Project Noise Trigger Levels (PNTLs) are summarised in **Table 46**.

Table 46 Project Noise Trigger Levels

Period	Recommended Amenity LAeq (period) (dBA)	Project Amenity LAeq,15min (dBA)	Intrusiveness LAeq,15min (dBA)	PNTL LAeq,15min (dBA)
Day	55	53	58	53
Evening	45	43	48	43
Night	40	38	38	38
Note: PNTLs are set at the lower of the project amenity and intrusiveness levels. Project amenity levels have been reduced by 5 dBA from the recommended amenity levels to account for other industrial noise sources in the area, consistent with NPfl requirements				

6.6.3 Impact Assessment

6.6.3.1 Construction Phase

Construction noise was assessed in accordance with the ICNG using worst-case 15-minute predictions. The Project-specific Noise Management Level (NML) for residential receivers during Standard Construction Hours is 63 dBA, with a Highly Noise Affected (HNA) threshold of 75 dBA. SLR identified 38 receivers surrounding the BESS, with the closest (R19) located 435 m from the centre of the BESS. Five worst-case construction scenarios were assessed, summarised in **Table 47**.

For the construction of the switching yard, earthworks are anticipated to be the loudest construction activity. The construction noise assessment demonstrates that one receiver (322 Wells Gully Road) falls marginally within the Noise Management Level (NML) Noise Affected buffer distance for switching yard earthworks and transmission line vegetation clearing. It remains outside the Highly Noise Affected threshold for all activities.

Full details of construction equipment, sound power levels and predicted noise levels at all receivers are provided in **Appendix I**.

Table 47 Construction Noise Compliance Summary

Scenario	Construction Zone	Activity	Max Predicted LAeq,15min (dBA)	NML (63 dBA)	HNA (75 dBA)	Compliance
W.01	BESS site	Earthworks	55 (at R19)	63	75	Yes
W.02	BESS site	Construction of pads and hardstands	47 (at R19)	63	75	Yes
W.03	BESS site	Equipment installation	48 (at R19)	63	75	Yes
W.04	BESS site	Noise wall installation	51 (at R19)	63	75	Yes
W.05	Access road	Campbell/Railway St upgrades	68 (at R36)	63	75	No - NML exceeded at R36 (+5 dB) and R37 (+2 dB). R38 at 0 dB margin. HNA not exceeded
—	Transmission and switching yard	Line, cabling and switching yard construction	<63	63	75	No - NML marginally exceeded at 322 Wells Gully Road for earthworks and vegetation clearing. HNA not exceeded.

The HNA threshold is not exceeded at any receiver. Mitigation measures are detailed in **Section 6.6.4**.

6.6.3.2 Construction Traffic Noise

Perth Street was identified as the most sensitive corridor, with the closest residential dwellings located approximately 15 m from the road. Baseline traffic on Perth Street is zero heavy vehicles and 94 light vehicles per hour. Construction traffic adds 14 heavy and 60 light vehicles per hour.

The predicted noise increase of 5 dB exceeds the NSW Road Noise Policy (RNP) 2 dB screening criterion. The predicted noise level of 64 dBA exceeds the RNP criterion of 55 dBA, with a mitigation distance of 77 m. Receivers at the western end of Perth Street are partially masked by the New England Highway; the impact is more pronounced toward the eastern end. Campbell Street also exceeds the RNP criteria, with a predicted noise level of 62 dBA against the 55 dBA criterion and a mitigation distance of 49 m. Affected receptors would require notification.

6.6.3.3 Construction Vibration

Vibration impacts are not anticipated given the large distances between works and receivers. The closest receiver (R19) is approximately 435 m from the BESS centroid, well beyond the maximum CNVG human comfort working distance of 100 m and cosmetic damage distance of 25 m for the heaviest plant. Compliance with both criteria is expected at all receivers.

6.6.3.4 Cumulative Construction Impacts

No other developments in the vicinity of the BESS are known to have construction activities overlapping with the Project's construction phase. Cumulative construction noise impacts are therefore not anticipated.

6.6.3.5 Operational Phase

Worst-Case Noise Assessment

The main noise sources during operation of the BESS are the cooling fans associated with the battery enclosures, the power inverters, and transformers. Two worst-case scenarios were modelled representing peak charging and discharging conditions:

- Scenario 1 (Day and Evening): 50°C ambient, battery fan duties at 100%, power electronics at 60%
- Scenario 2 (Night): 25°C ambient, battery fan duties at 60%, power electronics at 60%

Both scenarios assume all 204 battery units and 136 inverter units operating simultaneously with Original Equipment Manufacturer (OEM) noise attenuation kits and 7 m noise walls as shown in **Figure 12**. Full noise source inventory details are provided in **Appendix I** Table 20.

With mitigation in place, operational noise complies with the PNTLs at all 38 receivers across all periods, as summarised in **Table 48**. Operational noise contours for day/evening and night-time periods are provided in **Figure 13** and **Figure 14**.

Table 48 Operational Noise Assessment - Worst-Case Operations Compliance Summary

Period	PNTL LAeq,15min (dBA)	Worst-Case Predicted Level (dBA)	Most-Affected Receiver	Compliance
Day	53	36	R20/R21	Yes - all receivers
Evening	43	36	R20/R21	Yes - all receivers
Night	38	35	R19/R20/R21	Yes - all receivers
Note: Predicted levels represent the maximum across all 38 assessed receivers under worst-case Scenario 1 (Day/Evening) and Scenario 2 (Night). Full receiver-by-receiver results are provided in Appendix I , Table 25.				

Sleep disturbance is not expected at any receiver. No NPfI modifying factor corrections for tonality, low-frequency noise or intermittency are required, as the equipment operates as a steady-state noise source.

Modelling was conducted under noise-enhancing conditions per NPfI Fact Sheet D Option 1. A further 2 dB increase is theoretically possible under simultaneous downwind and temperature inversion conditions, however this coincides with reduced cooling loads and correspondingly lower equipment output. The assessment is considered appropriately conservative.

Operational traffic is conservatively assessed as a single light vehicle per day. No noticeable noise increase is anticipated at any receiver. Cumulative operational impacts are accounted for within the Project-specific PNTLs through the NPfI's 5 dBA project amenity reduction.



LEGEND

- BESS Area
- BESS Easement
- Access Road
- Railway
- Roads
- Site Layout
- Battery Buildings
- Noise Wall Configuration

0 25 50 75 100
Scale: 1:3,000

EMA
INTEGRATED ENVIRONMENTAL
MANAGEMENT
AUSTRALIA
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Source: LPI (Spatial NSW, 2026); BESS Data (EME Advisory, 2026); Noise Management Data (SLR, 2026)

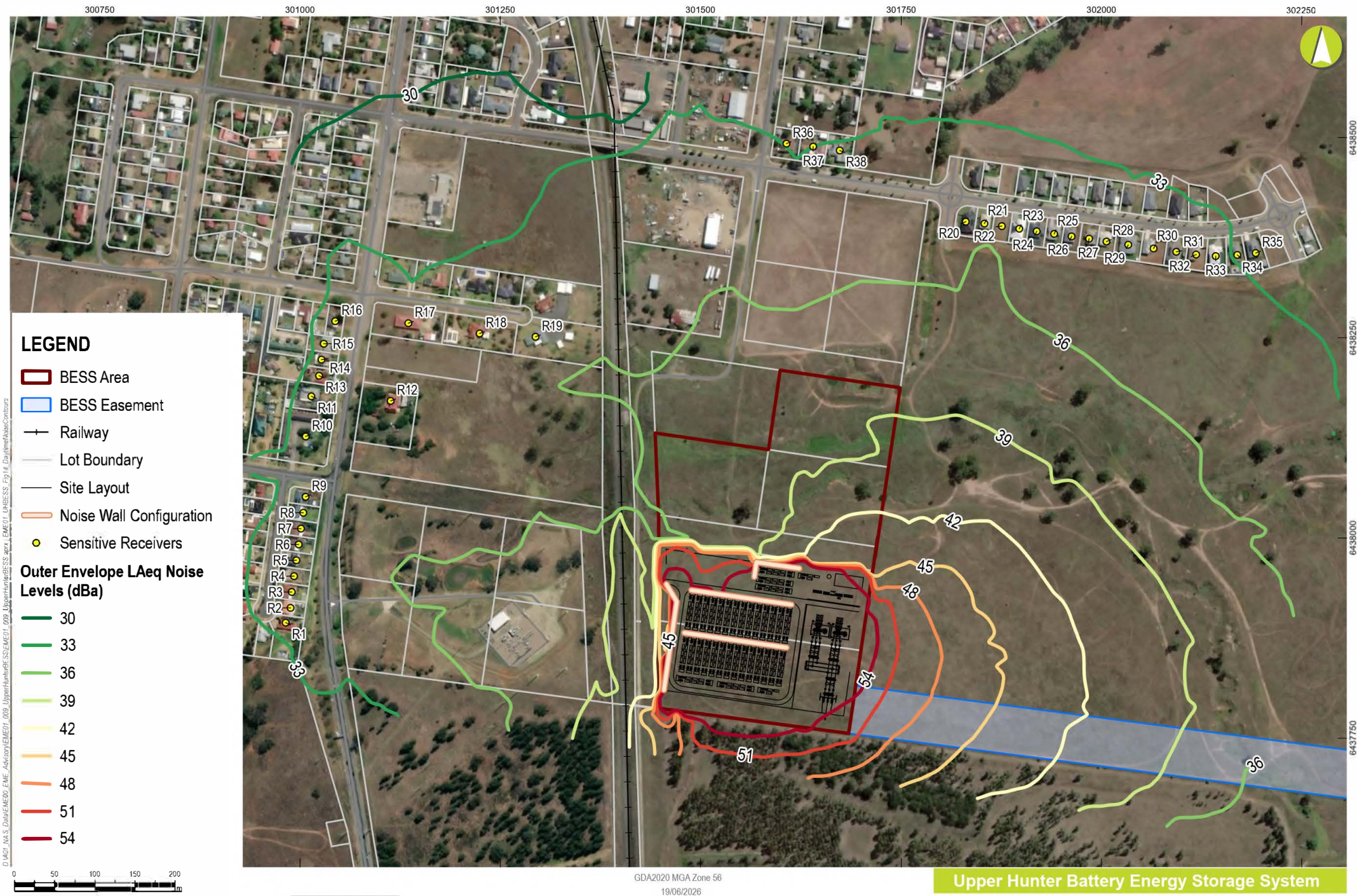
eme
ADVISORY

GDA2020 MGA Zone 56
19/06/2026

Upper Hunter Battery Energy Storage System

Noise Wall Configuration

FIGURE 12



D:\M01_NA\S_Data\EMED01_009_UpperHunterBESS\EMED01_009_UpperHunterBESS.aprx EMED01_UHABESS_Fig 14_DaytimeNoiseContours



D:\M01_NA_S_Data\EMED01_009_UpperHunterBESS\EMED01_009_UpperHunterBESS.aprx EME01_UHBESS_Fig 15_Nighttime Noise Contours

6.6.4 Mitigation and Management

Table 49 summarises the proposed noise mitigation measures for the Project.

Table 49 Noise Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Noise			
N-1	Impacts to sensitive receivers due to construction noise	Pre-construction Construction	A Construction Noise and Vibration Management Plan (CNVMP) would be prepared before any work begins. This would identify all potentially impacted receivers, assess the potential noise and vibration impacts from the proposal and provide details regarding how the impacts would be minimised through the use of all feasible and reasonable mitigation measures. The CNVMP would also contain procedures for handling complaints, should they occur, and detail any compliance monitoring requirements.
N-2	Noise impacts to the residence at 322 Wells Gully Rd from switching yard earthworks and transmission line vegetation clearing	Construction	CNVMP to include community consultation and notification to the affected resident to advise on the anticipated construction works.
N-3	Noise impacts associated with vehicle movements	Operations	Use broadband and/or ambient sensing alarms on heavy vehicles where they are required to reverse during the night-time (noting operational vehicle movements are minimal).
N-4	Noise impacts associated with plant and equipment	Operation	The noise impacts from all noise-generating plant items would be reviewed during detailed design stage to confirm unit selections and any additional mitigation requirements.
N-5	Noise impacts to nearby residential areas from BESS operations	Operation	Construction of 7 m noise walls has been incorporated into the design of the BESS layout to mitigate noise from BESS units. The final noise wall heights and locations will be confirmed during detailed design.
N-6	Noise impacts to residences from construction traffic on Perth Street and Campbell Street	Construction	CNVMP to include community consultation and notification to affected residents to advise on the anticipated construction traffic.

6.7 Traffic, Transport and Access

6.7.1 SEARs

SEARs	Details
Key Issues - Transport	Assessment of peak and average traffic generation including light vehicles, heavy vehicles, oversize/overmass vehicles requiring escort and construction worker transportation
	Assessment of likely transport impacts to site access routes, road capacity, conditions, safety and intersections
	Concept Level Route Analysis for heavy vehicles requiring escort and high risk heavy vehicles requiring escort
	Cumulative impact assessment of traffic from nearby developments including mining operations
	Details of mitigation and management measures developed in consultation with relevant road authorities including: a schedule of all required road upgrades; strategic concept designs of proposed road upgrades (including the site access point); and road maintenance contributions and other traffic control measures

Seca-Solution has been commissioned to prepare a Traffic Impact Assessment (TIA) (refer **Appendix J**) for the Project. A Concept Level Route Assessment for oversize/overmass (OSOM) vehicles has been separately prepared by Amber Organisation (refer **Appendix K**) in accordance with the SEARs requirement.

6.7.2 Existing Environment

6.7.2.1 Road Network and Hierarchy

The Road Network and Hierarchy for the Project is described in **Table 50** and shown in **Figure 15**.

Table 50 Road Network

Road	Classification	Jurisdiction	Pavement Width	Speed Limit	Key Characteristics
New England Highway (HW9)	State arterial road; National Freight Route; National Land Transport Network	Transport for NSW	14–20 m	100 km/h (rural); 50 km/h (Aberdeen township)	Pre-approved for B-double and OSOM combinations. Single lane each direction with kerbside parking. Approximately 20% heavy vehicles. Carries inter-state, regional and local traffic including B-doubles

Road	Classification	Jurisdiction	Pavement Width	Speed Limit	Key Characteristics
Perth Street	Local road	UHSC	8 m (near the Site) to 14 m (near New England Highway)	50 km/h	Connects to New England Highway at a four-way give way-controlled intersection (highway priority). Passes over the Main Northern railway line via an overbridge, structurally confirmed by Aurecon (June 2025) to accommodate transformer OSOM loads. Warning signage present for horse riders. Pedestrian footpath on northern side east of the highway. Road equipment and excavation business located at the Perth Street / Campbell Street intersection, generating periodic heavy vehicle movements including semi-trailers.
Campbell Street / St Helier Street / Railway Street	Local road (sealed to 24 m south of Perth Street; gravel beyond)	UHSC	Approximately 9 m (Campbell Street); gravel track beyond	50 km/h	North-south orientation. Connects Perth Street to the Site via St Helier Street and Railway Street and will be upgraded as part of the Project. Give way-controlled at Perth Street (Perth Street has priority). Access retained for existing road equipment company on the corner
Graeme Street	Local road	UHSC	7.6 m at rail overbridge; 16 m east of bridge; 12 m near Campbell Street	50 km/h	East-west orientation north of the Site. Intersects New England Highway with a channelised right-turn lane (78 m plus taper). Rail overbridge carries load limits of 6 t (single axle), 9 t (tandem axle) and 11 t (tri-axle) per axle group, governing eligibility of southbound heavy vehicles to use this route. Connects to Campbell Street at a four-way give way-controlled intersection
Wells Gully Road	Unsealed rural road	UHSC / MSC	5.5–6 m (variable)	Unposted (up to 100 km/h)	Accessed from Graeme Street. Proposed construction and maintenance access route for the switching station and transmission easement. Currently carries rural heavy vehicles including cattle transport. Limited curve delineation; signage advises "Drive to Conditions"

6.7.2.2 Existing Traffic Volumes and Network Operation

A permanent count station on the New England Highway (T6158N), approximately 780 m south of Perth Street, records annual average daily traffic (AADT) of approximately 5,700 vehicles per day per direction based on four years of data (2022-2025), with background growth of 1.5-2% per annum. The PM peak on the highway occurs between 3pm and 5pm, with the local road peak (7:45-8:45am AM peak) occurring later than the expected site arrival time for construction workers.

Turning movement counts were undertaken by Seca-Solution at the intersection of the New England Highway and Perth Street (December 2024) and the New England Highway and Graeme Street (October 2025). Key findings are summarised below:

- New England Highway: flows of less than 1,000 vehicles per hour (vph) two-way, within its design capacity of 1,410 vph (Level of Service D for a two-lane rural road). Well within operational capacity.
- Perth Street: flows of less than 100 vph two-way. Well within the capacity of a collector road

(desirable 300 vph, maximum 500 vph). Intersection of New England Highway and Perth Street operates at Level of Service A.

- Graeme Street: flows of less than 150 vph two-way. Intersection of New England Highway and Graeme Street operates at Level of Service A with an existing channelised right turn providing the highest level of intersection treatment.

Existing traffic flows on all local roads are very low. Observations confirm that the road network in the vicinity of the Site operates without material delay or congestion throughout peak periods.



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6.7.2.3 Pedestrian, Cycling and Public Transport

Pedestrian footpaths are provided along the New England Highway north from Perth Street to the Fitzgerald Bridge, with no dedicated cycling infrastructure in the locality. The nearest railway station is Aberdeen Station (approximately 750 m north of the Site), with three services daily in each direction; bus services along the New England Highway are limited to a small number of hail-and-ride services between Denman, Muswellbrook and Scone. The workforce is expected to travel to Site by private vehicle or organised minibus transfer from accommodation in Muswellbrook, Scone, Aberdeen and Singleton.

6.7.3 Impact Assessment

6.7.3.1 Traffic Generation

Construction Phase

Construction traffic has been estimated by Seca-Solution based on the Project construction program, peak workforce requirements and delivery schedules. The peak construction workforce is 100 FTE workers. A vehicle occupancy rate of 3-4 workers per vehicle has been assumed, reflecting the anticipated use of carpooling and shuttle transport from key accommodation locations. Under this scenario, approximately 20-35 light vehicle movements would occur inbound and outbound during peak activity. To provide a conservative assessment, a sensitivity analysis has been undertaken assuming a lower vehicle occupancy rate of two workers per vehicle, under which peak light vehicle movements could increase to approximately 70 vehicles inbound and outbound per day. This higher traffic generation rate has been adopted for the assessment where appropriate.

Traffic generation by construction phase is summarised in **Table 51**.

Table 51 Traffic Generation During Construction

Construction Phase	Duration	Peak Light Vehicles/day (each-way)		Peak Heavy Vehicles/day (each-way)		Total Vehicle Trips/day	Notes
		BESS	Switching Station	BESS	Switching Station		
Site establishment and earthworks	2 months	20	20	30	30	200	Scrapers, graders, water trucks and deliveries
Civil works (road, pads, fencing)	4 months	40	20	70	30	320	Concreting, gravel deliveries, telehandlers and trenchers
Battery delivery and installation	3 months	70	-	20	-	180	Semi-trailers transporting battery modules
Electrical installation and commissioning	4 months	60	30	20	15	250	Transformers, switchgear and cabling; includes OSOM transformer deliveries
General fit-out and finalisation	8 months	30	30	15	15	180	Final construction activities, landscaping and demobilisation

Construction Phase	Duration	Peak Light Vehicles/day (each-way)		Peak Heavy Vehicles/day (each-way)		Total Vehicle Trips/day	Notes
		BESS	Switching Station	BESS	Switching Station		
Average/range across build period	Construction	20-70	20-30	15-70	15-30	180-320	Staff numbers fluctuate throughout construction; peak workforce is approximately 100 workers

Peak hour movements during the peak civil works phase are summarised in **Table 52**.

Table 52 Peak Hour Traffic Demands

Vehicle Type	AM Peak - Inbound	AM Peak - Outbound	PM Peak - Inbound	PM Peak - Outbound	Total Daily Vehicle Trips
Civil Works					
Light Vehicles	60	0	0	60	120
Heavy Vehicles	14	14	14	14	56
Total	74	14	14	74	176
Electrical Works					
Light Vehicles	90	0	0	90	180
Heavy Vehicles	5	5	5	5	20
Total	95	5	5	95	200
Note: AM peak hour = 7:45am–8:45am and PM peak hour = 4:00pm–5:00pm, based on traffic surveys undertaken at the New England Highway/Graeme Street intersection. 100% of light vehicles are assumed to enter during the AM site peak and depart during the PM site peak. Heavy vehicles are distributed across the working day with 2-3 vehicles per hour. The 7:00am site start is prior to the local road AM peak.					

Approximately 60% of light vehicles and the majority of heavy vehicles are expected to approach from the south (Muswellbrook), approximately 25% from Scone, and the balance from within Aberdeen. Light vehicles from the south will use the channelised right turn at Graeme Street to approach southbound along Campbell Street. All heavy vehicles from the south will travel north through to Scone, execute the Kelly Street turnaround, and approach from the north via a left turn into Perth Street.

Operational Phase

Once operational, the Project requires a maximum of one light vehicle per day on site for routine maintenance and inspection, with infrequent heavy vehicle access for specific maintenance work only. No operational traffic impacts on the road network are anticipated.

6.7.3.2 Site Access and Intersection Performance

Access to the BESS will be via a new road constructed as an extension of Campbell Street comprising St Helier Street and Railway Street, designed and constructed in accordance with Council requirements to accommodate all delivery and OSOM vehicle swept paths. Sight distances of 69 m will be provided (compliant with AS2890.2 for a 50 km/h frontage speed). Access to the switching station will be via Wells Gully Road off Graeme Street, with new transmission easement access tracks developed, or existing tracks widened for construction and maintenance. All vehicles will enter and exit the Site in a forward direction. On-site carparking is anticipated to accommodate peak workforce vehicle requirements with carpooling; no external parking impacts are anticipated.

- New England Highway / Perth Street - Perth Street carries less than 100 vph two-way and the intersection operates at Level of Service A. Semi-trailers are already present on Perth Street given the existing road equipment depot. The addition of 1-2 heavy vehicles per hour during construction is assessed as having a minimal and acceptable impact on intersection operations. No geometric upgrade is required. All Project heavy vehicles approach from the north and execute a Basic Left Turn into Perth Street; no southbound right turn from the highway is required for any Project vehicle.
- New England Highway / Graeme Street - This intersection operates at Level of Service A with a channelised right turn lane already in place (the highest level of turn treatment per Austroads Guide to Road Design Part 4). The intersection is forecast to operate at Level of Service C under 2031 base conditions. Project traffic here consists of inbound light vehicles in the morning, which are counter-directional to the existing residential outbound peak and occur outside the 7:45-8:45am local road peak. No upgrade is required.
- Perth Street / Campbell Street - This intersection operates with very low flows and currently serves the road equipment company. No turn treatments are required for standard construction traffic. OSOM movements and occasions when opposing semi-trailers are required to pass will be managed by a Traffic Guidance Scheme.

6.7.3.3 Oversize and Overmass Vehicles

A Concept Level Route Assessment has been prepared by Amber Organisation addressing the transport of the substation transformer (High Risk OSOM, originating Port of Newcastle) and the battery module delivery vehicles (Class 1 OSOM, originating Port Botany). Vehicle specifications are summarised in **Table 53**.

Table 53 OSOM Vehicle Specifications

Component	Length	Width	Height	Mass	Configuration	Classification
Transformer	9,500 mm (load); ~65,800 mm (combination)	4,270 mm	Up to 5,000 mm	180 t (load); ~400 t (combination)	10×8 + 10×8 Platform Beam Set	High Risk OSOM - Transport Management Plan required; pilot and escort vehicles required
Battery modules	23,300 mm	3,500 mm loaded / 2,500 mm unloaded	3,800 mm	70 t	4×8 axle platform (ARES)	Class 1 OSOM - pilot vehicle required at the New England Highway / Perth Street left turn only

Transformer - High Risk OSOM (Port of Newcastle)

The proposed primary route maximises use of the National Land Transport Network from the Port of Newcastle via the Hunter Expressway, Golden Highway and Denman Road, before traversing the TfNSW/EnergyCo committed Muswellbrook bypass (Bengalla Road - Wybong Road - Kayuga Road - Invermein Street - Stair Street - Dartbrook Mine Private Access Road) to rejoin the New England Highway north of Aberdeen, then Perth Street and Railway Street to the Site (approximately 181 km). The assessment has conservatively assumed EnergyCo Port to REZ upgrades are not yet in place, to demonstrate works required if the transformer is delivered before those upgrades are complete. TfNSW's forecast completion date for the upgrades is late 2026 which would allow this route to be used for Project OSOM movements.

A swept path assessment was undertaken at 19 pinch points using Autodesk Vehicle Tracking software. The route is feasible subject to road upgrades totalling approximately 989 m² of trafficable area and one traffic sign relocation, as summarised in **Table 54**.

Table 54 Schedule of Road Upgrades - Transformer Route

Road / Location	Required Road Upgrade	Responsible Party
Wybong Road / Kayuga Road (Muswellbrook)	Construct approximately 331 m ² of trafficable area and temporarily relocate one traffic sign	EnergyCo / Transport for NSW (Port to REZ commitment)
Invermein Street / Stair Street (Kayuga)	Construct approximately 262 m ² of trafficable area	EnergyCo / Transport for NSW (Port to REZ commitment)
Stair Street / Dartbrook Mine Private Access Road (Kayuga)	Construct approximately 167 m ² of trafficable area	EnergyCo / Transport for NSW (Port to REZ commitment)
Perth Street / Railway Street (Aberdeen)	Construct approximately 229 m ² of trafficable area	Proponent
All other pinch points (01–13, 17–18)	No road upgrades required	N/A

The minimum height clearance along the primary route is 5.4 m, exceeding the maximum vehicle height of 5.0 m. A powerline survey is recommended prior to delivery to identify any lines requiring lifting. Structural assessment of bridges and culverts along the route is to be confirmed as part of the TMP process.

An alternative route via the New England Highway through Muswellbrook (Bell Street - Victoria Street - Market Street detour) has been assessed and confirmed feasible, requiring approximately 17 m² of trafficable area and temporary guardrail removal. A height constraint of 4.88 m at an unnamed highway overpass in Muswellbrook is addressed by lowering the transformer load on the beamset from approximately 500 mm above the road surface to approximately 200 mm above the road surface, a standard adjustment for this type of OSOM vehicle combination, reducing the overall vehicle and load height to approximately 4.7 m. Two OSOM movements are required in total for transformer delivery, to be timed to avoid other OSOM vehicles operating in the area, managed through the TfNSW permit process.

Battery Modules - Class 1 OSOM (Port Botany)

Battery delivery vehicles are Class 1 OSOM compliant and can travel directly through Muswellbrook without requiring the transformer detour. The proposed route is: M1 Pacific Motorway - Hunter Expressway - New England Highway - Kelly Street, Scone (turnaround) - New England Highway southbound - Perth Street - Railway Street (approximately 288 km). No road upgrades are required on this route. The vehicle takes up the full road width of Perth Street when executing the left turn from the New England Highway; a pilot vehicle is required for this manoeuvre only. A maximum of six battery vehicles per day will access the Site, scheduled outside peak periods and school bus times. NHVR permits are required for Perth Street and Railway Street prior to deliveries.

commencing.

6.7.3.4 Road Safety

A road safety assessment was undertaken by Seca-Solution along the route between the New England Highway / Perth Street intersection and the site access on Railway Street (posted speed 50 km/h throughout). A review of TfNSW accident data (2019-2023) identified three accidents in the vicinity of the Site: a cross-traffic non-casualty (2020) and a right-rear moderate injury (2023) at Perth Street, and a right-rear non-casualty (2020) near St Heliers Street. No pattern of systemic safety deficiency is identified at these locations.

Risk assessment against the Austroads Guide to Road Safety Part 6 risk matrix identified the following key risks with development:

- New England Highway / Perth Street - risk of side impact with left-turning heavy vehicles increases from Rare/Low to Unlikely/Medium due to increased turning movements (2 per hour). The route already carries frequent B-doubles and semi-trailers; the additional volume is considered acceptable
- Perth Street rail bridge - risk of collision with cyclists or horse riders is rated High (Fatal or Serious Injury) for heavy vehicles both with and without the Project given the existing bridge geometry and horse rider warning signage. Increased warning signage and inclusion in the Drivers Code of Conduct and daily toolbox talks is required
- Wells Gully Road (switching station access) - risk of collision at access points and on curves increases from Medium to High with development due to unfamiliar drivers on an unsealed, unposted-speed road. Curve alignment markers and a project-specific 40 km/h speed limit for workers are required

6.7.3.5 Cumulative Traffic Impacts

Several projects pose potential for concurrent construction activity during the Project's construction program (refer **Section 6.11.3.5**). Muswellbrook Shire Council has modelled a regional peak of up to 4,500 temporary workers between 2027 and 2029, coinciding with the Project's anticipated construction program.

The following regional roadworks are also relevant to the cumulative traffic context:

- Muswellbrook bypass: preferred route determined; construction tender expected late 2026 with completion the following year. Relevant to the alternative OSOM transformer route assessment
- Singleton bypass: construction underway; expected to open late 2026 bypassing five sets of traffic lights
- M1 Pacific Motorway northern extension to Raymond Terrace: completion date 2028

On the state and regional network, total traffic flows from the Project will remain well within capacity, consistent with existing high heavy vehicle proportions and regular OSOM movements from mining operations. Cumulative impacts on the regional network are not anticipated. On local roads, Project volumes are modest against very low existing flows. Competition for OSOM permit slots from concurrent projects is a relevant consideration and will be managed through coordinated scheduling during the TMP and NHVR permit application processes.

6.7.4 Mitigation and Management

Table 55 summarises all traffic and transport mitigation measures, their effectiveness and residual impacts.

Table 55 Traffic and Transport Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Traffic			
T-1	Impact of construction traffic on road safety and network performance	Pre-construction Construction	Preparation of a Construction Traffic and Pedestrian Management Plan (CTPMP) in consultation with TfNSW and Council to detail the arrangement for construction vehicle routes and access to the construction sites including arrangements for pedestrian safety along streets used by pedestrians.
T-2	Risk of collision with cyclists or riders on rail bridge	Construction	Increased warning signs for all road users during the construction period and identification of the risk in the Drivers Code of Conduct and daily tool box talks.
T-3	Road safety at Perth Street for BESS unit OSOM movements	Construction	Use of pilot vehicles for the BESS unit OSOM turning movements from New England Highway to Perth Street.
T-4	Roads safety at Perth Street and Campbell Street intersection	Construction	Development of a Traffic Guidance Scheme (TGS) at the intersection of Perth Street and Campbell Street to allow for the swept paths of oversized vehicles and opposing semi-trailers. This TGS will only be required if scheduling sees the need for two opposing semi-trailers or for OSOM movements and shall be in place during construction when these vehicles are scheduled.
T-5	Road safety on Wells Gully Road	Construction	Project construction drivers will be directed through a workplace management plan to limit their speed to 40km/h along Wells Gully Road in response to the unsignposted speed limit and lack of curve delineation on the road. Curve alignment markers will be installed for north and south bound movements at the curve north of the switching station to improve readability of the road alignment in this location.
T-6	Road safety New England Highway / Perth Street intersection	Construction	All heavy vehicles approach from north and execute Basic Left Turn into Perth Street only; light vehicles from south directed via Graeme Street channelised right turn.
T-7	Reduce road safety risk associated with High Risk OSOM transformer transport	Construction	Prepare an OSOM Transport Management Plan (TMP) to confirm the OSOM route and associated escort arrangements.
T-8	Road pavement damage	Construction	Pre and post-construction dilapidation survey of Perth Street and approximately 200 m southbound on New England Highway to determine the scope of any required make good works.
T-9	Improve road safety through community awareness	Construction	Provide regular community updates for residents along the New England Highway in the vicinity of the site and on Perth Street and surrounding local roads to advise of construction activities and increased heavy vehicle movements along this route
T-10	Road safety for OSOM	Construction	Obtain the necessary permits for the movement of high risk OSOM prior to OSOM movements, including a Class 1 Heavy Vehicle Access Permit and Transport Management Plan.

Ref	Potential Impact	Phase	Mitigation measures
T-11	Road safety for OSOM	Construction	Prior to OSOM movements, undertake a powerline survey to confirm any overhead powerlines along the route which may need to be lifted, and on-site assessment of any overhanging vegetation (e.g. tree branches) may also be required.
T-12	Road / rail safety for OSOM	Construction	Prior to OSOM movements, consult with rail authorities to confirm any specific conditions or traffic management measures to be adopted during railway crossing manoeuvres in relation to the Selwyn Street crossing.

A schedule of all required road upgrades is provided in **Table 56**.

Table 56 Schedule of Road Upgrades

Road / Location	Required Upgrade	Responsible Party	Timing
Campbell Street extension (St Helier Street and Railway Street)	Construct new access road to Council standards accommodating all delivery and OSOM swept paths	Proponent	Prior to first heavy vehicle movement
Perth Street / Railway Street (Aberdeen)	Construct approximately 229 m ² trafficable area	Proponent	Prior to OSOM transformer delivery
Wybong Road / Kayuga Road (Muswellbrook)	Construct approximately 331 m ² trafficable area; temporarily relocate one traffic sign	EnergyCo / TfNSW	Prior to OSOM transformer delivery
Invermein Street / Stair Street (Kayuga)	Construct approximately 262 m ² trafficable area	EnergyCo / TfNSW	Prior to OSOM transformer delivery
Stair Street / Dartbrook Mine Private Access Road (Kayuga)	Construct approximately 167 m ² trafficable area	EnergyCo / TfNSW	Prior to OSOM transformer delivery
Perth Street and New England Highway (dilapidation zone)	Pre- and post-construction dilapidation survey and reinstatement to pre-existing standard	Proponent	Survey pre-construction; reinstatement within 3 months of construction completion
Wells Gully Road (switching station access)	Curve alignment markers; 40 km/h project speed limit signage; construction access controls per Traffic Control at Work Sites Technical Manual Issue 6.1	Proponent / contractor	Prior to switching station construction commencement

Note: Upgrades at Wybong Road, Invermein Street and Stair Street are committed under the EnergyCo/TfNSW Port to REZ program. Strategic concept designs for the Campbell Street extension will be developed at detailed design stage in accordance with Council requirements.

6.8 Water

6.8.1 SEARs

SEARs	Details
Key Issues - Water and Soils	Assessment of likely impacts on surrounding watercourses (including Strahler Stream Order), groundwater resources and surface water movements, including flooding and pre/post development flood modelling, and measures proposed to monitor, reduce and mitigate these impacts
	A site water balance for the development
	Details of water requirements and supply arrangements for construction and operation (including consultation with suppliers)
	Description of erosion and sediment control measures in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004) and Volume 2A (Landcom, 2008)
	Assessment of hydrology and groundwater impacts (if extraction or interference is proposed), including changes to overland flows and groundwater levels on-site and off-site
	Where works are within 40 metres of any river, lake or wetlands: identify likely impacts to waterfront land and demonstrate compliance with DPI Guidelines for Controlled Activities on Waterfront Land (2018) and Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPE, 2013)
	Identification of flood risk having regard to adopted flood studies, potential effects of climate change and the NSW Flood Risk Management Manual
	Where development could alter flood behaviour or expose users to flood risk: provide a Flood Impact and Risk Assessment (FIRA) prepared in accordance with Flood Risk Management Guide LU01, and detailed design solutions and operational procedures to mitigate flood risk

SLR Consulting Pty Ltd (SLR) has been engaged to prepare a Surface Water Assessment (SWA) including a Flood Impact and Risk Assessment (FIRA) for the Project (refer **Appendix L**), addressing surface water quality, hydrology, flooding, groundwater and water supply requirements.

6.8.2 Existing Environment

6.8.2.1 Topography and Drainage

The BESS area slopes from southeast to northwest, with elevations ranging from approximately 200 mAHD to 183 mAHD. The majority of the BESS site drains westward via two ephemeral creek lines - a first and second order watercourse - which converge into a third order watercourse that crosses the northern property boundary before passing under the Main Northern Railway via a single 1.78 m diameter culvert, then continuing approximately 2.5 km to the Hunter River (refer **Figure 16**).

The transmission easement is intersected by two unnamed tributaries running northwest and includes approximately 1 km of underground cabling within the Wells Gully Road corridor crossing under a single first order drainage line.

The switching station is located on a broad ridge adjacent to Wells Gully (third order) and its tributary (second order), with the upper reaches draining steeply vegetated valleys to the east.

6.8.2.2 Soils

Two soil classifications are mapped across the Site - Sodosols and Natric Kurosols - both characterised by strong texture contrast between surface and subsoil horizons. Many subsoils are highly dispersible and erodible, particularly in the Dochra landscape at the switching station. Acid sulfate soil mapping indicates no known occurrence across the Site. Further detail is provided in the Soil, Land and Agriculture Impact Assessment.

6.8.2.3 Groundwater

The Site is underlain by the Permian Wittingham Coal Measures, forming part of the Hunter Valley fractured rock aquifer system. Groundwater yield is generally low with flow predominantly associated with faults and fractures. No licensed groundwater bores are present on or adjacent to the Site. The GDE Atlas (2022) identifies no Aquatic Groundwater Dependent Ecosystems (GDEs) within the Project area, though Terrestrial GDEs are present within portions of the easement footprint.

The Site is not mapped as a groundwater vulnerability area. A groundwater vulnerability area is mapped approximately 1.2 km west, associated with the Hunter River.

6.8.2.4 Flood Context

The Site is not within the 1% AEP or Probable Maximum Flood extent of the Hunter River. However, the BESS is located adjacent to a minor drainage line, with existing flood ponding occurring upstream of the railway culvert during storm events. The existing Railway Street access road is at grade and is inundated during both minor and major events. No previous flood modelling exists for the local catchment; the WMA 2013 Aberdeen Flood Study was used to inform calibration parameters.

6.8.3 Impact Assessment

6.8.3.1 Construction - Erosion and Sediment

The primary construction risk is ground disturbance exposing dispersive sodic soils, with potential for sediment mobilisation into receiving creek lines. Mitigation includes staged works with progressive revegetation, clean water diversions, sediment basins where required (estimated annual sediment generation exceeds 150 m³), and gypsum treatment of sodic soils subject to high-impact disturbance. An Erosion and Sedimentation Control Plan (ESCP) will be prepared as part of the CEMP in accordance with Landcom (2004). With these measures in place, water quality impacts are considered low and manageable.

6.8.3.2 Operation - Hydrology

Increased imperviousness from concrete pads, sealed roads and compacted hardstand is expected to increase runoff volumes and reduce infiltration. Benching of the BESS will reduce overland flow velocities, and an onsite retention/detention pond at the northwest corner will attenuate peak flows and provide water quality treatment prior to discharge through sediment settlement and controlled release. An isolation valve allows the pond to be sealed in the event of a significant spill. Fire water storage tanks will also contribute to stormwater detention by temporarily retaining hardstand runoff prior to discharge. Preliminary sizing of the pond is 576 kL based on fire water containment requirements; detention storage will be confirmed at detailed design. The switching station is located on a broad ridge above Wells Gully Road; no significant hydrological impacts are anticipated.

Benching will also be used at the switching station site with a proposed average grade of approximately 1.3% to the northwest corner of the area. The site access road will be constructed at grade with a ramp at the bench. Runoff from the site will remain free draining with no culverts required to direct flow under the road. A clean water diversion bund is proposed at the eastern boundary of the switching station to restrict run-on and divert flows around the bench. Use of grass swale, sump or similar methods are proposed to mitigate flow increases

at the switching station.

6.8.3.3 Operation - Water Quality

Battery systems are enclosed within self-bunded weatherproof enclosures providing primary containment of any chemical leakage. The site retention pond provides secondary treatment of all site runoff prior to discharge via sediment settlement, with an isolation valve allowing onsite containment in the event of a significant spill. Electrical infrastructure including transformers will be bunded to 110% of contained oil volume. A water quality monitoring program will be implemented over the first 12 months of operation and reported through the OEMP. Operational maintenance activities involve minor, infrequent disturbance to the hardstand and surrounding ground surface, with negligible water quality risk.

6.8.3.4 Flooding

Flood modelling considers different storm events which are defined based on the chance of a flood happening in any single year. Flood modelling for the Project considered the 10%, 1% and 0.2% (1 in 500) events. The 0.2% flood event is used as a proxy for a climate change scenario where rainfall depths in extreme events are expected to increase.

The flood modelling confirmed the BESS bench will not be inundated under these design events. The flooding extent reaches the northwest corner of the bench but does not overtop it. Two scenarios could result in inundation of the northwest corner (containing the retention pond and water tanks): storms exceeding the 1 in 500 AEP event; or complete blockage of the railway culvert, which alone could produce flood levels of approximately 184.2-186.0 mAHD at the northwest corner. Both scenarios are considered unlikely given the Project's ~25-year design life but are not impossible and have been addressed through design. Any sensitive electrical infrastructure will be located clear of the 0.2% AEP flood envelope. Pre and post development modelling results are summarised in **Table 57**.

Table 57 Pre/Post Development Flood Modelling Summary

Design Event	Pre-Development Peak Flow (m ³ /s)	Post-Development Peak Flow (m ³ /s)	Change (%)	Pre-Development Peak Depth at Railway Culvert (m)	Post-Development Peak Depth at Railway Culvert (m)
10% AEP	5.17	5.26	1.7	2.09	2.11
1% AEP	8.25	8.33	1.0	3.02	3.04
1 in 500 AEP (climate change proxy)	10.13	10.20	0.6	3.80	3.83
Note: Post-development modelling conservatively assumes no detention storage in the retention pond. Changes are within the order of accuracy of the model. No significant impacts to drainage line stability or downstream areas are expected.					

The access road (Railway Street) has been designed to 182.6 mAHD, the maximum level achievable given constraints from the railway corridor, drainage line and existing services. At this level, minor shallow overtopping (<0.06 m, H1 hazard - generally safe for vehicles and people) occurs during the 10% AEP event. The road will be inundated during 1% AEP and larger events, with a maximum depth of 0.95 m (1% AEP) and 1.73 m (1 in 500 AEP), and is classified H4 (unsafe for vehicles and people) at these events. Flood risk management measures include flood warning signs and depth markers, staff awareness, and a flood management plan.

Two 1200 mm x 2400 mm box culverts under the raised road have been sized to minimise changes to upstream flood storage and downstream peak flows, subject to detailed design. The switching station is located above the

1 in 500 AEP flood extent, with adjacent Well Gully flood levels of 203 mAHD at the north and 211 mAHD at the south, both below the lowest bench level of 212.32 mAHD. The flood extent is located over 50 m from the switching station bench.

Climate change has been assessed using the 0.2% AEP (1 in 500) event as a proxy for the SSP3-7.0 mid-term (2050) rainfall scenario, which represents a comparable 26-29% increase over the 1% AEP.

6.8.3.5 Groundwater

No groundwater extraction is proposed. The Project is not expected to have any impact on groundwater resources. Benching and subgrade placement will result in minimal changes to groundwater recharge. No Aquatic GDEs are present within the Project area. Terrestrial GDEs within the easement footprint are unlikely to be materially affected given the minor ground footprint of transmission masts and the ephemeral nature of the drainage lines.

6.8.3.6 Waterfront Land

The BESS, switching station and all transmission masts are located more than 40 m from mapped drainage lines. Watercourse crossings and waterfront land impacts are summarised in **Table 58**. The Project is excluded from requiring approval under Section 91 of the *Water Management Act 2000* as SSD under the EP&A Act.

Table 58 Watercourse Crossings and Waterfront Land

Location	Stream Order	Within 40 m Waterfront Land	Crossing Type	Key Mitigation
Railway Street access road - BESS catchment drainage line	Third order (confluence downstream)	Yes - road crossing within drainage line corridor	Two 1200 mm x 2400 mm box culverts	Culverts sized to maintain pre-development flood storage; scour protection at outlet; road designed to 182.6 mAHD (maximum achievable level given site constraints); Class 4 fish passage classification - culvert crossing suitable
Transmission easement - eastern tributary	First order	No - overhead crossing only	Overhead transmission line	No ground disturbance within drainage line; riparian vegetation base structures retained where clearing required
Transmission easement - western tributary	Second order	No - overhead crossing only	Overhead transmission line	As above
Underground cabling - Wells Gully Road corridor	First order	No - existing road corridor	Underground conduit within road reserve	Existing culvert retained; no new crossing required
Switching station - Well Gully and tributary	Second and third order	No - bench located >40 m from drainage lines	No crossing	All masts and bench located outside drainage lines and flood extent

6.8.3.7 Water Supply

Arrangements for construction water supply will be confirmed by the contractor. UHSC has confirmed that a metered standpipe can be provided at the site for construction water needs. Council has also confirmed that a

permanent water supply connection can be provided to the site to support operations, which can be installed during anticipated roadworks for the Project (refer **Section 6.7**), avoiding additional impacts. Given the low staffing levels during the operational phase, water demand is low at approximately 500 kL per annum.

Wastewater from construction amenities will be removed offsite for treatment. During operation, non-potable demands (battery cleaning, dust suppression, fire water top-up) will be met via mains supply (refer **Appendix R**). Fire water storage of 576 kL will be provided on-site in accordance with AS2419.1. Potable water will be via bottled supply. As the site cannot be serviced by a sewer connection due to the site topography, a septic tank will be provided with a contractor engaged to transport wastewater offsite on a periodic basis for treatment at the Aberdeen Wastewater Treatment Plant.

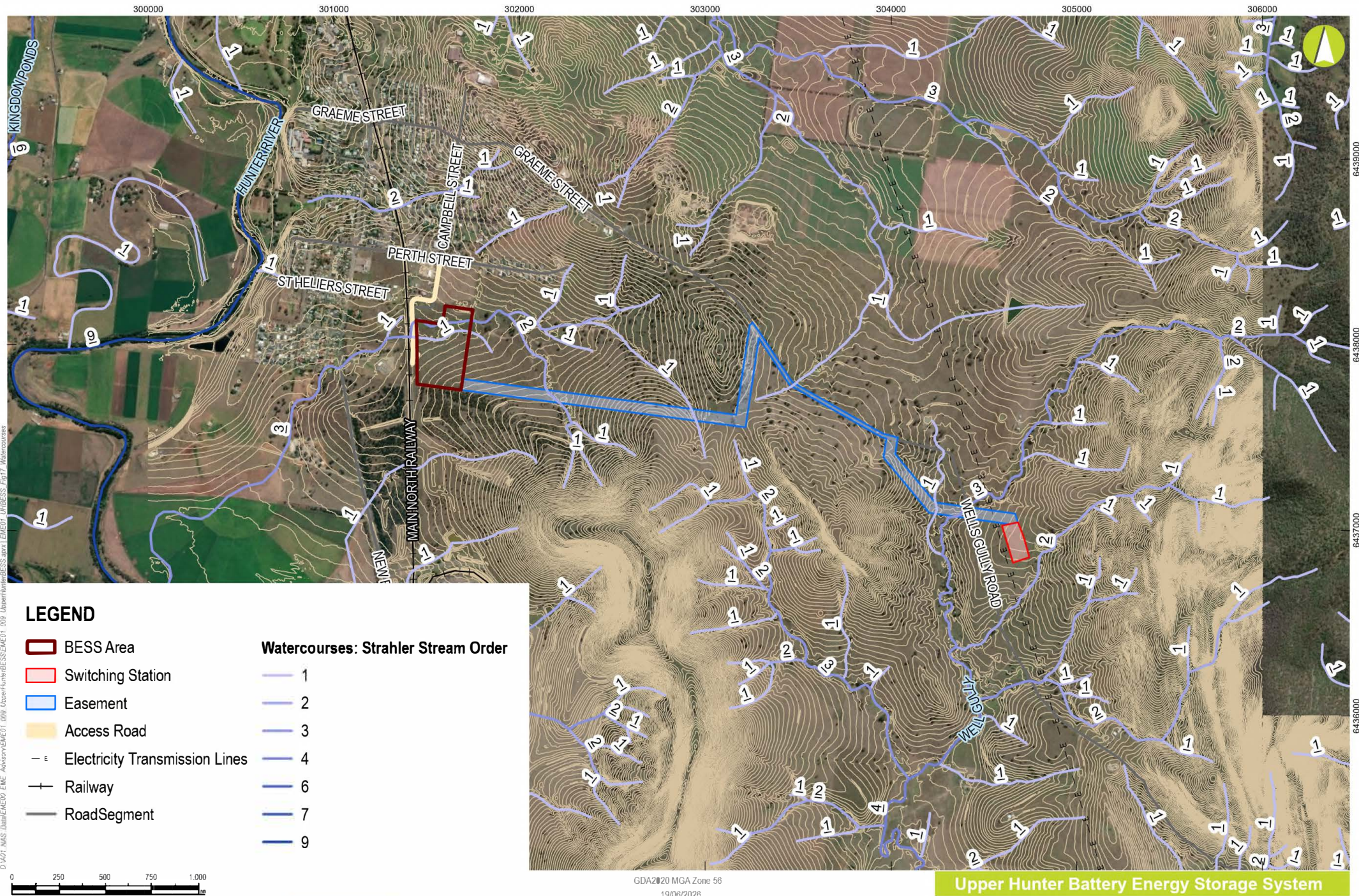
6.8.4 Mitigation and Management

Surface water and flooding mitigation measures are summarised in **Table 59**.

Table 59 Surface Water and Flooding Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Water			
W-1	Flood risk	Operations	Installation of flood warning signs and depth markers along access road in vicinity of the expected flood area to raise awareness of flood risk.
W-2	Flood risk	Operation	Provide suitable culverts under the access road to minimise flood risk to the access road.
W-3	Flood risk	Operation	All BESS enclosures will be elevated above the surrounding ground. Elevation will be increased where unites are located in localised overland flow paths running across the site area.
W-4	Hydrology	Operation	Inclusion of suitable onsite detention within proposed retention pond to mitigate changes to peak flow as a result of the development.
W-5	Hydrology	Operation	Use of subgrade, gravel or vegetation where possible on the bench to increase roughness and reduce flow velocities.
W-6	Hydrology	Operation	Use of grass swale, sump or similar to mitigate flow increases at the switching station as required.
W-7	Erosion and sediment during construction	Pre-construction Construction	Preparation of an Erosion and Sedimentation Control Plan (ESCP) to detail measures to minimise erosion and mobilisation of sediment to waterways.
W-8	Pollution due to spill risk	Construction Operation	Chemicals and hydrocarbon fuels will be stored in bunded areas in accordance with Australian Standards. Substations, transformers and other infrastructure that store or use oil will be bunded. A Spill Response Plan will be prepared including emergency response and EPA notification procedures. Infrastructure to be regular inspected to identify any issues with leakage and test the effectiveness of the spill response plan.

Ref	Potential Impact	Phase	Mitigation measures
W-9	Minimise erosion and sedimentation during decommissioning	Decommissioning	Prepare an Erosion Sediment Control Plan (ESCP) for the decommissioning phase to identify temporary ground cover and revegetation arrangements after removal of BESS and Transmission Line infrastructure.
W-10	Water quality	Construction Operation Decommissioning	All site runoff to be discharged via the site retention pond with requirements for water quality monitoring incorporated into the site Operational Environmental Management Plan (OEMP).
W-11	Water quality / riparian land	Construction	Retain the base structure of any large riparian vegetation to be cleared under transmission lines.



6.9 Bushfire

6.9.1 SEARs

SEARs	Details
Bushfire	Bush fire hazard assessment by a suitably qualified consultant identifying potential hazards and risks associated with bushfires and use of bushfire prone land, and demonstrating compliance with Planning for Bush Fire Protection 2019

Cool Burn Fire and Ecology (Cool Burn) has been engaged to undertake a Bushfire Assessment Report (BAR) (refer **Appendix M**) for the Project. The BAR was reviewed by a Bushfire Planning and Assessment Design (BPAD) Accredited Practitioner recognised by the NSW Rural Fire Service (RFS) and the Fire Protection Association Australia (FPAA) as a suitably qualified consultant in bushfire risk assessment.

6.9.2 Existing Environment

The Site is characterised by managed grassland resulting from historical agricultural land use. The primary bushfire hazard is located immediately to the south and southwest, consisting of plantation forestry characterised by Spotted Gum (*Corymbia maculata*) with significant tree density over a grassy understorey, classified as Forest under Planning for Bushfire Protection 2019 (PBP 2019). Further east along the transmission easement, vegetation transitions between Grassland and Forest formations.

6.9.2.1 Vegetation Categories

Data from the NSW RFS on the NSW Planning Portal Spatial Viewer was used to assess the Bushfire Prone Land (BFPL) vegetation categories applicable to the Site, as described below:

- Vegetation Category 1 is the highest bushfire risk category, requiring a 100m buffer. It has the highest combustibility and likelihood of forming fully developed fires including heavy ember production, consisting of forest, woodlands, heaths, forested wetlands and timber plantations
- Vegetation Category 3 is a medium bushfire risk category requiring a 30m buffer, typically consisting of grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands

As shown in **Figure 17**, Category 1 BFPL occurs immediately to the south of the Site and along portions of the transmission easement. Category 3 BFPL applies to the Site and Switching Station, extending east, south and southwest of the Site.

6.9.2.2 Weather and Climate

The Site is located within the Greater Hunter Fire Weather District, with an accepted Fire Danger Index (FDI) of 100 and a Grassfire Danger Index (GFDI) of 130. The indices provide a measure of potential fire behaviour ranging from zero to 100 plus for bushfires generally (FDI) and zero to 130 plus for grass fires (GFDI). Higher values mean more dangerous fire behaviour and greater fire danger risk. While the Site is located in a District with high fire risk values on the FDI and GFDI, the Site-specific bushfire risk assessment has demonstrated compliance with the NSW RFS criteria when mitigation measures are considered.

The bushfire season generally occurs between October through March, characterised by strong southwest to northwest winds accompanied by high daytime temperatures and low relative humidity.

6.9.2.3 Topography

The Site is located on a lower gully/basin associated with a drainage line, with topography rising to the north

and east and toward Browns Mountain to the southeast. Localised downslopes are present to the south, southwest and west, associated with a watercourse that traverses the Site.

6.9.2.4 Fire History

There is no recorded fire history within 5km of the Site. Four fires have been recorded within a 15km radius over several decades, summarised in **Table 60**.

Table 60 Fire History within 15km

Fire event	Year	Area burnt (ha)	Cause
Barton Street Scone bushfire	2023/24	1,157	Arson
Needles bushfire	2008/09	182	Unknown
Nandowra Grassfire	2008/09	161	Lightning
Glenbawn State Recreation Area bushfire	1990/91	101	Arson

6.9.3 Impact Assessment

Bushfire Attack Level (BAL) contours were determined having regard to vegetation formation (Forest and Grassland), effective slope and the relevant fire weather district FDI. Slopes to the south, southwest and west of the Site are conservatively assessed as downslope 0-5°, consistent with the localised topographic context described in **Section 6.9.2.3**. The BAL setback distances applied are summarised in **Table 61** and the resulting BAL contours are shown in **Figure 18- Figure 20**.

Table 61 BAL Setback Distances (metres)

Vegetation / Slope Class	BAL Flame Zone	BAL-40	BAL-29	BAL-19	BAL-12.5	BAL-Low
Flat - Upslope						
Forest vegetation	<18	18–<24	24–<33	33–<45	45–<100	>100
Grassland vegetation	<8	8–<10	10–<15	15–<22	22–<50	>50
Downslope 0–5°						
Forest vegetation	<22	22–<29	29–<40	40–<54	54–<100	>100
Grassland vegetation	<9	9–<12	12–<17	17–<25	25–<50	>50

Initial modelling identified that the southern end of the Project infrastructure would fall within the BAL Flame Zone, where radiant heat exposure would exceed 40kW/m² with a significantly higher likelihood of direct flame contact from a fire front. In response, Maizewood modified the siting of the Project by relocating BESS infrastructure further from the southern vegetation boundary, reducing radiant heat exposure at the southern end to BAL 29 (29kW/m²) or less. Following this design evolution, no critical infrastructure remains within the BAL Flame Zone or BAL 40 extents.

Early consultation was requested with the RFS and Fire and Rescue NSW, both of whom confirmed the Project

would be reviewed during the submission phase. The NSW Fire and Rescue - Aberdeen brigade attended a Project community information session where information about the Project and impact assessments was provided, and have met directly with the project team on two separate occasions.

With the mitigation measures detailed in **Section 6.9.4**, the Project demonstrates compliance with the aims and objectives of PBP 2019.

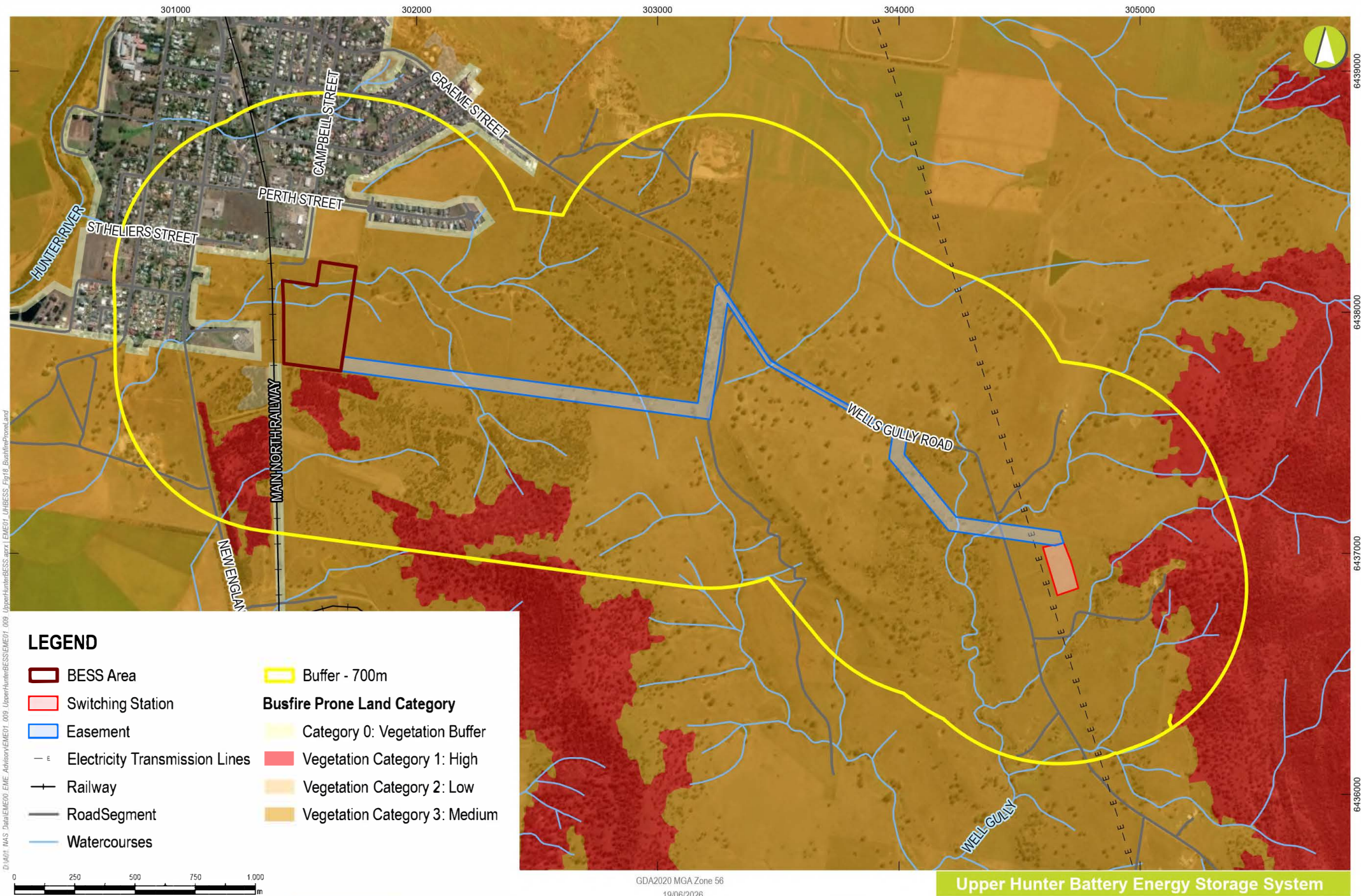
6.9.4 Mitigation and Management

Table 62 summarises all mitigation measures, their effectiveness and residual impacts.

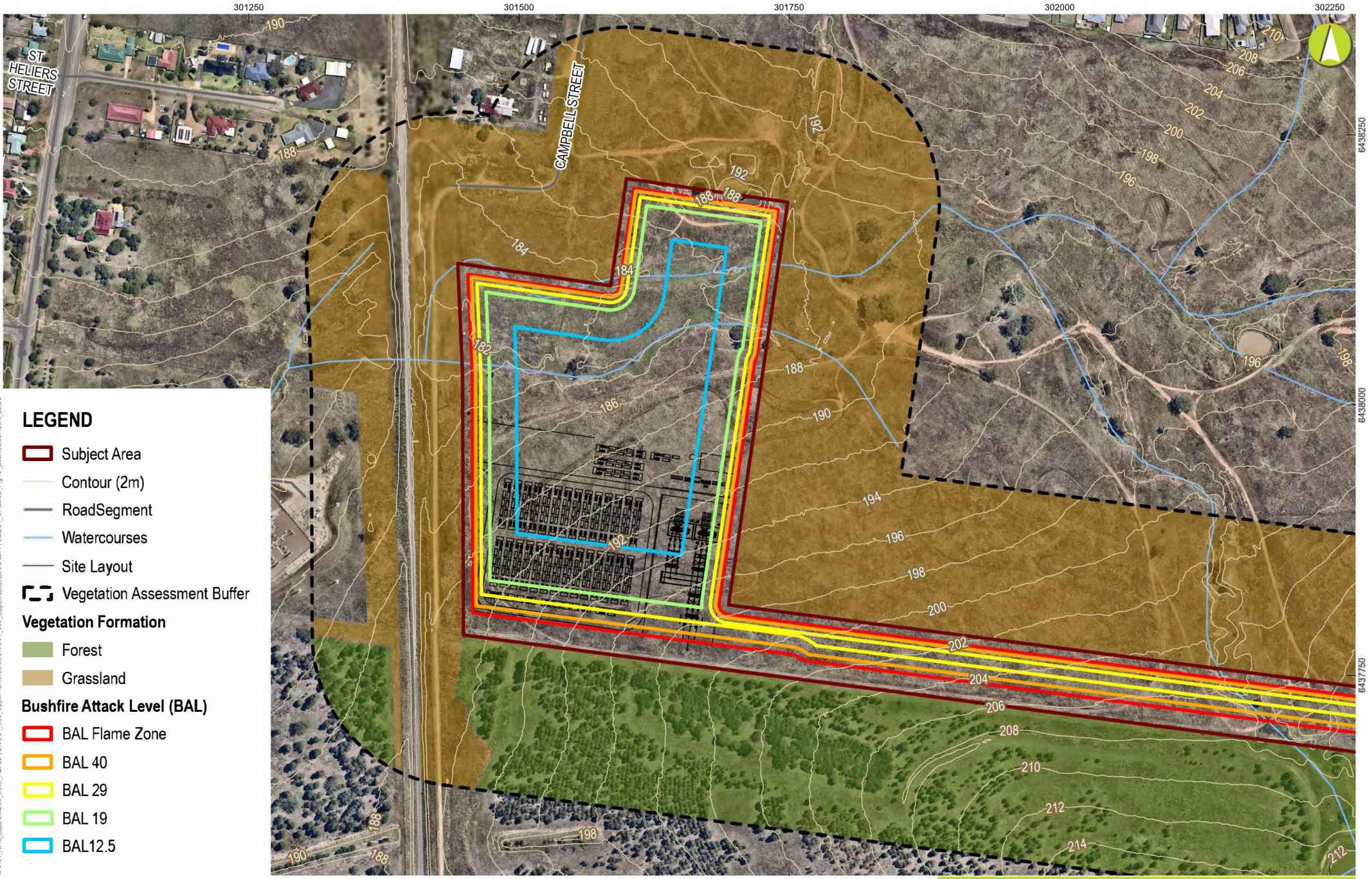
Table 62 Bushfire Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Bushfire			
BF-1	Effective emergency response management	Pre-construction	An emergency management plan will be prepared in consultation with the NSW RFS for the management of a bushfire incident and include the following: • Detailed measures to prevent or mitigate fires igniting such as hot works permits for works which may result in the ignition of fire and a ban on hot works on Total Fire Ban days, or when local authorities or the Site Manager deems weather conditions too dangerous. • 24-hour emergency contact details including alternative telephone contact • Inductions for construction personnel on bushfire risk management, other fire related risks, and emergency response procedures that could present during construction and operation • Availability of fire-suppression equipment, access, and water including site infrastructure plans and site access and internal road plans • Location of hazards (physical, chemical, electrical) that will impact on the firefighting operations and procedures to manage any identified hazards during firefighting • Storage, maintenance and appropriate signage of any flammable or hazardous materials • Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a high fire danger period (as declared by the NSW RFS) to ensure weather conditions are appropriate • Situational awareness and evacuation planning, including: ○ how situational awareness will be managed (bushfire alert levels, local fire weather information sources and details) ○ fire response and evacuation matrix ○ evacuation procedures, evacuation routes, and neighbourhood safer places.
BF-2	Infrastructure exposure to radiant heat	Operation	Implementation of minimum 10 m Asset Protection Zone (APZ) between infrastructure and the bushland interface in accordance with the Bushfire Report. Minimum 10 m defendable space to be established around the Switching Station.

Ref	Potential Impact	Phase	Mitigation measures
			The APZs must be managed and maintained for the life of the development to the standard of an Inner Protection Area (IPA).
BF-3	Increased fire risk from landscaping	Operation	The entire BESS Area and Switching Station APZ should be established and managed to the prescribed standards for an Inner Protection Area (IPA) as detailed in PBP 2019 Appendix 4. The landscaping and vegetation will be managed for the life of the Project under a landscape or vegetation management plan to the standards of an IPA to ensure the activities are delivered with regularity and the above criteria can be consistently achieved. The transmission easement should be maintained in a reduced fuel condition by avoiding tree growth. Any fencing and gates installed for the Project need to be made of non-combustible material only.
BF-4	Bushfire risk to temporary construction facilities	Construction	Implement the following bushfire protection objectives for temporary construction offices and amenities: • Provision for safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupant egress for evacuation • Provide suitable emergency and evacuation arrangements for occupants of the development • Provide adequate services of water to assist management of fire risk, during and after the passage of bushfire • Storage of combustible materials away from the hazard and asset wherever possible
BF-5	Water supply for fire fighting	Operation	The Project will include a water supply dedicated for RFS use at the BESS via a minimum 20,000L volume water tank (Static Water Supply) dedicated for bushfire protection or extension of the reticulated water supply to the site. Connection to the water supply to be in accordance with RFS requirements.
BF-6	Risk of ignition due to transmission line contact with vegetation	Operation	No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines. The transmission easement should be maintained in a reduced fuel condition avoiding tree growth.



Q:\M01_NAS Data\EME000 ENE Advisory\EME01_009 UpperHunterBESS and LEME01_UHBESS_Fig18_BushfireProneLand



LEGEND

- Subject Area
- Contour (2m)
- RoadSegment
- Watercourses
- Site Layout
- Vegetation Assessment Buffer

Vegetation Formation

- Forest
- Grassland

Bushfire Attack Level (BAL)

- BAL Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL12.5



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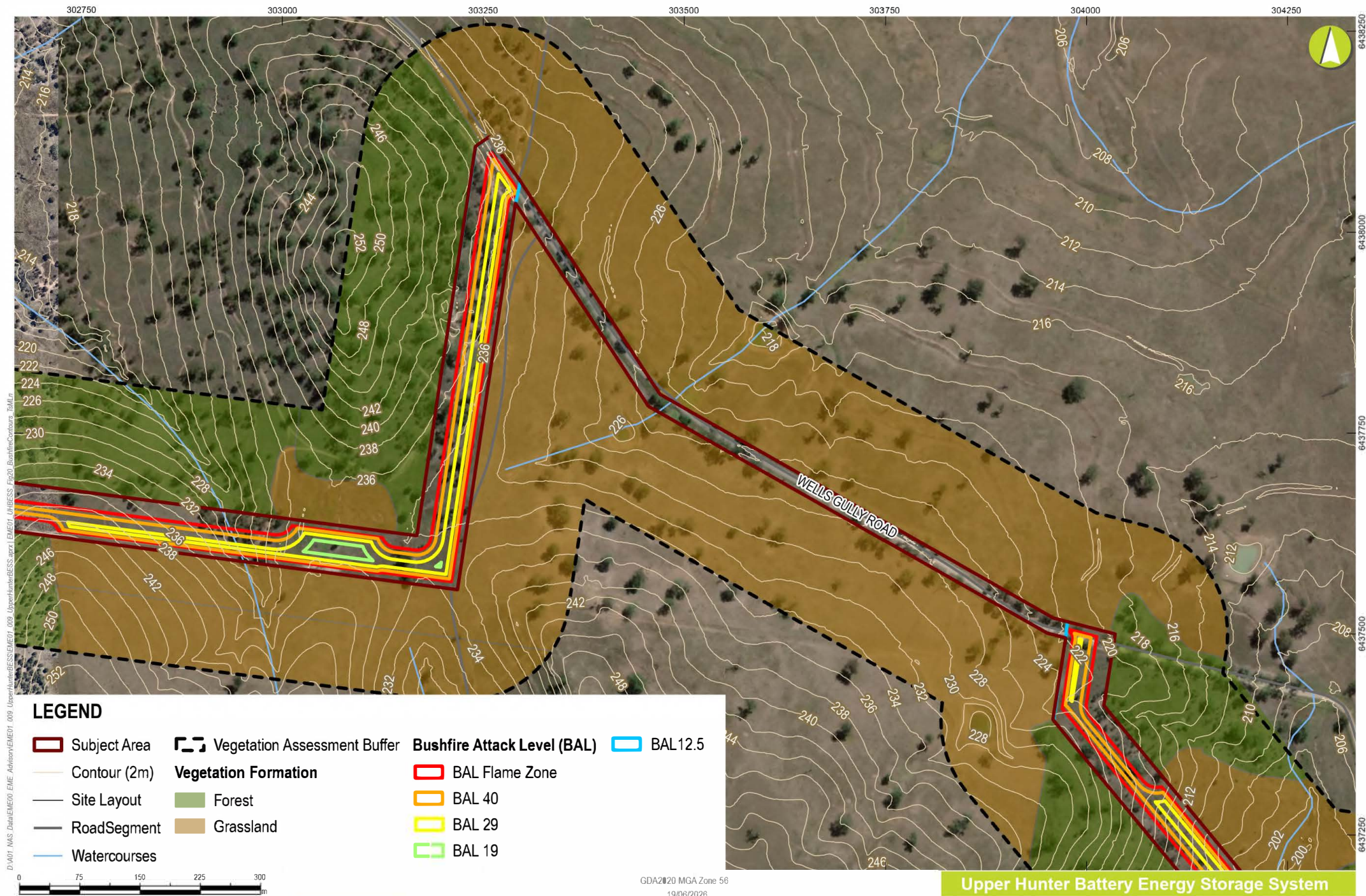
Upper Hunter Battery Energy Storage System



Sheet Size: A4
Source: LPI (Spatial NSW, 2026); BESS Data (EME Advisory, 2026); BAL Data (Coolburn Fire Ecology, 2026)

Bushfire Contours - BESS

FIGURE 18



6.10 Hazards

6.10.1 SEARs

SEARs	Details	EIS Section
Key Issues - Hazards	Health: assessment of potential hazards and risks including fires, spontaneous ignition, electromagnetic fields and proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (EMF)	Appendix N; Section 6.10
	Dangerous Goods: preliminary risk screening completed in accordance with the Hazards SEPP 2021	Appendix N; Section 6.10
	BESS - Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 (DoP, 2011) and Multi-Level Risk Assessment, considering all recent standards and codes, verifying separation distances to on-site and off-site receptors to prevent fire propagation, demonstrating compliance with HIPAP No. 4, and considering the effect of bushfires on batteries and other BESS components	Appendix N; Section 6.10

A Preliminary Hazard Analysis (PHA) has been prepared by Sherpa Consulting Pty Ltd (Sherpa) (refer **Appendix N**) for the Project. The PHA identifies and assesses credible hazards associated with the proposed operation of the BESS, determines risk acceptability from a land use safety planning perspective, and verifies that the proposed BESS capacity can be accommodated within the Site with appropriate separation distances to on-site and off-site receptors.

6.10.2 Existing Environment

The Site is located on Railway Street, Aberdeen, approximately 2 km south of the Aberdeen township, within both the Upper Hunter Shire and Muswellbrook Shire LGAs. The Site is located within the Hunter Central-Coast Renewable Energy Zone. The overall Site footprint is 10.45 ha, with a Site of approximately 5.2 ha.

Land uses to the north and east are primarily general residential and industrial; to the west, infrastructure and mixed use; and to the south, environmental management. The Main Northern Railway runs approximately 40 m to the west, carrying both passenger and freight trains. The separation distance exceeds the 20 m threshold at which derailment protection assessment would be required under AS 5100.2:2017.

The nearest non-associated off-site receptor is an existing substation approximately 166 m west of the nearest battery unit. The nearest area zoned for general residential use is 65 m from the nearest battery unit, and Aberdeen township is approximately 2 km to the north.

6.10.3 Impact Assessment

6.10.3.1 Dangerous Goods

A preliminary risk screening completed in accordance with the Hazards SEPP 2021 found that no applicable SEPP screening thresholds are exceeded for the storage or transport of hazardous materials associated with the Project. The Project is not considered a potentially hazardous industry in this regard. Notwithstanding this finding, the SEARs require a PHA to be completed for the BESS, which is addressed below.

6.10.3.2 BESS Hazard Assessment

Sixteen hazardous events were identified through the Hazard Identification (HAZID) process, covering electrical

faults, arc flash, battery unit fire, transformer fire, bushfire encroachment, chemical release, explosive gas generation, thermal runaway, EMF exposure, water ingress, vandalism, cyber sabotage, lightning strike, seismic events and train derailment. The effect of bushfire on BESS components was specifically considered, with bushfire identified as a credible initiating cause of battery unit fire across multiple HAZID events; the 10 m APZ (refer Section 1.4) is the primary control.

Consequence analysis was undertaken for the two scenarios with potential for off-site impact: a single battery unit fire (heat radiation and hydrogen fluoride (HF) toxic dispersion) and transformer fires. Results are summarised in **Table 63**.

Table 63 Consequence Analysis Summary

Scenario	Consequence	Maximum Impact Distance	Nearest Site Boundary	Off-site Impact?
Battery unit fire	Heat radiation - injury (4.7 kW/m ²)	14 m	26 m (west)	No
Battery unit fire	Heat radiation - fatality (12.6 kW/m ²)	8 m	26 m (west)	No
Battery unit fire	HF toxic dispersion - irritation (AEGL-1)	23 m	26 m (west)	No
Battery unit fire	HF toxic dispersion - injury (AEGL-2)	11 m	26 m (west)	No
BESS transformer fire	Heat radiation	Localised	20 m (west)	No
Substation transformer fire	Heat radiation	Localised	17 m (west)	No

The maximum consequence distance of 23 m (HF AEGL-1, daytime conditions) associated with the toxic gas dispersion is within the 26 m separation to the nearest Project Site boundary. The nearest non-associated residence is 166 m from the nearest battery unit and the nearest area zoned for general residential use is 65 m away. The concept layout has been designed incorporating Original Equipment Manufacturer (OEM)-specified clearances (3.050 m front, 1.500 m side, 0.508 m back-to-back) and the designated compound area is confirmed as sufficient to accommodate the proposed 920 MWh registered capacity.

Of the 16 identified events, 15 are rated Very Low risk against the AS/NZS 5139:2019 risk matrix. The one Medium risk event relates to vandalism by an unauthorised person with potential for self-injury on-site. No off-site impact is expected and security fencing, cameras and warning signage reduce the likelihood to Rare. All events are assessed as presenting negligible societal risk.

The Project meets all four HIPAP No. 4 qualitative risk criteria:

- Avoidable risks avoided - Lithium Iron Phosphate (LFP) battery chemistry is justified on cost and availability grounds; the Site location provides large separation distances to off-site receptors
- Major hazard risks reduced - no significant off-site impacts from any identified event
- Likely events contained within Site boundary - confirmed by consequence analysis
- No existing high-risk hazardous installation in the vicinity - none identified

6.10.3.3 EMF

EMF generated by the Project will not exceed the ICNIRP occupational exposure reference level at the Site boundary. Given the rapid attenuation of field strength with distance, the general public reference level (5,000 V/m electric field; 200 µT magnetic field at 50 Hz) will not be exceeded at off-site receptors, and impacts to

surrounding land uses are assessed as negligible.

6.10.4 Mitigation and Management

Table 64 summarises the hazard mitigation and management measures for the Project.

Table 64 Hazard Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Hazards			
H-1	Impacts from project hazards or incidents	Operation	Implementation the controls identified in the project HAZID register provided in the PHA.
H-2	Unauthorised access and vandalism	Operation	Secure perimeter fencing, security cameras and warning signage around BESS compound
H-3	Risk of BESS unit fire propagation	Operation	Battery units will be installed in accordance with OEM clearance requirements identified in the PHA to minimise the risk of propagation of BESS unit fires.
H-4	Transformer fire.	Operation	AS 2067 horizontal clearances will be maintained for all BESS MV transformers. Where clearances cannot be maintained, fire walls will be provided.
H-5	EMF exposure - general public	Operation	Perimeter fencing will be installed and maintained to limit general public access to distances where International Commission on Non-Ionizing Radiation Protection (ICNIRP) general public reference levels are not exceeded. The project will procure electrical equipment designed and procured to comply with relevant international and Australian standards
H-6	EMF exposure - on-site workers	Operation	The site will be operated to ensure ICNIRP occupational reference levels are not exceeded including warning signage and training in relation to high-field areas.
H-7	Emergency response	Pre-construction, Operation	An Emergency Response Plan will be developed prior to construction commencement, in consultation with Fire and Rescue NSW and the NSW RFS, covering fire response, evacuation procedures and hazardous materials management.

6.11 Social and Economic

6.11.1 SEARs

SEARs	Details
Key Issues - Social	Assessment of social impacts or benefits for the region and State in accordance with the Social Impact Assessment Guideline (DPE, 2023)
	Consideration of any increase in demand for community infrastructure and services
	Consideration of construction workforce accommodation

As the Project is State Significant Development (SSD) a Social Impact Assessment (SIA) has been prepared by The Social Aspect (refer **Appendix O**) in accordance with the DPHI Social Impact Assessment Guideline (DPHI, 2025), supporting Technical Supplement (DPHI, 2025a) and Engagement Guidelines (DPHI, 2026). A Preliminary Accommodation Strategy has also been prepared (refer **Appendix Q**) to address construction workforce accommodation as required under the SEARs.

6.11.2 Existing Environment

6.11.2.1 Social Locality

The SIA nominates both the Aberdeen Urban Centre and Locality (UCAL) and the Muswellbrook UCAL as the Project's social locality (refer **Figure 21**), on the basis that the Project's potential social impacts (positive and negative) would be experienced by residents of both Aberdeen and Muswellbrook as the closest service centres. The regional and local context of the Site is described in **Section 1.5**.

Key characteristics of the social locality are detailed in the social baseline section of the SIA and summarised in **Table 65**.

Table 65 Community Profile (ABS, 2021)

Characteristic	Aberdeen UCAL	Muswellbrook UCAL	NSW
Population	1,872	10,901	8,072,163
Aboriginal and/or Torres Strait Islander	199 (10.6%)	1,428 (13.1%)	278,043 (3.4%)
Median age	41	36	39
All private dwellings	858	5,000	3,357,785
Average people per household	2.4	2.5	2.6
Median weekly household income	\$1,375	\$1,547	\$1,829
Median monthly mortgage repayments	\$1,500	\$1,517	\$2,167
Median weekly rent	\$280	\$300	\$420
Average motor vehicles per dwelling	2.0	1.8	1.8

6.11.2.2 First Nations Community Context

Aboriginal cultural heritage matters are addressed in **Section 6.3**. First Nations people represent a significantly higher proportion of the local population than the NSW average, with a young age profile that extends long-

term community exposure to Project impacts. The Wonnarua Nation Aboriginal Corporation and the Wanaruah LALC were engaged during the SIA, with their priorities informing the Project's proposed community benefit commitments such as cultural support, financial sustainability and Close the Gap targets (refer **Section 6.11.4**).

6.11.2.3 Social Infrastructure

Aberdeen and Muswellbrook are serviced by a range of social infrastructure including health facilities, aged care, schools, emergency services, places of worship and recreation facilities, as mapped in the SIA (refer **Appendix O**, Figures 4 and 5). Both communities carry a higher burden of chronic ill-health than the NSW average - in Aberdeen, 12.0% of residents reported asthma, 11.8% arthritis, 6.8% diabetes and 10.1% a mental health condition; in Muswellbrook the equivalent figures are 11.6%, 10.0%, 5.9% and 11.6% respectively, each exceeding NSW averages. Only 54.0% of Aberdeen residents and 53.7% of Muswellbrook residents reported no long-term health condition, compared with 61.0% statewide.

The data underline the importance of minimising impacts from the Project that could potentially affect health and supporting workforce health and safety measures, and support for local health service capacity when assessing social impacts in the Aberdeen and Muswellbrook communities

6.11.2.4 Housing and Long-Term Rental Market

Both Aberdeen and Muswellbrook are predominantly low-density housing markets. Median weekly rent is \$280 in Aberdeen and \$300 in Muswellbrook, below the NSW median of \$420. Median weekly household income is \$1,375 in Aberdeen and \$1,547 in Muswellbrook, both below the NSW median of \$1,829.

Rental tenure accounts for 24.1% of occupied dwellings in Aberdeen and 35.8% in Muswellbrook. Among renters, approximately one-third in both centres are in rental stress, paying more than 30% of household income on rent (32.2% in Aberdeen, 34.0% in Muswellbrook). A survey of rental property vacancies conducted in January 2026 identified a combined total of 219 available bedrooms across Aberdeen, Muswellbrook and Scone.

Rental market conditions across the Hunter subregion have tightened progressively over recent years. The subregion recorded a vacancy rate of 2.0% in April 2023, below the 3.0% threshold generally considered indicative of a balanced market. By June 2025, the vacancy rate had declined further to 1.1%, with median house rents increasing to \$570 per week (PRD 2025). Given these conditions, long-term residential rentals are not considered an appropriate primary accommodation source for the Project's construction workforce, as worker demand would place additional pressure on an already constrained market and risk displacing existing residents.

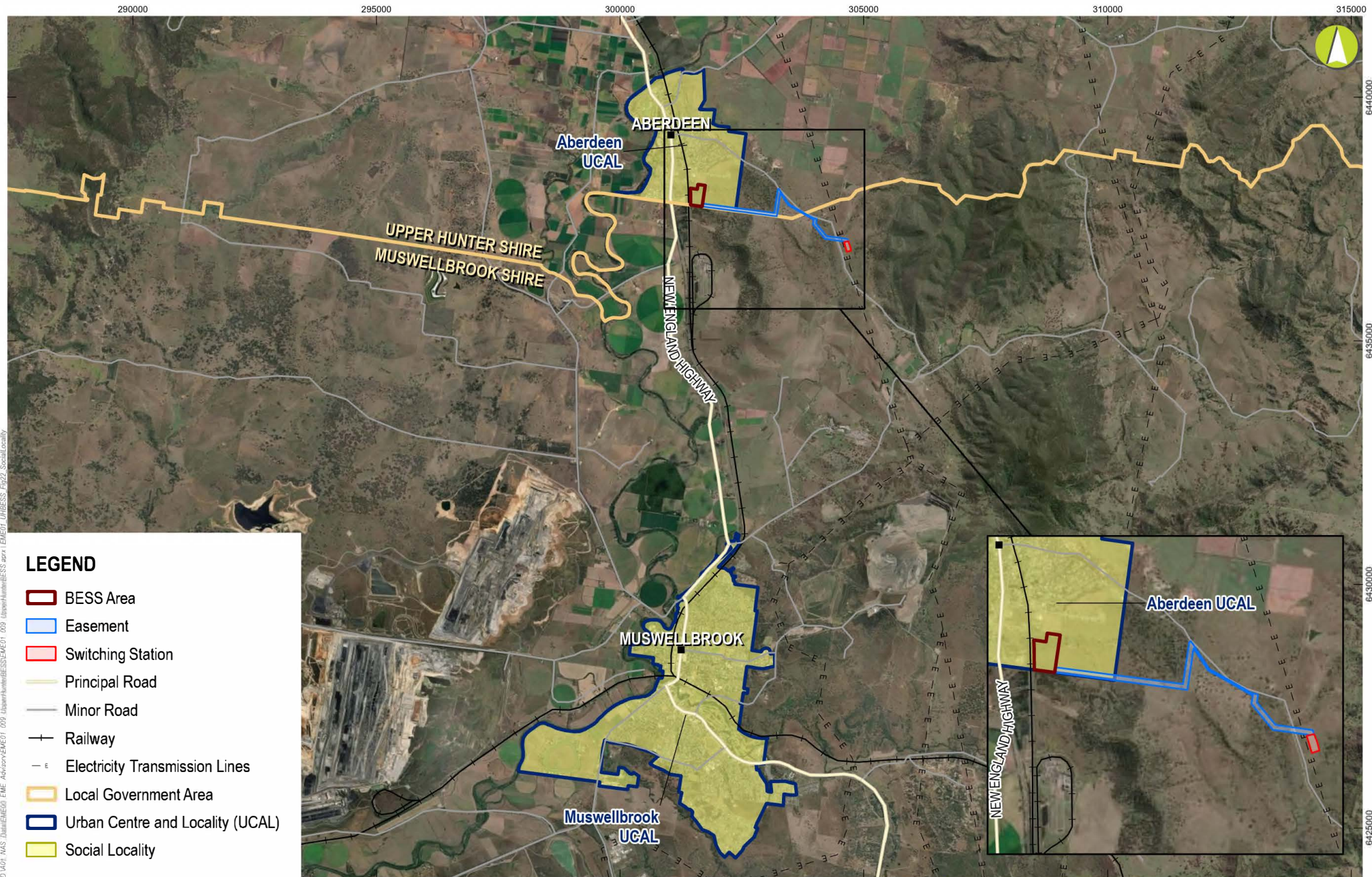
6.11.2.5 Short-Stay Accommodation Supply

A review of short-stay accommodation availability across Aberdeen, Muswellbrook, Scone and Singleton has been undertaken as part of the Preliminary Accommodation Strategy (**Appendix Q**), using publicly available booking platform data and direct operator enquiries. Room numbers are indicative, as some platforms limit display of total inventory. The combined identifiable short-stay capacity across the four towns is summarised below:

- Aberdeen - approximately 27-30 rooms/units, comprising motel and pub-style rooms (25) and short-stay/Airbnb-style properties.
- Muswellbrook - approximately 302 rooms/units, comprising 10-12 motels and hotels (232 rooms), caravan park cabins (37), and short-stay/Airbnb-style properties (33 units). Muswellbrook is identified as the primary base for non-local workers given the concentration of supply and established history of hosting mining and construction workforces
- Scone - approximately 145 rooms/units, comprising motels and boutique hotels (121 rooms), caravan park cabins (12) and short-stay properties (12 units). Scone experiences marked seasonal demand pressure during the annual Scone Horse Festival (held each May) and is therefore treated as a supplementary base outside major event periods

- Singleton - approximately 270-290 rooms/units, providing overflow capacity with a demonstrated history of hosting transient workforces. Singleton is designated as the primary contingency location in the event local supply is constrained

The combined identifiable short-stay supply across the four towns is approximately 700 rooms/units.



LEGEND

- BESS Area
- Easement
- Switching Station
- Principal Road
- Minor Road
- Railway
- Electricity Transmission Lines
- Local Government Area
- Urban Centre and Locality (UCAL)
- Social Locality

0 1,000 2,000 3,000 4,000
Scale: 1:100,000



Sheet Size: A4
Source: LPI (Spatial NSW, 2026); BESS Data (EME Advisory, 2026); Social Data (The Social Aspect, 2026)



GDA2020 MGA Zone 56
25/06/2026

Upper Hunter Battery Energy Storage System

Social Locality

FIGURE 21

6.11.3 Impact Assessment

The SIA identifies and assesses social impacts across seven categories defined in the NSW DPHI SIA Guideline (2025): Way of Life, Community, Accessibility, Culture, Health and Wellbeing, Surroundings and Livelihoods. Impacts are assessed against a likelihood-magnitude significance matrix, with significance levels ranging from Negligible to Very High. Impacts have been identified and assessed drawing on engagement inputs, secondary data sources and technical studies undertaken for the EIS.

6.11.3.1 Project Refinements

Prior to finalisation of the EIS, a number of Project design refinements were made in direct response to stakeholder feedback and technical assessment findings, as summarised in **Table 66**.

Table 66 Project Refinements

Stakeholder Feedback	Project Refinement	Status
BESS Unit Noise Attenuation	Noise walls incorporated into the design to reduce acoustic impacts to neighbouring residents (refer Section 6.6)	Adopted
Site Design	The site of the BESS was selected to avoid the northern lots which would have resulted in the BESS units being located closer to the Perth Street residential area and involved vegetation clearing and potential impacts to a watercourse. The site selection also avoided land with a Flame Zone classification, partially addressing community concerns about fire risk and ecological impacts	Adopted
BESS Unit Product Selection	The product selected initially had a louder noise profile than the product now forming part of the Project. The quieter product was chosen to mitigate noise impacts	Adopted
Visual amenity	A Concept Landscape Plan has been developed which describes the approach to vegetation screening to reduce the visual impact of BESS infrastructure.	Adopted

6.11.3.2 Social Impact Assessment

The predicted social impacts of the Project are summarised in **Table 67**. Unmitigated and residual significance ratings have been determined in accordance with the likelihood-magnitude matrix in the SIA.

Table 67 Social Impact Assessment Summary

Impact	Category	Phase	Likelihood	Magnitude	Significance (unmitigated)	Residual significance
Positive impacts						
Project-funded community initiatives and donations	Community	Construction and operation	Likely	Major	High	High
Energy diversification and access to renewable energy	Accessibility	Operation	Likely	Moderate	High	No change

Impact	Category	Phase	Likelihood	Magnitude	Significance (unmitigated)	Residual significance
Support for LALC cultural activities and programs	Culture	Construction and operation	Likely	Moderate	High	High
Employment opportunity	Livelihoods	Construction and operation	Likely	Moderate	High	High
Financial support for First Nations organisations	Livelihoods	Construction and operation	Possible	Moderate	Medium	High
Negative impacts						
Rifle club property access restrictions	Way of life	Construction	Likely	Moderate	High	Low
Construction workforce accommodation	Accessibility	Construction	Likely	Moderate	High	Medium
Fire risk - perceived health and wellbeing concern	Health and wellbeing	Operation	Likely	Moderate	High	Low
EMF and gas exposure - perceived health and wellbeing concern	Health and wellbeing	Operation	Almost certain	Moderate	High	Low
Impact to aquatic ecosystems	Surroundings	Construction and operation	Possible	Moderate	Medium	Low
Visual and acoustic amenity	Surroundings	Construction and operation	Possible	Moderate	Medium	Low

6.11.3.3 Construction Workforce Accommodation

Based on the occupational profile of the Upper Hunter SA3 labour catchment, a blended workforce is anticipated, with local workers filling the majority of civil and general construction roles and specialist roles sourced from outside the region.

Accommodation demand has been modelled assuming 40% non-local workforce during early works and demobilisation, increasing to 50% during the civil works phase and 60% during the peak civil, battery installation and electrical commissioning overlap (months 7-18 of construction). This produces a peak accommodation requirement of approximately 57 beds. Demand is concentrated within a 9-12-month window during the mid-construction phase, with materially lower requirements outside this period.

6.11.3.4 Estimated Development Cost

An Estimated Development Cost (EDC) report has been prepared by Muller Partnership (refer **Appendix P**) in accordance with the EP&A Act, EP&A Regulation, relevant SEPPs and Planning Circular PS 24-002 (February 2024). The total project cost is summarised in **Table 68**.

Table 68 Estimated Development Cost Summary

Cost Element	Total (\$)
Total Construction Cost	\$290,157,702
Biodiversity Offsets	\$3,028,990
Locality Allowance (9%)	\$26,114,193
Escalation (5% p.a.)	\$5,154,305
Contingency (5%)	\$3,953,344
Professional Fees (5%)	\$153,178
Authority Fees (0.25%)	\$725,394
Total Project Cost	\$329,287,106

6.11.3.5 Cumulative Social Impacts

The SIA identifies five major development proposals within the Upper Hunter Shire and Muswellbrook Shire LGAs with potential to generate cumulative social impacts when considered alongside the Project. These were identified through a search of the NSW DPHI Major Projects Planning Portal conducted in March 2026, limited to major SSDs within the two LGAs that are currently seeking approval or under assessment. Planning applications for modifications to projects already in operation were excluded on the basis that they are not considered of sufficient scale to generate cumulative social impacts. The five projects identified are the Liverpool Range Wind Farm, Sandy Creek (Muswellbrook) BESS, Muswellbrook BESS, New England REZ Transmission Project, and Kayuga Solar Farm. The construction programs of these projects have not been confirmed, and the extent of temporal overlap with the Project remains subject to change as individual approvals and procurement timelines evolve.

Muswellbrook Shire Council has modelled the cumulative temporary construction workforce associated with all proposed and approved SSD projects across the Upper Hunter and Muswellbrook region. This modelling indicates a regional peak of up to 4,500 temporary workers concentrated between 2027 and 2029, a period that coincides with the Project's anticipated construction program. Given the regional rental vacancy rate of 1.1% and limited short-stay supply across Aberdeen, Muswellbrook and Scone, cumulative workforce accommodation demand represents the most significant cumulative social risk, assessed as High if construction programs overlap as modelled.

Competition for specialist labour and contractors across concurrently active projects is assessed as a moderate cumulative risk, with the strongest pressure expected on HV electricians, commissioning technicians and specialist riggers, which are in high demand across the NSW renewable energy pipeline. Increased heavy vehicle movements on regional roads during overlapping construction periods are assessed as a low to moderate cumulative risk and are addressed in the traffic and transport assessment (refer **Section 6.7**). Community consultation fatigue arising from concurrent renewable energy approvals processes is identified as a low-level cumulative social risk, noting that all five identified projects are progressing through similar community

engagement obligations simultaneously. The Project's engagement strategy has responded to by using a broad range of mechanisms to target engagement with community and stakeholders.

6.11.4 Mitigation and Management

Table 69 summarises all social impact enhancement and mitigation measures, their effectiveness and residual impacts. The supporting social impact monitoring and management framework is contained in the SIA (**Appendix O**) and the Preliminary Accommodation Strategy (**Appendix Q**).

Table 69 Social and Economic Mitigations

Ref	Potential Impact	Phase	Mitigation measures
Social and Economic			
SE1	Community	Construction and operation	Ensuring the Community Benefit Scheme (CBS) is finalised and operational upon the project reaching final investment decision.
SE2	Accessibility	Operation	Ensuring the Community Benefit Scheme (CBS) is finalised and operational upon the project reaching final investment decision and includes provision for energy diversification and access to renewable energy upon the project reaching final investment decision
SE3	Culture	Construction and operation	Ensuring the CBS is finalised and operational upon the project reaching final investment decision and includes provision for the following nonpecuniary and in-kind initiatives preferred by the LALC: • Support for WLALC to establish an Indigenous Nursery • Support for the LALC Black Roo initiative and Indigenous Artwork procurement for Project • Participation in and support for Cultural Heritage training provided by the LALC.
SE4	Livelihoods	Construction and operation	Develop and implement Workforce Recruitment Strategy with local employment targets
SE5	Livelihoods	Construction and operation	Ensuring the CBS is finalised and operational upon the project reaching final investment decision and includes the provision of financial support for the LALC and Wonnarua Nation Aboriginal Corporation.
SE6	Way of life	Construction	Develop a Traffic Management Plan (TMP) that enables uninhibited rifle club member access to the rifle club property during Project constructions. Continued liaison with rifle club management and advanced notification about any construction activities.
SE7	Accessibility	Construction	Develop and implement a Project Workforce Accommodation Strategy which does not increase demand on local accommodation.
SE8	Health and wellbeing	Operation	Preparation of a succinct, plain-English summary of the preliminary hazards assessment report, including fire risk, EMF and gas exposure, to be made available on the Project website and emailed to all people that participated in SIA engagement activities and raised the concerns.

Ref	Potential Impact	Phase	Mitigation measures
SE9	Surroundings	Operation	Address perceived aquatic ecosystem impacts by preparing a succinct, plain-English summary of the SLR (2025) reports and make it available on the Project website and emailed to all people that participated in SIA engagement activities and raised the concerns.
SE10	Surroundings	Construction and operation	Implement on-site runoff controls per surface water assessment (Appendix L); prepare plain-English summary of findings for distribution via Project website
SE11	Surroundings	Construction and operation	Implementation noise and visual mitigation measures identified in the EIS.

6.12 Waste

6.12.1 SEARs

SEARs	Details
Key Issues - Waste	Identify, quantify and classify likely waste streams to be generated during construction, operation and decommissioning
	Describe measures to manage, reuse, recycle and safely dispose of waste in consultation with waste facilities including Council

This Section of the EIS provides a Preliminary Waste Management Plan (WMP) for the Project, addressing:

- Identification, quantification and classification of construction, operational and decommissioning waste streams in accordance with the NSW EPA Waste Classification Guidelines (2014)
- Proposed management strategies for segregation, reuse, recycling and safe disposal taking into consideration the waste management facilities in the locality and their available capacity
- Alignment with the waste hierarchy principles under the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act)

6.12.2 Existing Environment

The Site is located within the Upper Hunter Shire and Muswellbrook Shire LGAs and is currently undeveloped, historically cleared pasture. There are no existing waste-generating activities or legacy stockpiles on the Site. No evidence of asbestos or contaminated materials has been identified through the Preliminary Site Investigation (PSI) (refer **Section 6.4**). Unexpected finds of asbestos, contaminated materials or other regulated wastes will be managed in accordance with the procedures outlined in **Appendix G**.

6.12.2.1 Upper Hunter Shire Council Waste Infrastructure

Upper Hunter Shire Council operates a network of waste facilities comprising the Scone Waste Management Facility (WMF), the Aberdeen Resource Recovery Facility and transfer stations at Merriwa, Murrurundi and Cassilis. The Scone WMF is the Shire's primary waste management site and includes a landfill and Community Recycling Centre (CRC), accepting a broad range of general solid waste streams relevant to the Project, including construction and demolition waste, green waste, metals and common recyclables.

The Aberdeen Resource Recovery Facility provides additional landfill and resource recovery capacity and is the only facility within the Shire that accepts asbestos. Asbestos is not accepted at Scone, Merriwa, Murrurundi or Cassilis.

Former landfills at Merriwa (EPL 13108) and Murrurundi (EPL 13106) have reached capacity and now operate solely as transfer stations. Waste received at these sites is consolidated and transported to larger regional facilities in Scone (EPL 5863) and Aberdeen (EPL 13107) for disposal or processing. Cassilis (not licenced) functions similarly as a small satellite transfer station with no capacity for high-volume construction waste.

Across the network, UHSC facilities hold Environment Protection Licences and accept a range of recoverable materials, including scrap metal, lead-acid batteries, tyres, e-waste, garden organics, cardboard and paper. These facilities provide feasible pathways for most general solid waste and recyclable materials generated by the Project.

Large-format BESS components such as lithium-ion battery modules, inverters and any fire-affected equipment

fall outside the acceptance capabilities of Council facilities and will be directed to licenced specialist processors in accordance with EPA requirements.

6.12.2.2 Muswellbrook Waste Infrastructure

Muswellbrook Shire Council operates two key waste facilities: the Muswellbrook Waste and Recycling Facility on Coal Road and the Denman Waste Transfer Station on Rosemount Road. The Muswellbrook facility is the Shire's principal landfill and includes a Community Recycling Centre (CRC), accepting a broad range of general solid waste streams relevant to the Project, including Construction & Demolition (C&D) waste, metals, green waste, recyclables and domestic problem waste (e.g. paints, oils, batteries, gas cylinders and e-waste). The site operates under EPL 5980 and is accessible to heavy vehicles.

The Denman Transfer Station provides a local drop-off point for general waste and recyclables, with material consolidated for transport to regional disposal facilities. Due to its smaller scale and limited operating hours, it is expected that most Project-related construction waste would be directed to the Muswellbrook facility rather than Denman.

Muswellbrook Waste and Recycling Facility is also licensed to accept asbestos by prior arrangement, providing an additional regional disposal option for regulated wastes. Large-format BESS waste streams (e.g. battery modules, inverters and fire-affected components) will continue to be directed to specialist processors in accordance with EPA requirements.

6.12.2.3 Consultation

The Preliminary Waste Management Plan was provided to UHSC and MSC for comments, which were received prior to EIS lodgement. Waste management pathways have been developed based on publicly available information regarding Council-operated facilities and their accepted waste streams, as summarised in **Table 70**. Further consultation with Council and relevant facility operators will be undertaken during preparation of the detailed WMP prior to construction commencement.

6.12.2.4 Regional Waste Facilities Summary

Waste from the Project will be transported off-site by licenced contractors to appropriately permitted waste facilities as described in **Section 6.12.2.1** and **Section 6.12.2.2**. Key facilities within proximity to the Site are summarised in **Table 70**, based on publicly available data and indicative haulage distances.

Table 70 Regional Waste Facilities Servicing the Site

Facility Name	Distance from the Site	Relevant Waste Types	EPL tonnage limits
Aberdeen Resource Recovery Centre (45 Wells Gully Rd)	~1 km	Only UHSC facility licensed to accept asbestos; accepts common solid waste types including C&D waste, clean concrete, green waste, scrap metal EPL 13107; accessible for large trucks	5,000 tonnes in any year
Muswellbrook Waste Management Facility (252 Coal Rd, Muswellbrook)	~14 km	General solid waste (putrescible and non-putrescible), clean concrete and rubble, green waste, scrap metal, treated timber, tyres; accessible for large trucks; EPL 5980	50,000 tonnes per annum

Facility Name	Distance from the Site	Relevant Waste Types	EPL tonnage limits
Scone Waste Management Facility (129 Noblet Road)	~17 km	Landfill + CRC; accepts most common waste types including C&D waste, metals, organics, recyclables, household waste, e-waste, general solid waste; EPL 5863; accessible for large trucks	7,000 tonnes per annum
Singleton Waste Management Facility (Dyrring Rd, Fern Gully)	~64 km	General solid waste, clean concrete and rubble, scrap metal, treated timber, tyres, asbestos and special waste (by arrangement); accepted under EPL 5927	30,000 tonnes per annum
Merriwa Waste Management Facility (Depot Rd, Merriwa)	~81 km	General solid waste, minor quantities of controlled waste (e.g. motor oils); accepted under EPL 13108 No capacity to accept large volumes of construction waste.	5,000 tonnes per year
Licensed Commercial Contractors	Variable	Hazardous waste (e.g. oils, batteries), liquid waste (sewage, greywater), industrial and construction waste; transported to appropriately licensed liquid waste treatment facilities	n/a

6.12.3 Waste Assessment

Waste management for the Project will follow the NSW EPA's waste hierarchy, as outlined in the *Waste Avoidance and Resource Recovery Act 2001* and reinforced through the NSW Waste and Sustainable Materials Strategy 2041. This hierarchy provides a prioritised framework for managing resources and minimising environmental impact throughout the Project lifecycle. The application of the waste hierarchy to construction waste streams is reflected in the prioritisation of reuse and recycling through on-site management practices and off-site recovery pathways, as quantified in **Section 6.12.3.2**, with disposal limited to residual and non-recoverable materials. **Figure 22** illustrates the waste hierarchy as applied to the Project.

Figure 22 Waste Hierarchy

6.12.3.1 Waste Classification

Waste generated across the lifecycle of the Project will be classified in accordance with the NSW Environment Protection Authority's Waste Classification Guidelines - Part 1: Classifying Waste (2014). The primary waste classes likely to be encountered during construction, operation and decommissioning are summarised in **Table 71**.

Table 71 Waste Classification Summary

Waste Class	Applicable Streams
Hazardous Waste	Lithium-ion batteries, transformer oils, greases, fuels, spill kit residues
Special Waste	- Tyres, fire-damaged equipment, emergency spill materials, thermal runaway residues - Note: Special Waste refers to materials that may not meet the definition of Hazardous Waste but still require specialised handling and disposal under EPA guidelines (e.g. fire-damaged equipment, spill residues).
Liquid Waste	Greywater and sewage from temporary site amenities and washdown areas
General Solid Waste (Putrescible)	Organic waste from worker amenities (e.g. food scraps)
General Solid Waste (Non-putrescible)	Excavated spoil, vegetation clearing, concrete, timber, plastics, packaging, cable offcuts, pallets, office paper and cardboard

In the event of a fire or emergency involving battery components or oils, waste such as fire-damaged equipment, contaminated Personal Protective Equipment (PPE), emergency spill materials, or residues from thermal runaway events will be classified in accordance with the NSW EPA Waste Classification Guidelines and, where

applicable, transported under the Australian Dangerous Goods (ADG) Code if they meet Dangerous Goods thresholds.

6.12.3.2 Waste Stream Quantification

Anticipated waste volumes have been estimated for each phase of the Project, based on indicative construction quantities, typical maintenance schedules and comparable BESS decommissioning programs. These estimates will be refined prior to construction as part of the final WMP.

Construction Phase

Published benchmarks for utility-scale BESS construction waste generation (DPHI, 2025) indicate a typical range of 1 - 53 t/MW, with a median of 25.4 t/MW, of which approximately 35% is liquid waste (sewage). These benchmark values provide an indicative basis for estimating likely waste quantities for the Project.

Table 72 summarises the benchmark waste categories, the corresponding quantities scaled to the Project, and the anticipated on-site handling and off-site management pathways. These planning-level estimates will be refined during detailed design for inclusion in the Waste Management Plan.

Table 72 Estimated Construction Phase Waste Volumes

Material / Waste Type	Waste Class	Benchmark Rate (t/MW)	Approx. Total for 400MW (t)*	% of Whole*	On-Site Management	Off-Site Pathway
Liquid waste (sewage)	Liquid	9.05	~3,620	35.59	Captured in portable amenities	Licensed Commercial Contractors
Excavated spoil (C&D soil)	Non-putrescible	10.00–12.00 (portion of C&D total)	~4,000–4,800	63.72% (C&D Waste - Soil and concrete)	Stockpiled; reused for backfilling and bunding and site rehabilitation where feasible (refer Section 6.4)	Surplus spoil sent to approved facility (e.g. Aberdeen WMF, Scone WMF, Muswellbrook WMF)
Concrete (surplus / cuts)	Non-putrescible	4.00–6.00 (portion of C&D total)	~1,600–2,400		Crushed for re-use as road base or structural fill	Licensed landfill or recovery facility
Timber (pallets, formwork)	Non-putrescible	0.30–0.45	~120–180	<1%	Segregated for reuse; uncontaminated timber stored separately	Timber recycling contractor. Note: If pallets are made of composite materials, glued, painted etc cannot be recycled but should be landfilled.
Packaging (plastic / cardboard)	Non-putrescible	0.20–0.25	~80–100	<1%	Baled and stored in weatherproof bins	Licensed recycling contractor

Material / Waste Type	Waste Class	Benchmark Rate (t/MW)	Approx. Total for 400MW (t)*	% of Whole*	On-Site Management	Off-Site Pathway
Scrap metal / cable off cuts	Non-putrescible	0.15–0.20	~60–80	<1%	Stored in lockable bins or cages	Metal recycling depot (e.g. Aberdeen WMF)
Vegetation / green waste	Non-putrescible	0.10	~40	0.41	Mulched and reused onsite where suitable	Licensed green-waste processor
General site waste	Putrescible	0.04	~16	0.16	Stored in mobile, lidded and colour-coded waste and recycling bins located in designated waste storage areas in accordance with AS 4123.7-2024; daily collection	Council-managed waste services (resource recovery where available; landfill for residuals)
Hazardous waste (oils, lubricants, spill residues)	Hazardous	0.03	~12	0.12	Bunded storage in sealed containers	EPA-tracked contractor disposal
TOTAL (excluding sewage)	-	16.38	~6,550	-	-	-
GRAND TOTAL (including sewage)	-	25.43	~10,200	100	-	-

Operational Phase

Operational waste generation will be minimal and intermittent, occurring primarily during routine inspection, minor component replacement and vegetation management. Benchmark rates are not applicable due to the low and variable nature of operational waste; however, typical volumes for utility-scale BESS facilities are summarised in **Table 73**.

Table 73 Operational Waste Summary

Waste Type	Waste Class	Estimated Frequency / Volume	On-Site Management	Off-Site Pathway
Spare part packaging	Non-putrescible	Quarterly, small volumes	Segregated at source	Contractor-collected recycling
Hazardous waste (spill kits, absorbents)	Hazardous	Infrequent, event-based	Sealed containers stored in bunded area	EPA-tracked disposal

Waste Type	Waste Class	Estimated Frequency / Volume	On-Site Management	Off-Site Pathway
Defective battery modules (rare events)	Hazardous / Dangerous Goods (DG)	1–2 events over facility life	Palletised; stored in DG-compliant area	DG transport to licensed battery recycler/disposal site
General waste from maintenance staff	Putrescible	Very small volumes	Standard site bins	Landfill (residuals)

Decommissioning Phase

Decommissioning will involve removal of the BESS units, electrical infrastructure, civil works and ancillary structures. Waste will consist primarily of recyclable materials-metals, cabling, concrete-and large-format electrical equipment requiring specialist processing. **Table 74** outlines the expected materials and their proposed treatment strategies.

Table 74 Decommissioning Waste Strategy

Material	Waste Class	Estimated Quantity	On-Site Management	Off-Site Pathway
Batteries (Li-ion)	Hazardous / e-waste	~8,976 t (Based on 204 x Fluence GSP5000 enclosures at 44 t per unit)* As detailed in the decommissioning and rehabilitation strategy (refer Appendix G), approximately 92% of lithium battery material is recyclable (GHD, 2024)	Prior to removal, battery modules will be assessed for condition to determine suitability for reuse or recycling; crane-lifted and stored in DG-compliant area	Specialist battery recycling facility. A small number of specialist battery recycling facilities are being developed in anticipation of the demand for battery recycling. The market response is anticipated to increase significantly over the life of the project.
Transformers / inverters	Non-putrescible (recoverable metals)	~2,297 t (136 x PE Inverters at 5.3 t + 68 x MV Skids at 23 t + 35 x CSE at 0.33 t)*	De-energised and dismantled	Reuse/refurbishment or metals recovery
Concrete pads and footings	Non-putrescible	~2,500 m ³	Broken up on site	Recycled off site or reused as engineered fill
Transmission line poles and conductors	Non-putrescible (recoverable metals)	To be confirmed during detailed design (indicative pole spacing ~80–120 m; ~3.9 km easement)	Poles dismantled and conductors stripped on site	Structural steel and conductor metals to metals recycler; concrete pole footings broken up and recycled or reused as engineered fill

Material	Waste Class	Estimated Quantity	On-Site Management	Off-Site Pathway
Cabling and ductwork	Non-putrescible (metals)	~10 km	Recovered during dismantling	Sold to metals recycler; copper conductors and precious metals salvaged for resale where recoverable
Temporary buildings / amenities	Non-putrescible	8-12 units	Dismantled or removed whole	Salvage, resale or recycling
Green waste from final vegetation works	Non-putrescible	To be confirmed	Mulched where suitable	Licensed green-waste processor
Residual waste	Mixed (minor volumes)	Variable	Segregated as practicable	Licensed landfill
*To be confirmed during detailed design. Sources: (Fluence 2. G.-D.-E.-O.-O., 2025a); (Fluence, 2025b); (Fluence, 2024); (Power Electronics, 2025)				

6.12.3.3 Potential Impacts

Without mitigation, waste generated during the construction, operation and decommissioning of the Project could result in a range of environmental and compliance-related impacts, including:

- Soil and water contamination from incorrect disposal or stormwater exposure, particularly from uncovered stockpiles or liquid waste storage
- Regulatory non-compliance associated with the mishandling or unlicensed transport of hazardous waste such as lithium-ion batteries or oils
- Fire risk due to poor segregation or storage of flammable materials (e.g. oily rags, damaged battery cells)
- Greenhouse gas emissions resulting from the landfilling of recyclable construction and operational materials
- Unintended wildlife interactions with exposed or biodegradable waste materials, increasing fauna risk and hygiene concerns
- Visual and amenity impacts such as clutter, odour and litter, particularly where waste compounds are not maintained or secured
- Transport scheduling conflicts and safety risks associated with bulk material removal during decommissioning
- Dust, noise and sedimentation associated with equipment removal and concrete demolition
- Compliance risks if hazardous or recyclable components are not managed in accordance with evolving BESS dismantling and battery stewardship standards

6.12.4 Mitigation and Management

Table 75 summarises the key waste mitigation measures to be implemented throughout the Project lifecycle.

Table 75 Preliminary Waste Management Plan - Mitigation Measures

Ref	Potential Impact	Phase	Mitigation measures
Waste Management			
WM1	Inappropriate management of waste	All	The Preliminary Waste Management Plan will be updated and reissued for the construction, operation and decommissioning phases to reflect final design, contractor methodologies and phase-specific waste requirements.
WM2	Incorrect disposal	All	Classify all waste in accordance with the NSW EPA Waste Classification Guidelines (2014) to identify the appropriate management and disposal pathway.
WM3	Insufficient resource recovery	All	Apply the waste hierarchy (Avoid, Reduce, Reuse, Recycle, Dispose) when making purchasing decisions and selecting and implementing waste management measures across all waste streams.
WM4	Mixing of waste reducing resource recovery	Construction	Provide labelled and colour-coded receptacles for construction and operational waste streams in accordance with AS 4123.7-2024
WM5	Release of hazardous waste to the environment	All	Store hazardous and special waste in bunded, covered areas where applicable, in accordance with AS 1940, AS 5139 and relevant Dangerous Goods requirements
WM6	Inappropriate management of waste	All	Engage only licenced contractors for waste transport, recycling and disposal to ensure waste is handled, transported and managed in accordance with applicable legislation and industry standards.
WM7	Inappropriate management of waste	All	Maintain a Waste Register recording waste type, volume, classification, and disposal destination to provide traceability of waste once it leaves site.
WM8	Inappropriate handling and separate of waste	Construction	Include waste handling and storage procedures in site inductions and toolbox talks
WM9	Lost opportunity for resource recovery	Construction	Maximise on-site reuse and return-to-supplier schemes for pallets, cable drums and packaging
WM10	Long distance transport of waste	Construction	Consult with Council and relevant waste facility operators prior to construction to confirm acceptance pathways and any constraints.
WM11	Inappropriate management of specialist waste	Decommissioning	Direct large-format BESS components (e.g. batteries, inverters) to licenced specialist processors

Ref	Potential Impact	Phase	Mitigation measures
WM12	Inappropriate management of specialist waste	Construction	Collect and dispose of liquid waste from amenities and washdown areas via licenced liquid waste contractors
WM13	Lost opportunities for resource recovery	Construction	Break up and recycle concrete footings and pads off site or reuse as engineered fill where suitable
WM14	Lost opportunities for resource recovery	Construction	Recover and recycle metals including cabling, transformers, structural steel and transmission line conductors where suitable; salvage copper conductors and precious metals for resale where recoverable

6.13 Other

6.13.1 Air Quality

The construction phase of the Project has the potential to generate dust and particulates through earthworks, operation of plant and equipment, and vehicle movements on unsealed surfaces. A Construction Dust Management Plan will be prepared prior to commencement of construction to minimise the mobilisation of dust emissions and vehicle track-out, with reference to the EPA's Local Government Air Quality Toolkit Construction Sites Guidance Note. Measures will include watering of exposed surfaces during dry and windy conditions, speed controls on unsealed internal roads, wheel wash or rumble grid at site exits, progressive rehabilitation of disturbed areas, and monitoring of dust complaints. Operational activities are limited to infrequent light and heavy vehicle movements and periodic vegetation management, with negligible air quality impact anticipated.

6.13.2 Decommissioning

A Decommissioning and Rehabilitation Strategy (DRS) has been prepared by Minesoils (refer Appendix 4 of **Appendix G**) to outline the methodology for decommissioning all Project infrastructure and rehabilitating the land at the end of the Project's operational life. The DRS will form the basis of a Decommissioning and Rehabilitation Plan (DRP) to be prepared in accordance with Development Consent conditions.

The Project has an indicative operational life of 25 years. At the end of that period, the Proponent will consider continued operation via repowering or technology replacement, or full decommissioning and site rehabilitation. The DRS has been prepared on the assumption that full decommissioning will be required; however, some infrastructure may remain as part of future landowner agreements.

Decommissioning will involve removal of all above-ground infrastructure including the BESS units, switching station, substation, transmission poles and conductors, access roads, hardstands, fencing, and ancillary structures. The BESS will be de-energised and isolated from the grid prior to dismantling. Battery modules will be assessed for condition and suitability for reuse or recycling, with approximately 92% of lithium battery material considered recoverable. Underground cabling will be removed or left in situ subject to Development Consent conditions and landholder agreement, with all disturbed areas ripped, top-dressed and seeded. A waste minimisation hierarchy of avoid/reduce/reuse/recycle/dispose will be applied to all decommissioning waste streams, with residual waste classified and disposed of at a licensed facility in accordance with the POEO Act.

The overall rehabilitation objective is to return the Site to pre-disturbance land use and land capability. Agricultural grazing is the anticipated final land use, consistent with the historical land use of the site and the surrounding region. Rehabilitation will target reinstatement of Land Suitability Class (LSC) 3, 4 and 5 across the

RU1 and RU4 zoned portions of the Site, with the E4 and R1 zoned areas rehabilitated with approximately 200 mm of stripped topsoil without targeting pre-Project LSC classes, consistent with Department of Primary Industries and Regional Development endorsement.

All major decommissioning and rehabilitation activities are anticipated to be completed within 18 months of cessation of operations, with ongoing monitoring and maintenance continuing beyond this period as required by the Development Consent. The Proponent will be responsible for all decommissioning and rehabilitation costs. A dedicated decommissioning reserve fund will be established when the remaining economic life of the Project is determined to be less than six years, funded from operating cashflows. A full cost analysis will be undertaken during preparation of the DRP.

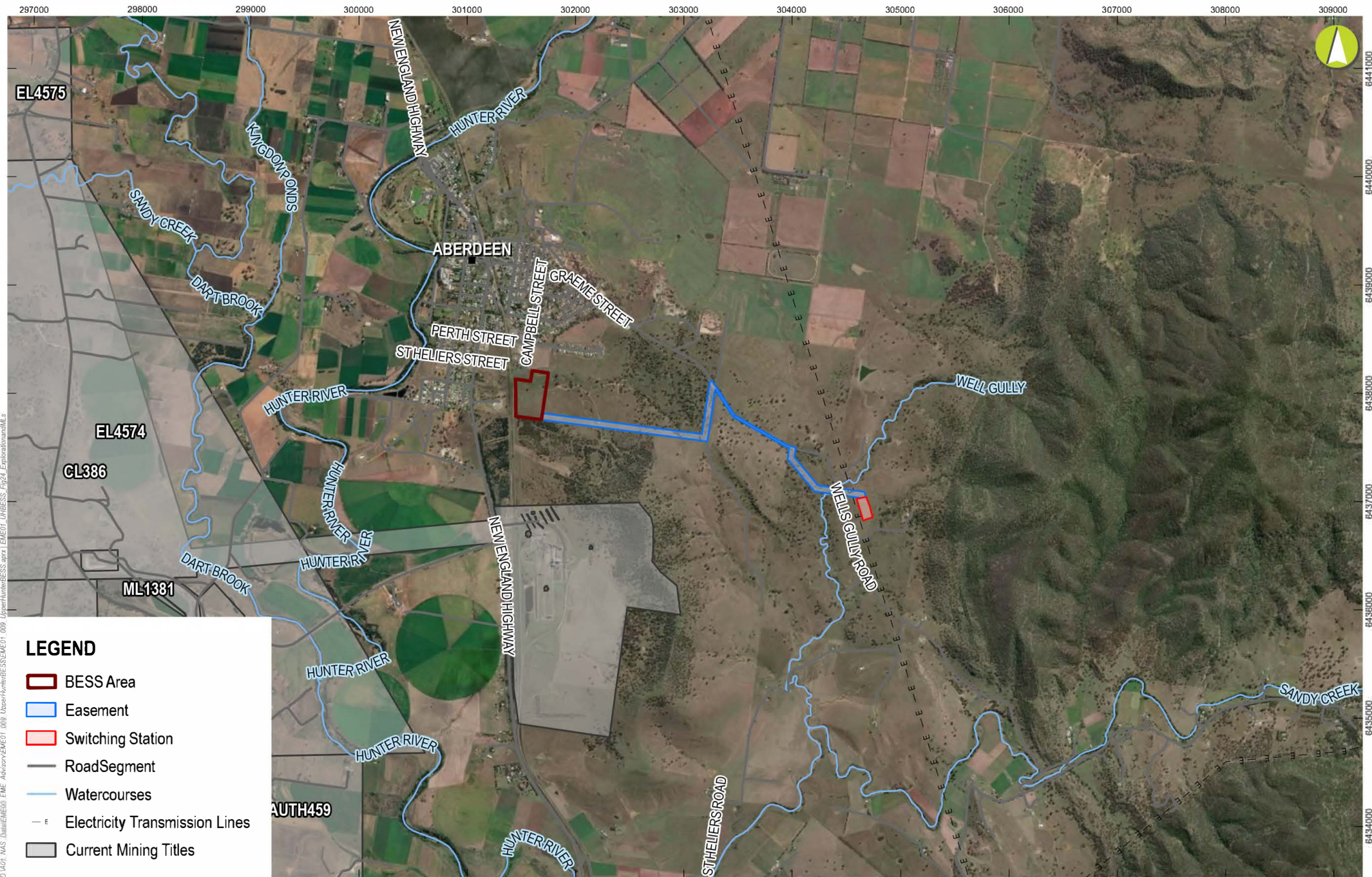
6.13.3 Mining

A search of the NSW MinView spatial dataset was undertaken to identify any exploration licences, coal leases, or mining authorities on or adjacent to the Site. The search identified the following titles in the broader vicinity of the Site:

- Exploration Licence EL4574
- Coal Lease CL386
- Mining Authority AUTH256

None of these titles overlap with the Site. The nearest title boundary is located approximately 630 m south of the Site. Accordingly, no consultation with exploration licence or mining title holders was required in relation to the Project. A search of the Gas Pipelines layer on MinView confirmed no gas pipelines are located on or adjacent to the Site (refer **Figure 23**).

The Site is located within the Muswellbrook Subsidence District. Consultation with Subsidence Advisory NSW has confirmed the Site is not undermined, is not within the zone of influence of any existing underground coal workings, and that design to account for future mine subsidence is not required.



Upper Hunter Battery Energy Storage System

Exploration and Mining Titles

FIGURE 23

6.14 Cumulative Impacts

6.14.1 SEARs

SEARs	Details
General Requirements	An assessment of likely impacts on the environment including: description of existing environment using sufficient baseline data; assessment of likely impacts of all stages including cumulative impacts; description and assessment of any staging; measures to avoid, mitigate and/or offset impacts (including draft management plans); and measures to monitor and report on environmental performance
Key Issues - Biodiversity	Cumulative impact assessment of biodiversity values in the region from nearby developments
Key Issues - Land	A cumulative impact assessment of nearby developments
Key Issues - Noise	Assessment of construction noise impacts per the ICNG, operational noise per the NSW <i>Noise Policy for Industry</i> (2017), traffic noise per the NSW <i>Road Noise Policy</i> (DECCW, 2011) and cumulative noise impacts
Key Issues - Transport	Cumulative impact assessment of traffic from nearby developments including mining operations

6.14.2 Methods

The Department's Cumulative Impact Assessment Guidelines for state significant Projects (Cumulative Impact Assessment Guideline (DPHI, 2026)) requires an EIS to identify projects in the same area as the Project that may generate cumulative impacts. The level of detail required for the cumulative assessment is based on the potential for significant cumulative impacts and the availability of publicly available information which is linked to the Project's status in the planning process.

The Guideline requires the following Projects to be identified based on their status in the planning system:

- Changes to existing approved projects
- Approved projects
- Projects under assessment
- Related development

The Guideline also emphasises the importance of focussing on potentially significant projects which may arise as a result of impact interaction with other large-scale projects including:

- SSD & SSI projects
- Projects that are classified as designated development and require an EIS
- Projects that require assessment under division 5.1 of the EP&A Act that are likely to significantly affect the environment and require an EIS
- Projects that have been declared to be controlled actions under the EPBC Act

- Any major greenfield and urban renewal developments that are scheduled for the area (e.g. new areas zoned for urban development).

Projects have been evaluated having regard to spatial proximity, likelihood of temporal overlap with the Project's construction program, and scale of potential impact interaction. Modifications to projects already in operation have been excluded as not being of sufficient scale to generate material cumulative impacts. Construction programs for many listed projects remain unconfirmed; the assessment therefore assumes a conservative scenario of overlap with the Project's anticipated construction period.

Projects located beyond 20 km from the Project have been included in **Table 76** for completeness but have been excluded from detailed cumulative assessment on the basis of distance. At these separations, the potential for material impact interaction with the Project is considered negligible given the intervening landform, road network and settlement patterns. The Bayswater and Liddell cluster of projects (located 25 km south) fall within this category; while they represent significant existing and transitioning energy infrastructure, their distance and operational status means no material cumulative interaction with the Project is anticipated across any assessed factor.

6.14.3 Existing Environment

A review of Major Projects planning portal has been undertaken to identify projects in the vicinity of the Project based on the criteria in the Guideline and is summarised in **Table 76** and shown in **Figure 24**.

Table 76 Projects Identified within 25 km

Project	Description	Location	Status
McCullys Gap BESS (SSD-81555720)	McCullys Gap BESS comprises a 400 MW / 1,600 MWh BESS and associated infrastructure.	6 km southeast 578 Sandy Creek Road, McCullys Gap NSW 2333	Prepare EIS
Muswellbrook Pumped Hydro Energy Storage (SSI-76014961)	Muswellbrook Pumped Hydro Energy Storage comprises a 500 MW pumped hydro facility utilising an upper reservoir at Bells Mountain and a lower reservoir in a former coal mine void, with associated infrastructure.	6 km southeast 250 Dolahentys Road, McCullys Gap	Prepare EIS
Kayuga Solar Farm (SSD-69489708)	Kayuga Solar Farm comprises an 80 - 100 MW solar photovoltaic installation, 50MW/100MWh BESS and associated infrastructure.	7 km southwest 261 Dorset Road, Kayuga	Prepare EIS
Muswellbrook Solar Farm and BESS	The Muswellbrook Solar Farm and BESS comprises a 135 MW solar photovoltaic installation paired with a 135 MW / 270 MWh BESS and associated infrastructure, located across approximately 482 ha of former coal mine land approximately 2.5 km east of Muswellbrook. The project was approved by the NSW IPC in May 2025 and is currently under construction, with operations expected to commence in 2028.	7 km southeast, Muswellbrook Coal Mine site, Muswellbrook NSW	Approved Project - Under Construction
Muswellbrook BESS (SSD-29704663)	Approved in July 2023, the Muswellbrook BESS comprises a 150 MW / 300 MWh BESS and associated infrastructure.	8.5 km south 20-24 Sandy Creek Road, Muswellbrook	Approved Project

Project	Description	Location	Status
Bowmans Creek Wind Farm Stage 1 (SSD-10315) Bowmans Creek Wind Farm Stage 2 (SSD-73123714)	Development of a 335 MW wind farm comprising up to 54 wind turbines, substation, access tracks and grid connection infrastructure. Approved in February 2024. A modification to Stage 1 to add a 250 MW / 2,000 MWh BESS was awarded a NSW Government long-duration battery contract in February 2026; a modification application is currently being prepared. Stage 2 EIS is currently being prepared for an expansion of up to 21 wind turbines and 120 MW of additional generation capacity.	17 km east Bowmans Creek NSW 2330	Stage 1 - Approved Project; Stage 1 Mod 1 (BESS) - Prepare Mod Report; Stage 2 - Prepare EIS
Edderton Solar Project (SSD-69965958)	Edderton Solar Project comprises a 350 MW solar photovoltaic installation, an integrated BESS, and associated infrastructure	19 km southwest Edderton Road and Denman Road	Prepare EIS
Upper Hunter Energy Park (formerly known as Kyoto Wind Farm) (Part3A Application MP06_0055)	Upper Hunter Energy Park comprises 18 wind turbines, a 66/33kV substation, 13 km of overhead line, 21 km of underground cabling, internal access tracks, and associated infrastructure, located approximately 12 km from Scone. Approved in 2010, works partially commenced in 2014 and are expected to recommence in late 2025.	22 km northwest Middlebrook and Mountainview Stations, Scone NSW	Approved Project
Bayswater - Mt Piper Transmission Line (Part3A Application MP10_0002)	The Bayswater - Mt Piper Transmission Line project involves the construction of a 500 kV electricity transmission line connecting Bayswater Power Station to Mount Piper Power Station. The line is designed to carry the bulk of the power generated at Bayswater to Mount Piper. Approved in July 2012.	22 km southwest Vicinity of Mangoola Coal Mine, Wybong/Mangoola NSW	Approved Project
Upper Hunter South Solar Farm (SSD-65996959)	The Upper Hunter South Solar Farm project proposes the construction, operation, and decommissioning of a 90 MW solar farm, a 30 MW / 60 MWh BESS, and associated infrastructure.	24 km southwest 1711 Denman Road, Denman	Prepare EIS
Liddell Power Station - East West Gas Pipeline (Part3A Application MP07_0028)	Approved in July 2009, the Liddell Power Station - East/West Gas Pipeline project involves the construction and operation of an approximately 25 km gas pipeline to transport coal seam gas obtained from neighbouring Hunter Valley coal mines to the Liddell Power Station. The pipeline extends between Mount Arthur and Ravensworth and terminates at the Liddell Power Station, located approximately 25 km south of Muswellbrook along the New England Highway.	25 km south New England Highway, Muswellbrook NSW 2333	Approved Project
Liddell Battery and Bayswater Ancillary Works (SSD-8889679)	Liddell Battery and Bayswater Ancillary Works comprises a BESS and associated ancillary infrastructure. The project was approved on 8 March 2022.	25 km south New England Highway, Muswellbrook NSW 2333	Approved Project

Project	Description	Location	Status
Liddell Power Station - N/S Gas Pipeline (Part3A Application MP08_0061)	Approved in July 2009, the Liddell Power Station - North/South Gas Pipeline comprises an approximately 51 km gas pipeline connecting nearby coal seam gas sources to the Liddell Power Station.	25 km south New England Highway, Muswellbrook NSW 2233	Approved Project
Liddell Future Land Use and Enabling Works Project (SSD-24937520)	Liddell Future Land Use and Enabling Works Project comprises demolition works, site remediation and enabling works for future industrial land uses on the former Liddell Power Station site. The project area covers approximately 143 hectares and was approved on 4 February 2025	25 km south New England Highway, Muswellbrook	Approved Project
Bayswater Power Station - Wastewater Upgrade (Part3A Application MP06_0047)	Bayswater Power Station - Wastewater Upgrade comprises improvements to the wastewater management systems at the Bayswater Power Station. Approved on 6 April 2006.	25 km south New England Highway, Muswellbrook NSW Australia	Approved Project
Bayswater - Wastewater Upgrade (Mod 1) (SSD Modifications MP06_0047-Mod-1)	Bayswater - Wastewater Upgrade (Modification 1) comprises modifications to the previously approved wastewater upgrade at Bayswater Power Station. Approved on 13 April 2018.	25 km south New England Highway, Muswellbrook NSW Australia	Approved Project
Bayswater Power Station - Gas Pipelines (Part4 Application DA24-12-2007)	Bayswater Power Station - Gas Pipelines comprises gas pipelines supplying fuel to Bayswater Power Station.	25 km south New England Highway, Muswellbrook NSW Australia	Approved Project
Bayswater Power Station Upgrade (SSD-9697)	Bayswater Power Station Upgrade comprises works to maintain operation of the power station. Approved February 2022, with activities commencing onsite from 29 August 2022.	25 km south Bayswater Power Station, New England Highway, Muswellbrook	Approved Project

6.14.4 Impact Assessment

The projects identified in **Section 6.14** represent the currently known pipeline of renewable energy and storage infrastructure near the Project. The cumulative assessment below focuses on the environmental factors most likely to generate material cumulative impacts when considered alongside the Project. For each factor, the assessment draws on the technical analysis contained within the relevant Sections of this EIS.

6.14.4.1 Biodiversity

The Project will result in clearing of approximately 13.83 ha of disturbance footprint, with biodiversity impacts assessed and offset in accordance with the BC Act and EPBC Act (refer **Section 6.2**). The broader renewable energy pipeline in the Upper Hunter region contributes to cumulative pressure on the Central Hunter Valley eucalypt forest and woodland ecological community and associated threatened species habitat. Four projects identified in **Section 6.2** have been assessed in the BDAR as having potential for cumulative biodiversity

interaction with the Project: the Muswellbrook BESS (SSD-29704663), Muswellbrook Solar Farm and BESS, McCullys Gap BESS (SSD-81555720), and the Muswellbrook Pumped Hydro Energy Storage (SSI-76014961).

The most material cumulative biodiversity interactions are with the Muswellbrook Solar Farm and BESS, which shares two TECs and one species credit species with the Project. The combined clearing of approximately 38.6 ha of Central Hunter Valley eucalypt forest and woodland across both projects represents approximately 0.056% of the TEC's estimated area of occupancy of 68,000 ha in NSW. The combined clearing of approximately 203.7 ha of Central Hunter Grey Box-Ironbark Woodland across both projects represents approximately 0.43% of that TEC's estimated area of occupancy of 46,920 ha. *Diuris tricolor* endangered population is a species credit species common to both projects, with the combined footprints contributing to incremental loss and fragmentation of habitat within its known distribution. Indirect cumulative risks including habitat fragmentation, degradation of ecological condition, and disruption of landscape connectivity are also identified where shared TECs occur across adjacent project footprints.

Each project in the region is required to assess and offset its own biodiversity impacts under the BC Act framework, and the cumulative effect of multiple offset obligations is assessed through the regional biodiversity offset market. The avoidance and minimisation measures detailed in **Section 6.2.4** and the offset package described in **Section 6.2.5** are designed to limit the Project's contribution to these cumulative pressures. While the percentage losses of each TEC's total extent are small, the fragmented distribution and reduced condition of these communities across the Hunter region means that incremental loss from multiple concurrent projects warrants active management through robust offsetting. Cumulative biodiversity impacts are assessed as low to moderate at the regional scale, with residual effects addressed through the offset framework.

6.14.4.2 Land

The Project will temporarily remove approximately 16.9 ha of land capable of agricultural use from the RU1 and RU4 zoned portions of the Site for the duration of the Project's operational life. The broader renewable energy pipeline in the Upper Hunter Shire and Muswellbrook Shire LGAs has the potential to generate incremental reductions in agricultural land across the region, particularly where multiple projects occupy rural land currently used for low-intensity grazing.

However, given the predominantly low-intensity grazing character of the regional agricultural industry, its established interface with large-scale extractive industries, and the negligible productivity value of individual project footprints relative to LGA-wide agricultural land coverage, significant cumulative impacts on regional agricultural businesses, critical mass thresholds or agricultural infrastructure are unlikely in the foreseeable future. The Site represents 0.006% of Muswellbrook Shire LGA and 0.002% of Upper Hunter Shire LGA agricultural land - proportions that remain negligible even when considered in combination with other renewable energy projects in the region.

No BSAL or SSAL is present within the Site, and the nearest mapped BSAL and SSAL are located approximately 580 m southwest of the Site. The cumulative impact of multiple renewable energy projects on strategically significant agricultural land in the locality is therefore not anticipated.

Cumulative land and agricultural impacts are assessed as low.

6.14.4.3 Noise

Construction and operational noise impacts from the Project have been assessed against the relevant frameworks in the NIA (refer **Appendix I**). No other developments in the vicinity of the Project are known to have construction activities overlapping with the Project's anticipated construction program. In addition, the distance from the Site to the projects identified for potential cumulative impact assessment range from 6 to 25k kms. Accordingly, cumulative construction noise impacts are not anticipated.

For operational noise, the NPfl addresses cumulative impacts through the application of project-specific PNTLs.

The NPfl requires that recommended amenity noise levels be reduced by 5 dBA when deriving the project amenity noise level for any individual development, to ensure that the combined contribution of all industrial noise sources in an area remains below the recommended amenity levels. Where the project amenity noise level applies and can be met, the NPfl states that no additional consideration of cumulative industrial noise is required.

The operational noise assessment demonstrates that the Project complies with all PNTLs at the 38 assessed receivers across all periods, with a maximum predicted level of 36 dBA against a night-time PNTL of 38 dBA. Cumulative operational noise impacts are assessed as low.

6.14.4.4 Traffic and Transport

Construction of the Project will generate up to 180 total daily vehicle trips broken down as 140 light and 40 heavy vehicle trips on the local road network, primarily on the New England Highway, Perth Street and Campbell Street. The peak morning period will see 72 inbound vehicle trips to site (70 light and 2 heavy) with the same outbound trips in the afternoon peak.

Several projects in the region have the potential to generate concurrent heavy vehicle movements on the New England Highway if their construction programs overlap with the Project's construction period. Muswellbrook Shire Council has modelled a regional peak of up to 4,500 temporary construction workers concentrated between 2027 and 2029, coinciding with the Project's anticipated construction program.

The New England Highway operates well within capacity at current volumes (approximately 5,700 vehicles per day per direction against a design capacity of significantly higher flows), and the Project's contribution to regional heavy vehicle volumes is modest given the existing high proportion of mining-related freight on this corridor. On local roads, Project volumes are modest against very low existing flows, with Perth Street and Campbell Street both operating well below collector road capacity thresholds.

Competition for OSOM permit slots and scheduling windows is the most material cumulative traffic risk, given the number of renewable energy projects in the Upper Hunter region with concurrent construction programs and similar OSOM requirements. This will be managed through permit applications with TfNSW and the NHVR during the TMP process. Relevant regional roadworks underway or planned during the construction period, including the Muswellbrook bypass, Singleton bypass and M1 Pacific Motorway northern extension, are not anticipated to generate material conflicts with Project traffic.

Cumulative traffic and transport impacts on the regional network are assessed as low.

6.14.4.5 Workforce Accommodation

Muswellbrook Shire Council has modelled a regional peak of up to 4,500 temporary construction workers concentrated between 2027 and 2029, coinciding with the Project's anticipated construction program. The regional rental vacancy rate of 1.1% and limited short-stay supply across Aberdeen, Muswellbrook and Scone means that simultaneous mobilisation of multiple project workforces could place material pressure on available accommodation. The Project's Preliminary Accommodation Strategy (refer **Appendix Q**) addresses this risk through prioritisation of local labour, early block booking of short-stay accommodation, staggered worker mobilisation, and coordination with nearby providers. Cumulative accommodation impacts are assessed as medium if construction programs overlap significantly, reducing to low with the measures outlined in the Preliminary Accommodation Strategy in place.

6.14.4.6 Visual Amenity

The LCVA (refer **Section 6.5**) was prepared in accordance with the Cumulative Impact Assessment Guideline (DPHI, 2026) and considers the Project in the context of other nearby renewable energy developments that have the potential to contribute to cumulative landscape character and visual change in the Upper Hunter region.

Three projects within the broader study area were assessed for cumulative visual interaction with the Project: the Kayuga Solar Farm, the Muswellbrook Solar Farm and BESS, and the Bowmans Creek Wind Farm. In each case, the combination of large separation distances and intervening landform means the projects would not be viewed together or sequentially from any identified sensitive viewpoint. No cumulative landscape character or visual impact is therefore assessed to arise from these projects in combination with the Project.

More broadly, the Upper Hunter region is undergoing a gradual transition in landscape character as a consequence of its designation as part of the Hunter-Central Coast Renewable Energy Zone (REZ). The introduction of utility-scale renewable energy and storage infrastructure across the region will incrementally alter the rural and semi-industrial character of the landscape over time. The BESS compound has a low visual profile relative to wind turbines and solar arrays given its ground-level footprint, modest height, and the screening potential of proposed perimeter planting. The Project's landscaping measures will progressively reduce visibility from the nearest residential receivers over time. Cumulative visual impacts on the broader landscape character of the Upper Hunter region are acknowledged as an inherent consequence of the region's role as a REZ, but are assessed as low to moderate at the local scale given the separation distances between projects, the existing industrial character of the locality, and the low profile of the Project relative to other renewable energy infrastructure types.

6.14.4.7 Overall Cumulative Assessment

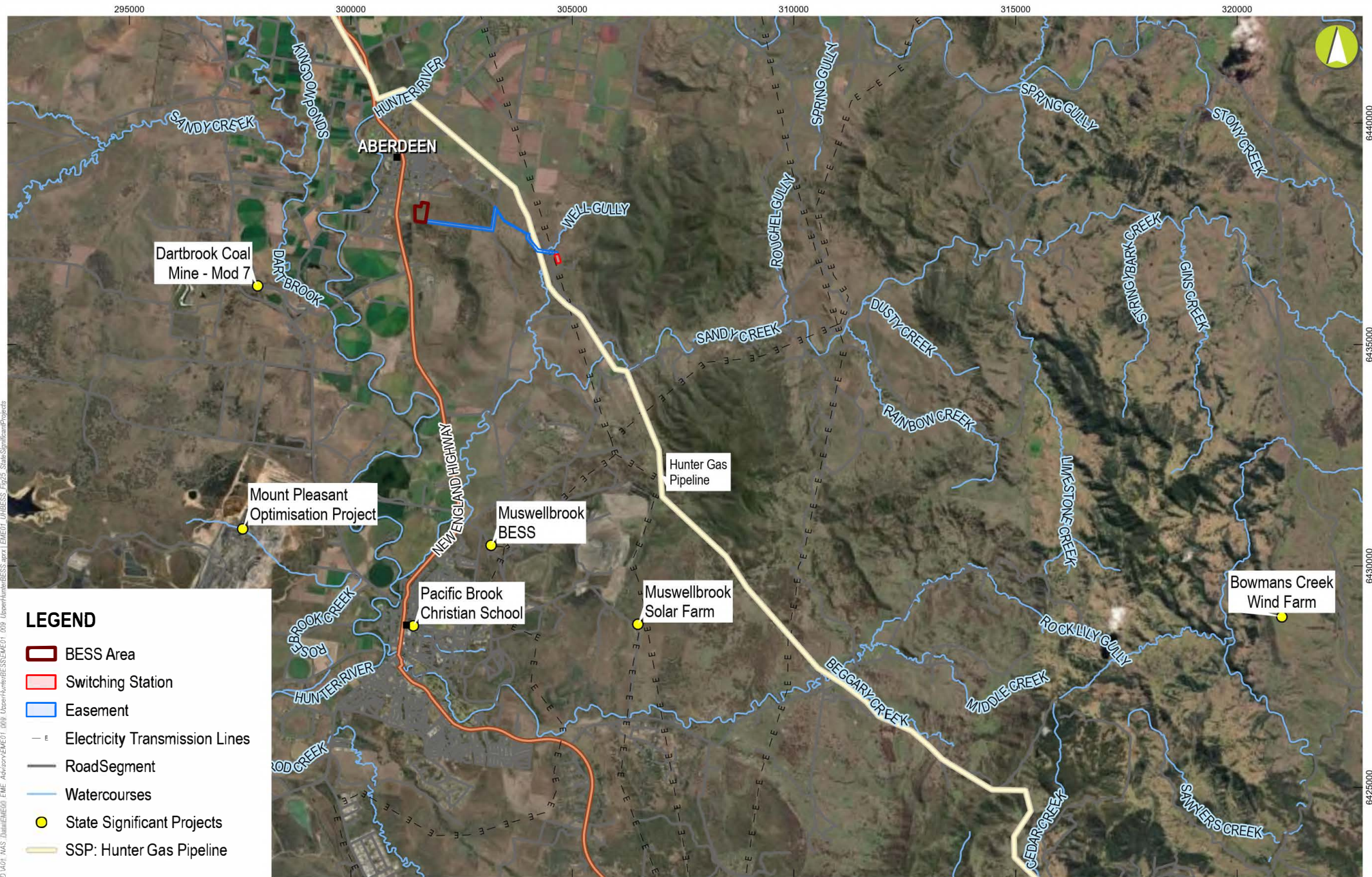
The Project is one of a number of renewable energy projects proposed, approved or under construction within the Upper Hunter region during a period of significant energy transition. The cumulative impact assessment has identified biodiversity and visual amenity impacts as low to moderate, noise and traffic impacts as low, and workforce accommodation impacts as medium where construction programs overlap, reducing to low with implementation of the Preliminary Accommodation Strategy.

Overall, cumulative impacts associated with the Project are assessed as low to medium, with workforce accommodation representing the most material cumulative issue identified. All identified cumulative impacts are manageable through the mitigation measures outlined in this EIS.

The Project will continue to implement the mitigation, monitoring and management measures identified throughout this EIS to ensure its contribution to cumulative impacts remains appropriately managed.

Figure 24 State Significant Projects

Figure 25 REZ Transmission Corridor



0 1 000 2 000 3 000 4 000
Scale 1:110,000



Sheet Size: A4
Source: LPI (Spatial NSW, 2026). BESS Data (EME Advisory, 2026). SSPs (NSW Planning, 2026)



GDA2020 MGA Zone 56
19/06/2026

Upper Hunter Battery Energy Storage System

State Significant Projects

FIGURE 24



Upper Hunter Battery Energy Storage System

REZ Transmission Corridor

FIGURE 25

7 Project Justification and Evaluation

7.1 SEARs

SEARs	Details	EIS Section
	A detailed evaluation of project merits having regard to: requirements in Section 4.15 of the EP&A Act; suitability of the site with respect to land use conflicts; and feasible alternatives including siting, design, shared infrastructure and consequences of not proceeding	Section 7

7.2 Overview

This Section evaluates the merits of the Project having regard to its environmental, social and economic impacts and benefits, the principles of ecologically sustainable development (ESD), the objectives of the EP&A Act, and the matters for consideration under Section 4.15 of the EP&A Act. The assessment presented throughout this EIS demonstrates that the Project supports Government policy objectives in relation to the transition to renewable energy and grid stability, while avoiding, mitigating and offsetting significant likely impacts. In addition, the Project has developed a Benefit Sharing Strategy to ensure that the communities within which the Project is located benefit directly from the Project.

7.3 Strategic Need and Policy Alignment

The Project directly responds to a need for dispatchable, large-scale energy storage in NSW and the National Electricity Market (NEM). As coal-fired generation continues to retire from the NEM, the integration of renewable energy sources requires firming capacity that can respond rapidly to fluctuations in supply and demand. The Project addresses this need by providing up to 400 MW / 920 MWh of lithium-ion battery storage, capable of charging during periods of excess renewable generation and discharging during periods of peak demand or system stress.

As detailed in **Section 2.1**, the Project aligns with a suite of international, national, state and regional policy frameworks, including:

- Australia's obligations under the Paris Agreement, through facilitating the integration of renewable energy and reducing reliance on fossil fuel-based firming
- The *AEMO 2024 Integrated System Plan*, which identifies storage as a priority investment in the NEM's optimal development path
- The National Energy Transformation Partnership, which supports investment in renewables, storage and transmission infrastructure as part of Australia's coordinated energy transition
- The NSW *Electricity Infrastructure Roadmap* (2020) and *Electricity Strategy* (2019), which identify BESS as a key firming technology within the Hunter-Central Coast REZ
- The NSW *Climate Change Policy Framework*, which identifies energy storage as a key enabler of net-zero emissions by 2050
- The *Hunter Regional Plan 2041*, which supports diversification of the region's energy capacity and transition to net zero

- The *Upper Hunter Land Use Strategy 2017*, which supports employment-generating energy infrastructure on appropriately zoned land
- The Department of Planning's Benefit Sharing Guidelines which aims to ensure that communities benefit from renewable projects located in their area.

The Project is strategically located within the Hunter-Central Coast REZ, close to high-capacity existing and planned transmission infrastructure and positioned to deliver reliable, dispatchable energy to a grid undergoing significant change. The Project benefits extend across the NEM through frequency regulation, grid stability services, and support for renewable energy integration at scale.

7.4 Site Suitability

The Site is considered suitable for the Project for the following reasons.

- The Site comprises historically cleared, largely undeveloped land zoned E4 General Industrial, with portions zoned RU1 Primary Production, RU4 Primary Production Small Lots and R1 General Residential.
- The BESS compound has been confined to the E4-zoned land, where electricity generating works are permissible with consent. The Main Northern Railway Line is located to the west providing separation between the BESS and residences to the west. The site is largely cleared of vegetation. Once operational, the BESS is a largely passive land use, with minimal traffic, noise and day-to-day activity. Compared with many other industrial uses that are permissible on E4 zones land, the Project is expected to generate substantially lower operational impacts and a lower overall intensity of industrial activity. No BSAL or SSAL is present within the Site, and agricultural productivity loss is assessed as negligible relative to regional output with provision made to return the land to its existing land and soil capability classification at end of life through the careful management of soils.
- The transmission easement is gently undulating and comprising cleared land and agricultural grazing with minor agricultural improvements such as stock shedding, stock fences and gates and unsealed access tracks, making it suitable for its intended use. The transmission easement is around 600 metres from the residential fringe of Aberdeen at its closest point.
- The Switching Station site is undulating, rising from a gully in the north of the site to a small hill to the south. The site is mostly cleared of trees and comprising pasture grasses. The lot includes trees to the east of the Switching Station site, on the rising landform. The land use in the vicinity of the Switching Station site and along the proposed transmission line corridor, is primarily rural (cattle grazing on open pastures). An existing 330kV transmission line, with both steel lattice and twin pole structures, extends in a north-south direction and passes through the Switching Station site.
- The Site's proximity to the existing TransGrid 330 kV transmission network reduces the infrastructure required to connect the Project to the grid, minimising land disturbance, visual impact and the need for additional easements across third-party land. The Site is also accessible from the New England Highway, supporting efficient delivery of construction components.
- The Site is not within a flood hazard area for the Hunter River, has no identified contamination, and carries no listed historic heritage items. Aboriginal Cultural Heritage impacts are manageable through the mitigation measures described in **Section 6.3**. Biodiversity values are present and have been assessed in detail; impacts are manageable through the mitigation and offset framework established under the BC Act and EPBC Act
- The Project has been sited and designed having regard to sensitive land uses in the vicinity, including the developing Aberdeen Heights residential subdivision to the north and northeast, equine

operations to the east, and the Aberdeen township. The BESS and transmission easement has been located as far south as practicable to maximise separation from residential receivers, with noise walls and landscape screening incorporated to further reduce amenity impacts. Land to the south is associated with mining operations. No significant land use conflicts remain following the design evolution described in **Section 2.2.4** and the key avoidance and minimisation strategies outlined in **Section 2.2.5.1**.

7.5 Consideration of Alternatives

An alternatives assessment has been undertaken in **Section 2.2**, evaluating development options including the do-nothing option, alternative sites, alternative technologies, alternative internal layouts, and the preferred option. The preferred option (proceeding with the Project on the Site) has been demonstrated to be superior to each alternative on the grounds of environmental performance, alignment with Government strategies and plans, grid connection efficiency, and land use compatibility.

The do-nothing option would forgo the significant energy storage, grid reliability and decarbonisation benefits of the Project and would be inconsistent with the state and national policy frameworks identified in **Section 2.1**. Alternative sites would not achieve the grid connection advantages offered by the Site's proximity to the existing TransGrid 330 kV infrastructure. Alternative technologies, including solar PV and onshore wind, would require substantially larger land footprints, involve greater biodiversity and visual impacts, and would not provide the same fast-response firming capability as battery storage. The preferred layout has been refined through multiple iterations to minimise impacts to biodiversity, watercourses, bushfire risk areas, and residential amenity.

7.6 Matters for consideration by the consent authority

Section 4.2.6 provides a detailed analysis of how the Project addresses the matters to be considered by the consent authority when evaluating a development application, including the provisions of environmental planning instruments (EPIs), development control plans (DCPs), planning agreements, the significant likely impacts of the development, the suitability of the site and the public interest.

The assessment demonstrates that the relevant environmental planning instruments (EPIs) have been appropriately addressed and that there are no inconsistencies that would preclude the Project from proceeding. While a section of the transmission easement traverses land zoned R1 General Residential, rendering that component of the Project partly prohibited, the easement has been located as far south as practicable within the R1 zone. This alignment minimises fragmentation of the land and reduces visual amenity impacts on established residential areas to the north and north-east.

The significant likely impacts are summarised in **Section 6**. Every attempt has been made to avoid impacts wherever possible through the Project design, with measures proposed to mitigate and offset any residual impacts. Site suitability is addressed in **Section 2.2** including a site-specific land use conflict risk assessment undertaken as part of the Land and Agriculture Assessment. The Site is well suited to the proposed BESS and ancillary infrastructure, given its proximity to existing transmission line to the east and the largely underutilised nature of the land. The BESS infrastructure has been positioned as far south within the Site as practicable to maximise separation from residential areas to the north and north-east. Additional mitigation measures, including noise attenuation walls and landscape screening, have been incorporated to further protect residential amenity. The transmission easement is located to the south for a large part of the alignment to minimise potential visual impacts on the residential areas to the north. Similarly, a section of transmission will be located in a trench in a road corridor to reduce visual impacts. The switching station site is by necessity located immediately adjacent to the existing Transgrid easement. For impacts that cannot be fully mitigated through design measures alone, discussions have commenced with affected landowners to identify and agree on appropriate mitigation and management outcomes.

In terms of the public interest, the Project provides material public benefit to the community via proposed VPAs

with UHSC and MSC and through a Benefit Sharing Strategy prepared in accordance with the NSW *Energy Policy Framework Benefit Sharing Guidelines*. The aim of the Guidelines is to ensure that the communities most affected by a Project benefit from the Project.

7.7 Evaluation of Environmental Impacts

Table 77 summarises the key findings across all assessed environmental impact categories and the residual impact following implementation of the mitigation and management measures detailed in **Section 6**.

Table 77 Summary of Environmental Impact Assessment

Environmental Factor	Key Finding	Residual Impact
Biodiversity	Clearing of 24.49 ha of PCT 3431 and associated TECs. No Serious and Irreversible Impacts identified. Offset obligations of 285 ecosystem credits and 483 species credits to be met through the NSW BOS	Low to moderate - addressed through offset framework
Aboriginal Cultural Heritage	21 sites identified; 10 directly impacted, all of low scientific significance. ACHMP to be prepared in consultation with RAPs prior to construction	Low
Historic Heritage	No heritage items or significant archaeological relics identified within the Site	Negligible
Land and Soil	No contamination identified. No BSAL or SSAL present. Agricultural productivity loss negligible relative to LGA-wide output	Negligible
Visual	Low to very low from all public viewpoints and most private dwellings. Moderate impact at two dwellings nearest the Switching Station, reducing progressively with screening vegetation	Public viewpoint assessment as very low except for one assessed as low. All private dwelling viewpoints assessed as low except for two viewpoints assessed as moderate due to proximity to the switching station.
Noise - Operational	Complies with NPfI at all 38 assessed receivers. Maximum predicted level 36 dBA against night-time PNTL of 38 dBA	No exceedance
Noise - Construction	Complies with ICNG at all receivers except localised, temporary NML exceedances at two receivers during access road construction	Low - managed through notification and construction controls
Traffic and Transport	Road network operates within capacity throughout construction. OSOM movements achievable subject to road upgrades in Table 56, majority committed under EnergyCo/TfNSW Port to REZ program	Low
Surface Water and Flooding	BESS bench above 1 in 500 AEP flood level. Access road subject to inundation during major events, managed through flood warning and operational protocols	Low

Environmental Factor	Key Finding	Residual Impact
Bushfire	No critical infrastructure within BAL Flame Zone or BAL 40 following design modification. Compliant with PBP 2019	Low
Hazards	Maximum consequence distance for all credible hazardous events within Site boundary. Project not a potentially hazardous industry under the Hazards SEPP 2021	Negligible off-site
Social	Positive impacts include employment, community benefit initiatives, VPAs with both councils, and First Nations cultural programs. Construction-phase accommodation pressure is the most material negative impact	Medium (accommodation, cumulative) / Low (all other negative impacts)
Cumulative	Low to moderate across all factors. Workforce accommodation is the most material cumulative concern, reducing to low with implementation of the Preliminary Accommodation Strategy	Low to medium

7.8 Ecologically Sustainable Development

The Project has been assessed against the principles of Ecologically Sustainable Development (ESD):

- The precautionary principle has been applied throughout the assessment process. Where uncertainty exists, conservative assumptions have been adopted, with additional surveys committed to as part of the Response to Submissions process. Design modifications have been made proactively to avoid identified risks
- Intergenerational equity is advanced by the Project's primary function: providing the firming capacity needed to accelerate the transition from fossil fuel-based generation to renewable energy, thereby reducing carbon emissions and preserving climatic conditions for future generations. The Project's 25-year operational life is designed to evolve with technology, with provisions for repowering or technology replacement at the end of the design life. The implementation of the Project's Benefit Sharing Strategy over the life of the Project will also ensure that benefits are distributed across generations.
- The conservation of biological diversity and ecological integrity is addressed through the biodiversity assessment and offset strategy, which ensures that unavoidable residual impacts to threatened ecological communities and species are offset in accordance with the BC Act and EPBC Act. The design has been refined to avoid areas of higher ecological value, and a Biodiversity Management Plan will govern construction and operational management of biodiversity risks
- The improved valuation and pricing of environmental resources is reflected in the Project's contribution to reducing the social cost of carbon through displacing fossil fuel-based firming. The Biodiversity Offsets Scheme assigns a measurable value to the ecological resources affected by the Project and requires their compensation through the market. The Project also bears the cost for additional mitigation measures such as noise walls to minimise noise impacts and landscaping to mitigation visual amenity.

7.9 Overall Evaluation

The Project represents a well-justified, strategically aligned and carefully designed response to NSW's need for large-scale, dispatchable energy storage during a period of transition in the electricity system. Its benefits - including grid reliability, renewable energy integration, emissions reduction, local employment and community benefit - are substantial and extend well beyond the immediate locality. The Proponent has made letters of offer to identify the commercial terms for a Voluntary Planning Agreement with Upper Hunter Shire Council (accepted by Council resolution in February 2026) and Muswellbrook Shire Council (currently under consideration). In addition, Maizewood has committed to funding community initiatives over the life of the Project through the Project Benefit Sharing Strategy.

The environmental impacts of the Project are, with limited exceptions, low to moderate and are manageable through the comprehensive mitigation and management framework established in this EIS. Where unavoidable residual impacts remain, these are addressed through appropriate offsetting mechanisms or specific impact agreements. No Serious and Irreversible Impacts have been identified.

The Project is consistent with the relevant strategic policy framework, makes efficient use of an appropriately located and serviced Site, and has been subject to extensive community and stakeholder engagement.

The overall rationale and merits of the Project can be summarised as:

- The need for the Project is established through comprehensive Government policy
- The Site is suitable for its intended use and minimises conflict with surrounding areas
- The environmental, social and economic impacts have been thoroughly assessed, mitigated and offset
- Reasonable alternatives have been considered
- Avoidance, minimisation and mitigation measures have been incorporated into the design
- Residual impacts are acceptable and can be appropriately managed
- The Project will deliver material public benefit to the local communities through Voluntary Planning Agreements with both Councils and a Benefit Sharing Strategy to fund community initiatives.

Considering the significant public benefits provided by the Project both in its role in supporting the renewable energy transition and through commitments to share the benefits of the Project with the local community, and the efforts to address impacts through avoidance, minimisation and offsetting, the Project has clear merit and is in the public interest.

8 Conclusion

This EIS has been prepared by EME Advisory on behalf of Maizewood Pty Ltd in support of an application for SSD consent (SSD-61707209) for the Upper Hunter Battery Energy Storage System. The Project involves the construction and operation of a lithium-ion BESS with a capacity of up to 400 MW / 920 MWh, including a 330 kV overhead transmission line, switching station, and associated infrastructure within the Upper Hunter Shire and Muswellbrook Shire LGAs.

The EIS has been prepared in accordance with Part 8, Division 5 of the EP&A Regulation and the Department's EIS Guidelines, addressing all matters required by the SEARs (issued 28 September 2023, extended to 28 September 2026) and supplementary SEARs (issued 20 January 2026) following the Project's determination as a controlled action under the EPBC Act (EPBC 2025/10353).

The Project directly supports NSW's transition to a net-zero energy system, aligning with a comprehensive suite of international, national, state and regional policy frameworks and responding to the well-documented need for dispatchable firming capacity as coal-fired generation retires from the NEM. The Site is well-suited to the Project, comprising historically cleared land with direct access to existing high-voltage transmission infrastructure, no identified contamination, no BSAL or SSAL, and no listed historic heritage items.

The environmental assessment demonstrates that the Project's impacts are, with limited exceptions, low to moderate across all assessed factors and are comprehensively addressed through the mitigation, management and offset framework established in this EIS. No Serious and Irreversible Impacts have been identified. Residual biodiversity impacts will be offset through the NSW Biodiversity Offsets Scheme. Operational noise complies with the NPfl at all assessed receivers. All credible hazardous event consequence distances are contained within the Site boundary. Social impacts are on balance positive, with community benefit delivered through VPAs with both Councils and the Community Benefits Strategy. Cumulative impacts are assessed as low to medium, with workforce accommodation addressed through the Preliminary Accommodation Strategy.

Extensive community and stakeholder engagement has been undertaken since May 2023, with feedback directly informing Project design.

The Project is permissible as SSD under the EP&A Act, is consistent with all relevant statutory and strategic frameworks, and has been subject to thorough environmental assessment and extensive community engagement. Having regard to the environmental, economic and social assessment presented in this EIS, and the principles of ecologically sustainable development, the Projects impacts are well understood, can be appropriately managed, and are acceptable when balanced against the project's benefits.

9 References

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Appendix A SEARs Compliance Table

This EIS has been prepared to address the SEARs as outlined in **Table 78**.

Table 78 SEARS Cross Reference

SEARs	Details	EIS Section
SSD-61707209 - Upper Hunter Battery Energy Storage System		
SEARs issued 16 July 2025		
General requirements	The Environmental Impact Statement (EIS) for the development must comply with the requirements in Part 8, of the Environmental Planning and Assessment Regulation 2021 (the Regulation) and must have regard to the State Significant Development Guidelines and any relevant planning circulars.	The EIS has been prepared consistent with the form and content requirements of Part 8 of the Regulation and the SSD Preparing an EIS Guideline.
	In particular, the EIS must include: • A stand-alone executive summary; • A full description of the development, including: ○ Details of construction, operation and decommissioning, including any staging of the development; ○ A description of the physical elements of the development including the form, maximum height and materials (including ancillary infrastructure); ○ A high quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure, and accommodation camps, that would be required for the development, but the subject of a separate approvals process); ○ The Project Area (as per Table 1 of the SSD guidelines – preparing an environmental impact statement) and Development Footprint (disturbance area including but not limited to areas for infrastructure, road works, access tracks, defensible space, fencing and temporary laydown); ○ A high-quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development; and ○ Confirmation if the project is designated development in accordance with the Environmental Planning and Assessment Act 1979 (EP&A Act) and the EP&A Regulation	Executive Summary Section 3; Section 3.3 Project Components Appendix B. Drawing DRG-PB-0003 shows all infrastructure. Section 3.2 Project Extents and Disturbance Footprint Site constraints are identified across numerous figures. Section 2.2. describes how the project siting and design has responded to constraints.
	Consistency in information presented in the EIS and all technical reports, including distances, development footprint, project design and infrastructure proposed, construction timeframes and receiver numbers;	Throughout
	A strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including existing land use, other proposed or approved energy facilities, major projects, rural/residential development, Crown lands within and adjacent to the project site and subdivision potential);	Section 2.2 describes the suitability of the site

SEARs	Details	EIS Section
	A risk assessment of the potential impacts of the development, identifying the key issues for further assessment;	Section 6.1 and the SEARs
	• An assessment of the likely impacts of the development on the environment, and any other significant issues identified in the above risk assessment, focusing on the specific issues identified below, including: • A description of the existing environment likely to be affected by the development using sufficient baseline data; • An assessment of the likely impacts of all stages of the Development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing, approved or proposed developments in the region and impacts on the site and any road upgrades, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the Cumulative Impact Assessment Guideline (DPE, 2022); • A description and assessment if staging of the project is proposed including any site mobilisation or pre-construction works; • A description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and • A description of the measures that would be implemented to monitor and report on the environmental performance of the development;	Section 6 summarises the detailed impacts assessments provided in the Appendices and provides an assessment of impacts for those matters for which a detailed impact assessment was not prepared. Cumulative impacts are assessed in Section 6.14 Avoidance is described in Section 2.2.5.1 Mitigation and offset measures are described throughout Section 6 and consolidated in Appendix E A CEMP and OEMP would be developed in response to a condition of consent and would include monitoring and reporting provisions.
	A model for community benefit sharing, prepared in accordance with the Benefit Sharing Guideline, including the terms of any proposed voluntary planning agreement with the relevant local council;	A Benefit Sharing Strategy has been prepared and is referenced throughout the EIS. Benefit sharing discussions are ongoing with relevant community groups (refer to Section 5)
	A consolidated summary table of all the proposed environmental mitigation, management and monitoring measures, identifying all the commitments in the EIS;	Appendix C
	• A detailed evaluation of the merits of the project as a whole, having regard to: ○ The requirements in section 4.15 of the EP&A Act, including the objects of the act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development; ○ The suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses;	Section 7

SEARs	Details	EIS Section
	Feasible alternatives to the development and its key components, including siting and project design alternatives to avoid areas of biodiversity value and high archaeological sensitivity, opportunities for shared infrastructure with proposed developments in the region, and the consequences of not carrying out the development; and	
	A detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter	Section 2.1
	The EIS must also be accompanied by an Estimated Development Cost (EDC) report, providing: • A detailed calculation of the EDC of the development prepared in accordance with the relevant planning circular using the Standard Form of EDC Report. • An estimate of the retained and new jobs that would be created during the construction and operational phases, including details of the methodology to determine the figures provided.	Appendix P Job estimates are provided in Section 3
	The development application must also be accompanied by: • The consent of the owner/s of the land (as required in Section 23(1) of the EP&A Regulation); and • A declaration from a Registered Environmental Assessment Practitioner that the EIS includes the information specified in the Department's Registered Environmental Assessment Practitioner Guidelines.	Owners consent has been obtained from all landowners REAP declaration provided.
Key issues - Biodiversity	Biodiversity – including: • An assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 (NSW) (BC Act), having regard to the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must: ○ Be prepared using the approved BDAR template; ○ Document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM; ○ Assess the impacts associated with all ancillary infrastructure, including the transport route road upgrades; ○ Include an assessment for serious and irreversible impacts (SAII) in accordance with Section 9.1 of the BAM; ○ Include a strategy to offset any residual impacts of the development in accordance with the BC Act; and ○ Be finalised by an accredited assessor as BAM-compliant within 14 days of submission;	BDAR provided in Appendix D; and summarised Section 6.2 of the EIS BDAR compliance requirements are provided in Appendix 1 to the BDAR Section 8 Avoid and Minimise Impacts Section 11 (Impact Summary) and Section 12 Biodiversity Credit Report and Appendix 6 Credit Reports Refer to BDAR Declaration on page XVIII Section 2.5 Aquatic Species Section 9.6 Cumulative Impacts

SEARs	Details	EIS Section
	• Unless Conservation Programs, Heritage and Regulation Group (CPHR) and the Department of Planning, Housing and Infrastructure (DPHI) determine the proposed development is not likely to have any significant impacts on biodiversity values; • An assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts; • A cumulative impact assessment of biodiversity values in the region from nearby developments; and • If an offset is required, details of the measures proposed to address the offset obligations.	
Key Issues - Heritage	An Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), identifying, describing and assessing impacts to Aboriginal cultural heritage sites or values (including earthworks, construction works and road upgrades) including results of archaeological test excavations (where required), undertaken in accordance with the relevant standards and requirements	ACHAR provided in Appendix E and summarised in EIS Section 6.3
	Evidence of adequate consultation with Aboriginal communities in determining and assessing impacts, identifying avoidance options and appropriate mitigation measures, having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	The process of consultation with Aboriginal cultural knowledge holders is described in Section 3 of the ACHAR.
	An assessment of historic heritage (including archaeological impacts) in accordance with the Guidelines for Preparing a Statement of Heritage Impact	A Statement of Heritage Impact is provided Appendix F and summarised in EIS Section 6.3
Key Issues - Land	Detailed justification of site suitability having regard to potential environmental impacts, land contamination, permissibility, strategic context and existing site constraints	Site suitability addressed in EIS Section 7.4 Land and agriculture Appendix G ; EIS Section 6.4 ; Section 1.5.3 ; Section 2.2
	Assessment of potential impacts on existing land uses on the site and adjacent land including: Agricultural land, flood prone land, nearby drinking water catchments, Crown lands, mining, quarries and mineral/petroleum rights (if relevant)	Flood and water Appendix L Land and agriculture Appendix G Mining, resources Section 6.13.3
	A soil survey to determine soil characteristics and consider potential for salinity, acid sulfate soils and erosion	Land and agriculture Appendix G

SEARs	Details	EIS Section
	A cumulative impact assessment of nearby developments	Land and agriculture Appendix G ; EIS Section 6.4 and Section 6.14
	An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: • Consideration of the zoning provisions applying to the land, including subdivision (if required); • Completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industries Land Use Conflict Risk Assessment Guide (if required); • An assessment of impact on agricultural resources and agricultural production on the site and region; and	Land and agriculture Appendix G ; EIS Section 6.4 and Section 1.5.3.1
	A preliminary investigation into potential contamination across the site, in accordance with the State Environmental Planning Policy (Resilience and Hazards) 2021 (Hazards SEPP) (as required).	Land and agriculture Appendix G
Key Issues - Landscape and Visual	Detailed assessment of likely visual impacts on surrounding residences (including approved developments, lodged das and dwelling entitlements), key locations, scenic quality of significant vistas and road corridors in the public domain	LVIA Appendix H and EIS Section 6.5 Section 6.2.2.8 and 6.4.2 of Appendix H public view point assessment and private view point asse Section 6.4.3 of Appendix H Views from approved developments, lodged development applications and dwelling entitlements.
	Details of measures to mitigate and/or manage potential impacts including a draft landscaping plan for on-site perimeter planting developed in consultation with affected landowners	Section 8 of Appendix H and EIS Section 6.5 Appendix B to Appendix H Concept Landscape Plan
Key Issues - Noise	An assessment of the construction noise impacts (including impacts from proposed road upgrades) of the development in accordance with the Interim Construction Noise Guideline (ICNG), operational noise impacts in accordance with the NSW Noise Policy for Industry (2017), assess traffic noise having regard to the NSW Road Noise Policy (DECCW, 2011) and cumulative noise impacts (considering other developments in the area), including (where appropriate):	Noise Impact Assessment Appendix I summarised in EIS Section 6.6
	Identification of impacts associated with construction, site emission and traffic generation at noise affected sensitive receivers, including the provision of operational noise contours	Section 6.1 of Appendix I Construction noise; EIS Section 6.6
	Details of noise monitoring survey, background noise levels and amenity noise levels at the most-affected residential receivers;	Sections 3 and 4 of Appendix I noise monitoring and criteria

SEARs	Details	EIS Section
		EIS Section 6.6
	Details of likely daily charging/discharging load profile, manufacturer specifications for plant and equipment and noise source inventory (including intensity, quantity, location, directivity and frequency information);	Section 5.2.1 of Appendix I noise scenarios and sources; EIS Section 6.6
	Assessment of 'worst case' noise emission scenarios during periods of discharging and charging	Section 5.2 of Appendix I Operational noise assessment ; EIS Section 6.6
	Consideration of annoying noise characteristics and prevailing meteorological conditions in the study area	EIS Section 5.2.2 of Appendix I correction for annoying noise ; EIS Section 6.6
	Details and analysis of the effectiveness of proposed management and mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration impacts following application of these mitigation measures and details of any proposed compliance monitoring programs.	Section 8 of Appendix I Mitigation; EIS Section 6.6
Key Issues - Transport	An assessment of the peak and average traffic generation, including light vehicles (including shuttle buses), heavy vehicles, heavy vehicles requiring escort, high risk heavy vehicles requiring escort (noting Table 1 in TfNSW Fact Sheet - Transport Management Plans for Over Size and/or Overmass Movements in NSW) and construction worker transportation;	Appendix J TIA; Appendix K OSOM; EIS Section 6.7
	An assessment of the likely transport impacts to site access routes, road capacity, conditions, safety and intersection, taking into consideration the above listed vehicles, site access points and any crown land;	Section 4 of Appendix J ; EIS Section 6.7
	A concept Level Route Analysis required for heavy vehicles requiring escort and high risk heavy vehicles requiring escort; a cumulative impact assessment of traffic from nearby developments (including mining operations); and	Section 4 and 5 of Appendix K route analysis; EIS Section 6.7
	Provide details of measures to mitigate and / or manage potential impacts (developed in consultation with the relevant road authorities) including: • A schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), • Strategic concept designs of proposed road upgrades (including the site access point); and Road maintenance contributions, and any other traffic control measures.	Section 4.5 of Appendix J mitigation measures; Section 4.2.7 of Appendix K identifies road upgrades with indicative extents shown in Appendix A to Appendix M; EIS Section 6.7

SEARs	Details	EIS Section
Key Issues - Water and Soils	An assessment of the likely impacts of the development (including flooding and pre and post development flood modelling) on surrounding watercourses (including their Strahler Stream Order), groundwater resources and surface water movements, and measures proposed to monitor, reduce and mitigate these impacts including water management;	Appendix L; Section 6.8 Section 7, 8, 9, 10 of Appendix N Surface Water, Groundwater, Water Supply and Flood Behaviour Assessment
	A site water balance for the development;	Section 9 Appendix L
	Details of water requirements and supply arrangements for construction and operation (including consultation with suppliers);	Section 9 Appendix L
	A description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004) and Managing Urban Stormwater: Soils and construction – Volume 2A manual (Landcom, 2008);	Section 6.1.1 Appendix L
	Assessment of the impacts of the development on hydrology and groundwater (if extraction or interference is proposed), including any changes to overland flows and groundwater levels on-site or off-site, and detail design solutions and operational procedures to manage impacts;	Sections 7 and 8 of Appendix L
	Where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPE, 2013); and	Section 6.2.4 of Appendix L
	Identification of any flood risk on site having regard to adopted flood studies, the potential effects of climate change and any relevant provisions of the NSW Flood Risk Management Manual;	Section 9 of Appendix L
	Where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a flood impact and risk assessment (FIRA) prepared in accordance with the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01; and	Section 9 of Appendix L
	Detailed design solutions and operational procedures to mitigate flood risk where required	Section 9 of Appendix L
Key Issues - Hazards	Health - an assessment of potential hazards and risks including but not limited to fires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields;	Appendix N PHA; Section 6.10 Section 5.2 and 5.5 of Appendix N Exposure to EMF Appendix M Bushfire Section 3 of Appendix N

SEARs	Details	EIS Section
	Bushfire – a bush fire hazard assessment completed by a suitably qualified consultant and identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a BESS would cause a bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019; Dangerous Goods - a preliminary risk screening completed in accordance with the Hazards SEPP 2021; and Battery Energy Storage System - a Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (dop, 2011) and Multi-Level Risk Assessment. The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with Hazardous Industry Advisory Paper No. 4, Risk Criteria for Land Use Safety Planning. The PHA must consider the effect of bushfires on batteries or other components of the BESS	Appendix N including Section 7 BESS Separation Distances. HIPAP 4 addressed throughout PHA
Key Issues - Social	Including an assessment of the social impacts or benefits of the project for the region and the State as a whole in accordance with the Social Impact Assessment Guideline (DPE, 2023), including consideration of any increase in demand for community infrastructure services, and consideration of construction workforce accommodation.	Appendix O; Section 6.11
	Consideration of any increase in demand for community infrastructure and services	Section 5.12 of Appendix O considers impacts on community access to services ; EIS Section 6.11
	Consideration of construction workforce accommodation	Appendix Q; Section 6.11
Key Issues - Economic and Benefit Sharing	Assessment of economic impacts or benefits for the region and State as a whole	Section 5.11 of Appendix O outlines the approach to benefit sharing; Section 6.11
	Details of any proposed voluntary benefit sharing having regard to the Benefit Sharing Guideline 2024 and Private Agreement Guideline 2024	Section 6.11
Key Issues - Waste	Identify, quantify and classify likely waste streams to be generated during construction, operation and decommissioning	Section 6.12
	Describe measures to manage, reuse, recycle and safely dispose of waste in consultation with waste facilities including Council	Section 6.12
Plans and Documents	All relevant plans, diagrams and documentation required under the SSD Guidelines and Part 3 of the EP&A Regulation, provided as part of the EIS rather than as separate documents	All Appendices
	High quality files of maps and figures of the subject site and proposal	Appendix B

SEARs	Details	EIS Section
Engagement	Consult with relevant local, State and Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence/mineral title holders	Section 5
	Undertake detailed consultation with affected landowners surrounding the development	Section 5
	Undertake detailed consultation with the owners of all exploration licences across the proposed development	N/A
	Undertake detailed consultation with the operator of any pipelines on or adjacent to the site	N/A
	Undertake detailed consultation with all relevant government agencies including the relevant local Council	Section 5
	Detail how engagement was consistent with the Undertaking Engagement Guidelines for State Significant Projects (DPHI, 2024)	Section 5
	Describe the consultation process and issues raised, and identify where the design has been amended in response. Where amendments have not been made, provide an explanation	Section 5
Supplementary SEARs		
EPBC Act - EPBC 2025/10353	On 8 December 2025, the proposed action was determined a controlled action under s.75 of the EPBC Act 1999. Controlling provisions: listed threatened species and communities (ss.18 and 18A). The EIS must address all matters in Schedule 4 of the EPBC Regulations and the requirements below.	Section 1.3.2; Section 4.1
General Requirements - Project Description	The title of the action, background to the action and current status	Section 1.3; Section 1.1
	The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on Matters of National Environmental Significance (MNES)	Section 3; Section 1.4
	How the action relates to any other actions that have been, or are being taken, in the region affected by the action	Appendix D; Section 6.2
	How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES	Section 3
General Requirements - Impacts	A description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts on matters protected by the controlling provisions	Appendix D; Section 6.2

SEARs	Details	EIS Section
	A statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible	Section 9.8 of Appendix D
	Analysis of the significance of the relevant impacts	Section 3.2 of Appendix D
	Any technical data and other information used or needed to make a detailed assessment of the relevant impacts	Section 1.5 (Information Sources) of Appendix D including Appendix 4 vegetation survey data
General Requirements - Avoidance, Mitigation and Offsetting	A description, and an assessment of the expected or predicted effectiveness of the mitigation measures	Table 9.7 of Appendix D includes consideration of effectiveness of mitigation measures
	Any statutory policy basis for the mitigation measures	Section 1.2 of Appendix D
	The cost of the mitigation measures	Section 12 (Biodiversity Credit Report) of Appendix D
	An outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing	Table 9.7 of Appendix D
	The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program	Mitigation measures will be finalised in a post-approval BMP to be endorsed by CPHR division
	Where a significant residual adverse impact to a relevant protected matter is considered likely: information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy	Appendix D
	For each relevant matter likely to be impacted: reference to and consideration of relevant Commonwealth guidelines and policy statements including any conservation advice or recovery plan, relevant threat abatement plan, wildlife conservation plan, and any strategic assessment	Appendix D
Key Issues - Biodiversity (EPBC Act)	Identify each EPBC Act listed threatened species, community and migratory species likely to be impacted. For likely impacts, provide a description of the nature, quantum and consequences. For species potentially located in the project area or vicinity that are not likely to be impacted, provide evidence why	Section 1.4 of Appendix D ; Section 6.2
	For each EPBC listed threatened species, community and migratory species likely to be impacted, provide a separate description of the habitat including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival, with consideration of and reference to relevant Commonwealth guidelines, conservation advice and recovery plans	Section 7 of Appendix D

SEARs	Details	EIS Section
	Details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements	Section 2 of Appendix D
	Description of the relevant impacts of the action having regard to the full national extent of the species or community's range	Section 11 of Appendix D
	Description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action	Section 8 of Appendix D
	Identification of significant residual adverse impacts likely to occur after proposed avoidance and mitigation activities are taken into account	Section 9.7 of Appendix D
	A description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established	Section 9.7 of Appendix D
	Details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts	Section 11.1 of Appendix D
	Details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites	Section 12 of Appendix D
	Any significant residual impacts not addressed by the BAM must be addressed in accordance with the EPBC Act 1999 Environmental Offsets Policy	Section 12 of Appendix D
Other Approvals and Conditions	Information in relation to any other approvals or conditions required, including the information prescribed in Schedule 4 Clause 5(a)(b)(c) and (d) of the EPBC Regulations	n/a
Environmental Record	Information in relation to the environmental record of the person proposing to take the action, including details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations	EIS Section 1.2
Information Sources	For information given in the EIS, state the source of the information, how recent the information is, how the reliability of the information was tested, and what uncertainties (if any) are in the information	Section 1.5 of Appendix D
Protected Matters (Appendix A - EPBC 2025/10353)	The following protected matters have been identified as likely to be significantly impacted, requiring a further assessment of significance and assessment of proposed avoidance, mitigation and offset measures: Central Hunter Valley eucalypt forest and woodland ecological community - Critically Endangered Hunter Valley Delma (<i>Delma vescolinata</i>) - Endangered	Section 7 of Appendix D ; EIS Section 6.2

SEARs	Details	EIS Section
	- Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>) - Endangered - Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) - Vulnerable Brown Treecreeper (south-eastern) (<i>Climacteris picumnus victoriana</i>) - Vulnerable	
	Key risks from the Commonwealth perspective: - Likely and potential direct and indirect impacts to EPBC listed threatened species and ecological communities from clearing - Likely potential prescribed impacts related to clearing of Category 1 - Exempt lands and non-native vegetation Likely and potential direct and indirect impacts (including prescribed impacts) to EPBC listed threatened species from ongoing operation and maintenance	Section 7 of Appendix D ; EIS Section 6.2
Department of Planning and Environment - Biodiversity Conservation Division (BCD) 31 August 2023		
Biodiversity	- Biodiversity impacts related to the proposed development (SSD-61707209) are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method 2020. - The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020. - The BDAR must include details of the measures proposed to address the offset obligation as follows - The total number and classes of biodiversity credits required to be retired for the development/project; - The number and classes of like-for-like biodiversity credits proposed to be retired; - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; - Any proposal to fund a biodiversity conservation action; - Any proposal to conduct ecological rehabilitation (if a mining project) - Any proposal to make a payment to the Biodiversity Conservation Fund. - If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits. - The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.	Appendix D BDAR BDAR compliance requirements are provided in Appendix 1 to the BDAR Chapter 8 Avoid and Minimise Impacts Chapter 11 (Impact Summary) and Chapter 12 Biodiversity Credit Report and Appendix 6 Credit Reports n/a Refer to BDAR Declaration of page XVIII
Water and soils	The EIS must map the following features relevant to water and soils including:	Section 3.2.8 Soil Hazard Features of Appendix D BDAR

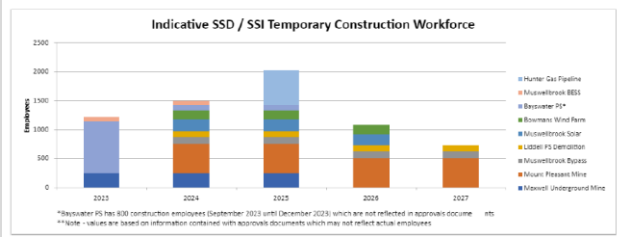
SEARs	Details	EIS Section
	○ Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map). ○ Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method). ○ Wetlands as described in s4.2 of the Biodiversity Assessment Method. ○ Groundwater. ○ Groundwater dependent ecosystems. ○ Proposed intake and discharge locations.	Section 3.2.2 Rivers, streams, estuaries and wetlands of the BDAR Section 3.2.1 Threatened Ecological Communities Significance Impact Assessment of the BDAR Section 9.5.2 Waterbodies, water quality and hydrological processes of the BDAR
	● The EIS must describe background conditions for any water resource likely to be affected by the development, including: ○ Existing surface and groundwater. ○ Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. ○ Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. ○ Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.	Appendix L Surface Water Assessment Section 3 Existing Water Environment and Site Soils Section 6.2.2 Hydrological Impact and Section 6.2.3 Water Quality Impact Section 5 Water Quality Section 5.3 ANZG 2018 Default Water Quality Trigger Values
	● The EIS must assess the impacts of the development on water quality, including: ○ The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. ○ Identification of proposed monitoring of water quality.	Appendix L Surface Water Assessment Section 6.2.3 Water Quality Impact Section 6.2.3 Water Quality Impact identifies proposed monitoring approach.
	● The EIS must assess the impact of the development on hydrology, including: ○ Water balance including quantity, quality and source. ○ Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. ○ Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.	Appendix L Surface Water Assessment Section 6.2.2 Hydrological Impact Section 8 addresses Water Supply during construction and operation.

SEARs	Details	EIS Section
	- Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches). - Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water. - Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options. - Identification of proposed monitoring of hydrological attributes.	Section 7 Groundwater describes impacts to Existing Water Users (Section 7.3)
Flooding and coastal erosion	- The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: - Flood prone land. - Flood planning area, the area below the flood planning level. - Hydraulic categorisation (floodways and flood storage areas).	Appendix L Surface Water Assessment Section 9.2 Existing describes flood prone land and the flood planning area 9.6.2 Site inundation, Discharges, Flood Levels and Velocities
	The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.	Appendix L Surface Water Assessment Section 9 Flood Behaviour including Section 9.3 Hydrology and Flooding Methodology and Section 9.4 Critical Duration Storms
	- The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios: - Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	Appendix L Surface Water Assessment Section 9.4 Critical Duration Storms (including climate change scenarios), Section 9.5 Wells Gully Modelling and Section 9.6 BESS Catchment Modelling
	- Modelling in the EIS must consider and document: - The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. - Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. - Relevant provisions of the NSW Floodplain Development Manual 2005.	Appendix L Surface Water Assessment Section 9 Flood Behaviour including Section 9.4 Critical Duration Storms (including climate change scenarios) Section 9.5 Wells Gully Modelling and Section 9.6 BESS Catchment Modelling
	The EIS must assess the impacts on the proposed development on flood behaviour, including:	Appendix L Surface Water Assessment

SEARs	Details	EIS Section
	- Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure. - Consistency with Council floodplain risk management plans. - Compatibility with the flood hazard of the land. - Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land. - Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site. - Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses. - Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council. - Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council. - Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES. - Any impacts the development may have on the social and economic costs to the community as consequence of flooding.	Section 9 Flood Behaviour including Section 9.5 Wells Gully Modelling and Section 9.6 BESS Catchment Modelling Section 11 Summary of proposed mitigation measures
Coastal processes and management	- The EIS must describe the potential effects of coastal processes and hazards (within the meaning of the Coastal Management Act 2016), including sea level rise and climate change: - On the proposed development - Arising from the proposed development	The site is not affected by coastal processes and hazards. Climate change considerations are addressed through the 1:500 event in the Flood Assessment.
	The EIS must consider have regard to any certified Coastal Management Program (or Coastal Zone Management Plan) and be consistent with the management objectives described in the Coastal Management Act 2016 and development controls for coastal management areas mapped under the State Environmental Planning Policy (Coastal Management) 2018.	The site is not located in an area to which Chapter 2 of the State Environmental Planning Policy (Resilience and Hazards) 2021 apply.
Department of Planning and Environment – Crown Lands 13 September 2023		
Crown lands	As no Crown land, roads or waterways are in the vicinity of the proposal/are affected by the proposal, Crown Lands has no comments at this time.	n/a

SEARs	Details	EIS Section
Department of Primary Industries – Agriculture 7 September 2023		
Land and agriculture	- DPI Agriculture supports the commitment to undertake a Land Use Conflict Risk Assessment (LUCRA) to address issues related to the current and surrounding land uses. - I note the scoping report has conducted an initial identification of the soil landscapes via the eSpade database and a commitment to conduct a soil survey, also required by the draft SEARs. DPI Agriculture supports the confirmation of the land and soil capability (LSC) considering the nearby identified Biophysical Strategic Agricultural Land (BSAL), Critical Industry Cluster (Equine) and draft SSAL. - DPI Agriculture requests that the Rehabilitation and Decommissioning/Closure Management Plan should include, but not be limited to, describing the potential design criteria of the final land use and landform, and the removal of any underground cables, along with the expected timeline for the rehabilitation program.	Appendix G Land and Agriculture Assessment Appendix 1 of the Land and Agriculture Assessment includes a Land Use Conflict Risk Assessment Soil Survey and Site Verification is provided in Section 3.2 of Appendix G A Rehabilitation and Decommissioning Plan is provided as Appendix 4 to Appendix G. The criteria for final land use are summarised in Section 6.5 of Appendix G.
Department of Primary Industries – Fisheries 11 September 2023		
Fisheries	DPI Fisheries has reviewed the scoping report and notes that the proposed works footprint is intercepted by two watercourses that appear to be third order streams using the Strahler stream order systems. These watercourses have not been previously mapped as containing key fish habitat, and as such, will require on site investigation to determine the presence of key fish habitat	Sections 2.5, 3.2.2, 5.3.3 and 9.5.2 of Appendix D BDAR describe aquatic / fish habitat and potential impacts.
	- DPI Fisheries therefore recommends that the SEARs should request the following: - Information on the likely direct and indirect impacts to key fish habitat within and adjacent to the development footprint associated with construction and operation of the facility. - Information on how the development will avoid, minimise and mitigate, and where necessary, offset development and operational impacts to key fish habitat.	Appendix D BDAR As above Avoidance is described in Section 8 of the BDAR and offsets are described in Sections 11 and 12.
	DPI Fisheries' standard minimum information requirements for environmental assessment are clearly detailed in section 3.3 of the DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management (2013). Please ensure that the proponent addresses these requirements in their environmental studies. This will facilitate effective assessment of the proposal and reduce delays.	Appendix D BDAR Section 2.5 of the BDAR describes the approach to aquatic surveys and assessment of Key Fish Habitat.
Department of Planning and Environment – Heritage NSW 6 September 2023		

SEARs	Details	EIS Section
Historic heritage	The subject site is not listed on the State Heritage Register (SHR), nor is it in the immediate vicinity of any SHR items. Further, the site does not contain any known historical archaeological relics. Therefore, no heritage comments are required. The Department does not need to refer subsequent stages of this proposal to the Heritage Council of NSW.	A Statement of Heritage Impact (SoHI) is provided as Appendix F .
Department of Planning and Environment – Heritage NSW 12 September 2023		
Aboriginal cultural heritage	Provide an Aboriginal Cultural Heritage Assessment Report (ACHAR), prepared in accordance with relevant policy and guidelines, identifying, describing and assessing any impacts to Aboriginal cultural heritage sites or values associated with the project. The ACHAR must be prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of thorough archaeological survey and test excavations (where required); Include evidence of adequate and continuous consultation with Aboriginal stakeholders in determining and assessing impacts, developing and selecting options for avoidance of Aboriginal cultural heritage and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010).	An Aboriginal Cultural Heritage Assessment Report (ACHAR) is provided as Appendix E. The ACHAR has been prepared in accordance with relevant guidance as described in Section 1 of the ACHAR. The process of consultation with Aboriginal cultural knowledge holders is described in Section 3 of the ACHAR.
Regional NSW - Mining, Exploration & Geoscience 4 September 2023		
Mineral resources	MEG has reviewed the scoping report and draft SEARs for the Upper Hunter BESS and has no additional requirements to those in the draft SEARs document.	n/a
Muswellbrook Shire Council 11 September 2023		
Visual	Staff are particularly interested in the impacts to motorists travelling along the New England Highway toward and away from Muswellbrook, particularly the visual / aesthetic effect of the presence of the Project and how it impacts the perception of Muswellbrook. Staff request inclusion of photomontages from key vantage points on the New England Highway to either demonstrate that the Project will have no impact on motorists, and / or to show effective tree screening treatments that minimises any impact.	A Landscape and Visual Impact Assessment (LVIA) is provided in Appendix H. Section 6.2.2 provides an assessment of visual impacts from public viewpoints including from the New England Highway to the Project.

SEARs	Details	EIS Section
Cumulative Impacts	Workforce Accommodation and Housing There are multiple projects proposed within the Muswellbrook LGA with overlapping construction periods, as shown in the figure below. In addition to projects identified in Table 8 of the Scoping Report, the Proponent must consider temporary construction workforce requirements for the construction phases of Maxwell Underground Mine, Muswellbrook Bypass, and Hunter Valley Operations Coal Mine and the Liddell Power Station Demolition  Indicative SSD / SSI Temporary Construction Workforce The chart shows the number of temporary construction employees (SSD / SSI) required for various projects from 2023 to 2027. The projects include Hunter Gas Pipeline, Muswellbrook BESS, Bayswater DP, Bayswater Wind Farm, Muswellbrook Solar, Liddell PS Demolition, Muswellbrook Bypass, Mount Pleasant Mine, and Maxwell Underground Mine. The highest demand is in 2025, with approximately 2000 employees required. *Bayswater PS has 800 construction employees (September 2023 until December 2023) which are not reflected in approvals documents **Note - values are based on information contained within approvals documents which may not reflect actual employees	A Preliminary Workforce Accommodation Strategy is provided in Appendix Q and includes consideration of cumulative accommodation demand and information provided by Muswellbrook Shire Council in relation to cumulative demand. The Strategy will be updated in response to a condition of consent to provide a current assessment of available accommodation and taking account of update timelines for other projects.
	Staff request a commitment that an Accommodation Strategy be prepared post approval, prepared in accordance with DPE's 'Temporary and seasonal workers' accommodation draft guideline'. At a minimum, any Accommodation Strategy should: - Demonstrate how accommodation demand will be managed during periods of high demand e.g. during key regional events; - Document an approach to informing regional accommodation providers of project workforce accommodation demands including anticipated timing; - Enable the coordinated placement of the workforce in short-term accommodation throughout the Shire; - Keep key stakeholders informed of predicted project accommodation demands; and - Contain a monitoring framework incorporating 'triggers' in decisions about additional accommodation options.	As above.
	Noise A cumulative noise assessment should be undertaken that includes the nearby Dartbrook Mine Coal Handling and Processing Plant (CHPP).	A Noise Impact Assessment (NIA) is provided in Appendix I. The NIA included background noise monitoring including in the southern area of the site close to the Dartbrook Mine CHPP. Therefore noise from the CHPP is reflected in the noise impact assessment.
	Traffic The Proponent states they are not proposing to use any local Council roads to transport Project components to site i.e. all transport will be on State roads	A Traffic Impact Assessment is provided in Appendix J with an OSOM Assessment provided in Appendix K. Project vehicles will access the site using the New England Highway and Perth Street.

SEARs	Details	EIS Section
	The current position of Council is to object to all SSD applications that nominate the use of local roads in Muswellbrook Shire to transport over dimensioned components to another LGA, until EnergyCo, Transport for NSW and DPE develop a strategic solution to managing transport issues that is acceptable to Council. The use of Bell Street, Victoria Street and Market Street Muswellbrook will not be permitted for any heavy vehicles or heavy vehicles requiring escort and this will be required to be a condition of consent	Section 4.2 of the TIA Appendix J identifies the routes to be used by Project vehicles to access the site which involves the New England Highway and Perth Street. The OSOM routes are identified in Section 4.1 of the OSOM report Appendix K with a proposed route based on EnergyCo's Port to REZ and alternative route should the Port to REZ not be available in time.
Biodiversity	The final location of the transmission line should avoid areas of significant remnant native vegetation	The approach to avoidance of biodiversity impacts is described in Chapter 8 of the BDAR (Appendix D)
Waste	Construction Council's waste facility is licenced to accept the following classifications of waste: General Solid waste (putrescible) General Solid Waste (non-putrescible) Asbestos, safely delivered as per legislated requirements. No other waste types are permitted. Staff request a commitment from the Proponent that a Waste Management Plan be prepared in consultation with the relevant authority that includes waste volumes, types and disposal methods. A copy of the plan should be provided to Council's Waste Facility to prepare for any incoming waste.	Section 6.12 of the EIS provides an assessment waste that would be generated by the Project and options for how that waste would be managed, including the availability of waste management infrastructure and licensing constraints in Muswellbrook Shire Council. The waste assessment will be updated post-approval and will involve consultation with Council.
	Decommissioning Given the Muswellbrook Shire has recently been declared part of the Hunter Central Coast Renewable Energy Zone, it is essential that waste generated by multiple energy projects is managed responsibly. As recycling initiatives are still evolving, staff request a commitment that the Proponent will stay informed with the evolving recycling initiatives and waste management solutions in the renewable energy sector. This includes staying up to date with State and Federal recycling programs and exploring innovative recycling opportunities for components specific to a BESS.	The waste management approach referred to above (Section 6.12) includes the decommissioning phase.
Consultation	Staff request that the Proponent provide a presentation to Council's State Significant Development Committee prior to exhibition of any Environmental Impact Statement	Section 5 The Proponent is arranging a briefing with Council.
NSW Rural Fire Service 11 September 2023		

SEARs	Details	EIS Section
Bushfire	The New South Wales Rural Fire Service (NSW RFS) has reviewed the information provided and advises that a bush fire assessment report shall be prepared which identifies the extent to which the proposed development conforms with or deviates from the relevant provisions of Planning for Bush Fire Protection 2019	A Bushfire Assessment Report prepared in accordance with Planning for Bushfire Protection 2019 is provided in Appendix M .
Subsidence Advisory NSW 1 September 2023		
Subsidence	The project site is not within a declared Mine Subsidence District. Our records indicate there are no mine workings under the site. Under the Act, improvements constructed on properties that are not within Mine Subsidence Districts are eligible for compensation for damage caused by mine subsidence, provided construction has occurred in accordance with all relevant approvals.	n/a
Transport for NSW 4 September 2023		
Transport	To ensure that TfNSW's key interests are addressed, TfNSW requests that any future application be submitted with an Environmental Impact Assessment (EIA) containing a Traffic Impact Assessment (TIA), prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, Australian Standards and any complementary TfNSW Supplements, and Roads and Maritime Guide to Traffic Generating Developments. The TIA should contain information listed in Attachment A: Traffic Impact Assessment (TIA).	A Traffic Impact Assessment is provided in Appendix J with an OSOM Assessment provided in Appendix K .
	If Oversize Overmass Vehicles (OSOM) are required for the transportation of materials, including batteries and transformers, further analysis will be required. In addition to the requested TIA, due to the significant scope of the transport logistics for OSOM transit, a concept-level route analysis is required to be provided with the SSD application based on high-level 3D swept path analysis to generally indicate locations where civil works are likely to be required. The route analysis is to include at a minimum the following: Identify the OSOM route to be utilised and any indicative pinch points within the network vertically, horizontally and laterally and the potential civil works required to accommodate the OSOM vehicles. The logistics assessment is to highlight each at-risk road structures that the haulage route crosses including bridges, traffic signals, signage, major culverts, and minor culverts that may not meet the desirable cover to cater for proposed axle loads. Provide bridge assessments for any at risk bridges on the classified road network due to the dimensions of the laden load.	An OSOM Assessment is provided at Appendix K. The OSOM Assessment identifies a preferred route based on the assumption that EnergyCo's Port to REZ road upgrades will be available in time for first OSOM movements, and an alternative route should Port to REZ not be available within required timeframes. See Section 4.1 of the OSOM Report. Pinch points and potential civil works are identified in Section 4.2 (Transformer Preferred Route) and Section 4.3. (Transformer Alternative Route). Bridges and Culverts are identified in Section 4.2.3.

SEARs	Details	EIS Section
	Pull-over bay locations for the design vehicle or identification of any long haulage segments of the route where overtaking cannot be achieved. Identify Pull-over Bay/layby locations (including GPS coordinates) and whether the pull-over bay/layby can physically accommodate the laden components (in terms of size, width and accessibility) for the largest OSOM laden components. The design vehicle templates used with the swept path analysis software are also requested in order for TfNSW to review the performance within the software. Provide the following measurements parameters of the OSOM components / materials to be moved: Identify all the types of OSOM vehicles proposed to be used for the project. Overall (component and nominated vehicle) combination length, width, height and mass Maximum component length, widths, heights and mass Maximum load heights (clearance to overhead obstructions such as structures, utilities and vegetation), Wheelbase dimensions, Maximum trailer articulation angle(s), Minimum overhang heights above the road surface, Axle loads and axle group loads in terms of both tonnes and Equivalent Standard Axles.	Structural assessment of bridges has not yet been undertaken other than for the Perth Street bridge – Section 4.2.3. Pull over bays and rest areas identified in Section 4.2.4 and 4.2.5. OSOM vehicle specification is provided in Section 3.
Upper Hunter Shire Council 10 September 2023		
Various	Upper Hunter Shire Council has reviewed the proposal and recommends that the following assessment requirements be included in the SEARS for the proposed development: 1. Social Impact Assessment 2. Land Use Conflict Risk Assessment 3. Traffic Impact Assessment 4. Bushfire Risk Assessment 5. Risk Screening Assessment 6. Biodiversity Development Assessment Report (BDAR) 7. Surface Water Assessment 8. Soil and Water Management Plan 9. Noise and Vibration Impact Assessment 10. Aboriginal Cultural Heritage Assessment 11. Waste Management Plan 12. Visual Impact Assessment 13. Air Quality Impact Assessment 14. Cumulative Impact Assessment	Appendix O: SIA Appendix G: Land and agriculture includes a LUCRA and Decommissioning and Rehabilitation Plan Appendix J Traffic Impact Assessment and Appendix K OSOM Assessment Appendix M Bushfire Appendix N Preliminary Hazard Analysis includes a Preliminary Risk Screening Appendix L Surface Water Assessment including an outline of Soil and Water Management measures (a detailed SWMP will be prepared in response to a condition of consent) Appendix I Noise Impact Assessment

SEARs	Details	EIS Section
	15. Workforce & Accommodation Strategy 16. Project decommissioning and site rehabilitation plan 17. Consideration of the Upper Hunter Shire Local Strategic Planning Statement and Upper Hunter Land Use Strategy 2017.	Appendix E ACHAR Waste management is assessed in Section 6.12 of the EIS Appendix H Landscape and Visual Impact Assessment An Air Quality Impact Assessment is provided in Section 6.13.1 of the EIS. A Cumulative Impact Assessment is provided in Section 6.14 of the EIS Appendix Q Preliminary Workforce Accommodation Strategy The Land Use Strategy is considered throughout the EIS.

Appendix B Detailed Maps and Plans

Appendix C Mitigation Measures Table

A consolidated list of mitigation measures has been provided in **Table 79**.

Table 79 Consolidated Mitigation Measure

Ref	Potential Impact	Phase	Mitigation measures
Biodiversity			
B-1	Impacts to native vegetation and fauna	Pre-construction Construction	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEE and approved by NSW DPHI prior to construction. The BMP will be prepared with input from a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the BDAR.
B-2	Impacts to native vegetation and fauna	Pre-construction Construction	All relevant Project personnel involved in vegetation clearance, including relevant sub-contractors, will be trained on biodiversity management protocols and the requirements for the Project through inductions, toolbox talks and targeted training. All relevant Project personnel will be provided with sensitive area maps (showing clearing boundaries and exclusion zones) and will be updated as required.
B-3	Impacts to hollow-bearing trees (HBTs)	Pre-construction Construction	Manage impacts on HBTs by conducting pre-clearance surveys and implement mitigation measures such as marking no-go zones and two-staged habitat removal process. Include procedures to record the effort and outcomes of the habitat removal process.
B-4	Impacts to native vegetation and fauna	Construction	Pre-clearing surveys will be completed by a suitability qualified and experienced ecologist. The proposed clearing extents will be marked out on site prior to the pre-clearing surveys. During the surveys, the ecologist will: • Survey the proposed clearing extent. • Identify any fauna habitat and fauna that will require relocation prior to clearing, document location of any fauna release sites. • Confirm the location and mark out the extents of any biodiversity exclusion zones including locations of unexpected finds (threatened species or threatened species habitat). • Confirm that HBTs to be retained within and adjacent to the clearing extents are clearly marked/tagged. Confirm that nest boxes are in place (where required) in suitable locations.
B-5	Impacts to native vegetation and fauna	Pre-construction Construction	A Vegetation and Habitat Clearance Protocol for the Project will be prepared. The Protocol for the Project would include, but not be limited to: • Staff and contractors involved in vegetation clearance works would be made aware of clearing limits via the ground disturbance process.

Ref	Potential Impact	Phase	Mitigation measures
			• Clear delineation of the areas to be disturbed prior to clearing activities; disturbance boundaries would be digitally captured and displayed within the Subject Land survey and GIS databases. This data would be made available either digitally or in map format. • Locate potential habitat features within the Subject Land that may require special management/ salvaging during clearing (such as the 57 HBTs identified as part of this BDAR, fallen logs and any other habitat feature). • Identify habitat features that can be salvaged (where practicable) for reuse in adjoining non-disturbed native vegetation areas. • Temporary or permanent protective fencing must be erected around all areas identified for retention (retained areas). • Works for clearing and construction of access tracks will be carried out in such a manner that the least practicable disturbance to actual ground cover and contours is caused. • A two-staged clearing process will be implemented after the pre-clearance assessment: ○ Stage 1 clearing will include the removal of non-habitat vegetation within a minimum of 48 hours of Stage 2 clearing; this will allow unassisted exodus of native fauna from remaining habitat. ○ Stage 2 clearing can commence under ecological supervision. • Ecological supervision: ○ A suitably trained and qualified ecologist or wildlife handler would be present during the clearing of identified habitat features to manage animals that may be encountered/displaced during the process ○ Options to minimise harm to fauna by modifying the clearance method may include shaking or nudging tree trunks to evacuate mobile fauna or lowering trees with suspected tree hollows being used by fauna with the hollow facing upwards to enable fauna to exit. If an animal is injured during these works, the fauna ecologist will ensure that they receive the appropriate level of care. Depending on the level of injury and status of the injured fauna, WIRES and/or the nearest veterinary clinic are to be contacted to retrieve the animal into care or to determine whether the veterinary staff can care for injured native animals. ○ Preparation and implementation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.

Ref	Potential Impact	Phase	Mitigation measures
B-6	Impacts to native vegetation and fauna	Construction	Logs and tree hollows that could provide fauna habitat (the total length of wood at least 10 cm in diameter and at least 0.5 m long) would be relocated to adjacent woodland and/or suitable woodland locations where available/feasible.
B-7	Impacts to native vegetation and fauna	Pre-construction Operation Post-operation	Preparation of a Soil and Water Management Plan (SWMP) as part of the BMP to manage water quality impacts to surface water, and groundwater and soils during construction of the Project. A SWMP would enable surface flow, groundwater and associated ecosystem functions to be monitored and managed through a structured approach that includes regular monitoring, impact assessment, and adaptive management. The SWMP will include a combination of the following: • Erosion and Sediment Control Plans (ESCPs) • Emergency Spill Procedure • Unexpected Contaminants Finds Protocol Hygiene protocols and construction staging to reduce pathogen and weed spread.
B-8	Indirect impacts to native vegetation and fauna	Pre-construction, construction	Preparation of an ESCP by a certified professional in erosion and sediment control: • Preparation of an ESCP as part of the SWMP to manage erosion and sedimentation impacts during construction of the Project • Regularly inspect and clean sediment control devices to ensure they are functioning properly and to prevent system failure during heavy rainfall events • Consideration of sediment controls (e.g. coir logs, sediment fencing, revegetation) to avoid indirect sedimentation into sensitive habitats (e.g. swamps and riparian areas) • Site specific erosion and sediment controls to be developed and implemented across construction areas, particularly at waterway crossings • The ESCPs will be developed for the activities and areas that are considered higher risk. The plans will detail the processes, responsibilities and measures to manage potential soil and water quality impacts in accordance with the principles and requirements in: • Emergency Spill Plans • Unexpected Contaminants Finds Protocol. • An ESCP will only be required for the Subject Land. The plan will detail the processes, responsibilities and measures to manage potential soil and water quality impacts in accordance with the principles and requirements in: ○ Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volumes 2A (DECC 2008a) and Volume 2C (DECC 2008b), commonly referred to as the 'Blue Book' ○ Best Practice Erosion and Sediment Control (International Erosion Control Association [IECA] 2012)

Ref	Potential Impact	Phase	Mitigation measures
			Guidelines for Controlled Activities on Waterfront Land (Natural Resources Access Regulator [NRAR] 2018).
B-9	Indirect impact to native vegetation and fauna	Pre-construction and construction	Mitigation measures would be implemented to manage and reduce bushfire risk. They would focus on education and training, annually assessing the bushfire hazards, minimising and controlling ignition sources (e.g. by appropriate engineering design, where relevant) and revising existing responses and evacuation strategies for the Subject Land. Standard bushfire protection measures include (Cool Burn 2025): • Asset Protection Zone (APZ) and landscape management actions required to protect assets and prevent the spread of fire (including, but not limited to slashing and mowing, potential agricultural activities for fuel management, landscaping and maintenance, property fire breaks) • Building and construction requirements, commensurate with the purpose/use and construction of the structures • Access provisions (e.g. public access, property access, construction access) • Water supply and utilities (power/electricity) Emergency management arrangements.
B-10	Indirect impacts due to light spill, noise and dust	Pre-construction, Construction	Light spill would be managed as follows: • Wherever possible, artificial light impacts during construction would be managed through shielding/directing light spill away from sensitive areas. Noise and vibration would be managed as follows: • All feasible and reasonable measures would be applied to reduce the potential noise, and vibration impacts from the Project. Dust suppression would be addressed as follows: • Reduced vehicle speeds during the construction phase • No dust generating work would be conducted during high winds • Stockpiles will be kept covered with material to prevent the generation of dust • Application of water as dust suppression during dust generating activities including access tracks where practicable
B-11	Indirect impact to native vegetation and fauna due to biosecurity risk	Pre-construction Construction Operation	A Biosecurity Management Plan will be developed as a part of the BMP, to be implemented during construction. The plan will include: • Biosecurity protocols for plant and equipment movement between sites, including species specific measures

Ref	Potential Impact	Phase	Mitigation measures
			• Protocols for the identification of priority weed species, relevant pests and diseases of concern, mandatory reporting obligations and management of Emergency, Control and Biosecurity zones as per the <i>NSW Biosecurity Act 2015</i> • Weed and pest animal management and monitoring requirements, where relevant • Inclusion of a Trigger Action Response Plan (TARP) for key biosecurity threats including known biosecurity threats to threatened species and populations • Locations, timing and methods for removing soil and plant matter from vehicles and machinery and sourcing clean soil and materials free of contaminants for construction work • Implement a weed hygiene protocol for all machinery and vehicles entering the Subject Land, including cleaning stations to remove soil and plant material • Clean down stations (water or air, dependent on the identified biosecurity risk) will be provided at suitable locations to clean down vehicles and the shoes of all site personnel to stop the spread of weeds and pathogens (e.g. Myrtle Rust, <i>Phytophthora cinnamomi</i>, KoRV and Chlamydia, Psittacine Circoviral Disease, and Chytrid Fungus) • Consult with relevant agencies and groups involved with pest management in order to contribute to existing or future monitoring and management programs A weed control strategy would be developed and implemented during the operational stage of the Project to manage existing or emerging issues.
B-12	Indirect impacts to native fauna due to vehicle collision	Construction	Education of construction teams will be provided regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.
B-13	Indirect impacts to avifauna	Pre-construction, Construction, Post-construction	Assess collision risk to fauna and aves from transmission infrastructure, and investigate installation of deterrent devices (e.g., flapper devices) to increase line visibility and reduce injury or mortality from collisions. Adaptive management may be required to manage impacts. To determine where design measures are warranted, a monitoring protocol is to be developed to guide the placement of deterrent devices and other design measures: • Pre-construction monitoring in areas identified as moderate to high risk • Post-construction seasonal monitoring in areas identified as moderate to high, where deterrent devices have been installed and adjacent to nearby raptor nests. Adaptive management measures must be instated, if high risk flyway areas are identified during pre and post construction monitoring.

Ref	Potential Impact	Phase	Mitigation measures
B-14	Residual direct impacts to biodiversity values	Prior to construction	Offset 285 ecosystem credits and 483 species credits through the NSW Biodiversity Offsets Scheme (BOS) in accordance with credit profiles specified in the BDAR
Aboriginal Cultural Heritage			
A-1	Harm to identified Aboriginal cultural heritage sites within the impact area	Pre-construction Construction	As the project is classified as a State Significant Development, an Aboriginal Heritage Impact Permit will not be required to impact Aboriginal cultural heritage sites. Instead, management of the sites within the Subject Area should be conducted by formulating an Aboriginal Cultural Heritage Management Plan (ACHMP) to manage the archaeological resources present. If any Aboriginal heritage sites identified within the Subject Area will be impacted by the proposal, the management measures to be implemented would be outlined in the ACHMP. These management and mitigation measures can be finalised once the nature of the impacts is known following the finalisation of the design and layout of the proposed works.
A-2	Harm to identified Aboriginal cultural heritage sites within the impact area	Ongoing	Ongoing consultation with the RAPs in regard to the Project in accordance with the Aboriginal cultural heritage consultation requirements for Proponents 2010. • Consultation may include, but is not limited to: • Finalisation of ACHA. • RAP monitoring during future works. • Unexpected finds. Note: Throughout the life of the project, project updates should be sent to all RAPs every 6 months at a minimum to ensure the consultation associated with this ACHA remains active.
A-3	Harm to identified Aboriginal cultural heritage sites within the impact area	Pre-construction Construction	Prior to works commencing, all workers should be inducted into the Subject Area, so they are made aware of their obligations under the NPW Act and any conditions of unexpected finds procedures prior to and during and after construction activities.
A-4	Harm to identified Aboriginal cultural heritage sites within the impact area due to unexpected finds	Construction	During any future works, in the event that previously unknown Aboriginal object(s) and/or sites are discovered during the proposed activity, work must stop, and an appropriately qualified archaeologist be contacted to assess the nature, extent, and significance of the identified sites and notification is provided to Heritage NSW. Works should not proceed without advice from Heritage NSW or an appropriately qualified archaeologist.

Ref	Potential Impact	Phase	Mitigation measures
A-5	Harm to human remains due to unexpected finds	Construction	During any future works, in the unlikely event that suspected human remains are encountered during construction, all work in the area that may cause further impact must cease immediately and: • The location, including a 20 metre (m) curtilage, should be secured using barrier fencing to avoid further harm. • The NSW Police must be contacted immediately. • No further action is to be undertaken until the NSW Police provide written notification. • If the skeletal remains are identified as Aboriginal, the Proponent or their agent must contact Heritage NSW's Enviroline on 131 555 and representatives of the RAPs. No works are to continue until Heritage NSW provides written notification to Maizewood or their Agent.
Historic Heritage			
HH-1	Unexpected archaeological finds	Construction	Implementation of an Unexpected Finds Procedure. If suspected archaeological material is encountered, work must stop within a 10 m area until assessed by a qualified archaeologist.
Land			
L-1	Temporary loss of agricultural land	Decommissioning	Agricultural land use would be re-established over 16.9 ha of RU1 and RU4 land removed from agriculture by the Project at the time of decommissioning or sooner unless otherwise agreed with the landowner and/or regulatory authorities
L-2	Soil capability and soil handling	Construction Operation Decommissioning	All soil that is proposed to be disturbed during the Project will be handled in accordance with a site soil management plan that includes soil management measures relating to soil stripping, stockpiling, respread/reuse, and land rehabilitation.
L-3	Land and soil capability	Decommissioning	Return all disturbed land to an equivalent Land and Soil Capability (LSC) class following the end of life for the Project, i.e. the reinstatement of 20.9 ha of LSC class 3 land through site rehabilitation and good soil management practices.
L-4	Soil erosion and sedimentation	Construction Operation Decommissioning	All soil resources are to be managed throughout construction, operation and decommissioning phases of the Project in accordance with an Erosion and Sedimentation Control Plan (ESCP).
L-5	Weed and pest management	Construction Operation Decommissioning	Preparation of a weed and pest management protocol for the management of pest and weed species.
L-6	Biosecurity	Construction Operation Decommissioning	Preparation of an Agricultural Biosecurity Management Plan for the management of biosecurity risk.

Ref	Potential Impact	Phase	Mitigation measures
L-7	Unexpected contamination encountered during construction	Construction	Prepare and implement an Unexpected Finds Procedure (UFP) as part of the CEMP detailing the procedures to be followed if contamination is encountered including the classification of contaminated soil in accordance with the NSW EPA Waste Classification Guidelines (2014) prior to removal
Landscape and Visual			
LV1	Amenity impacts due to intrusive lighting	Construction and operation	Lighting during construction and operation would be designed and operated in accordance with AS4282-2023 Control of the obtrusive effects of outdoor lighting.
LV2	Amenity impacts due to scale of noise walls	Construction	Noise walls and buildings (excluding electrical facilities such as MVPS and BESS containers) to be painted a colour that blends with the local landscape (such as Colorbond Cottage Green, Woodland grey, Pale Eucalypt or similar) to reduce their prominence of these structures in views from surrounding areas.
LV3	Amenity impact to residences in close proximity to infrastructure	Pre-construction	Prior to finalising design, explore options to reduce visual impact to the residences close to the switching station
LV4	Amenity impacts to residences in close proximity to infrastructure	Pre-construction	Develop and implement the concept landscape plan in consultation with the residences closest to the Switching Station (322 and 376 Wells Gully Road) and adjoining landholder of land zoned for Residential near the BESS site.
Noise			
N-1	Impacts to sensitive receivers due to construction noise	Pre-construction Construction	A Construction Noise and Vibration Management Plan (CNVMP) would be prepared before any work begins. This would identify all potentially impacted receivers, assess the potential noise and vibration impacts from the proposal and provide details regarding how the impacts would be minimised through the use of all feasible and reasonable mitigation measures. The CNVMP would also contain procedures for handling complaints, should they occur, and detail any compliance monitoring requirements.
N-2	Noise impacts to the residence at 322 Wells Gully Rd from switching yard earthworks and transmission line vegetation clearing	Construction	CNVMP to include community consultation and notification to the affected resident to advise on the anticipated construction works.
N-3	Noise impacts associated with vehicle movements	Operations	Use broadband and/or ambient sensing alarms on heavy vehicles where they are required to reverse during the night-time (noting operational vehicle movements are minimal).

Ref	Potential Impact	Phase	Mitigation measures
N-4	Noise impacts associated with plant and equipment	Operation	The noise impacts from all noise-generating plant items would be reviewed during detailed design stage to confirm unit selections and any additional mitigation requirements.
N-5	Noise impacts to nearby residential areas from BESS operations	Operation	Construction of 7 m noise walls has been incorporated into the design of the BESS layout to mitigate noise from BESS units. The final noise wall heights and locations will be confirmed during detailed design.
N-6	Noise impacts to residences from construction traffic on Perth Street and Campbell Street	Construction	CNVMP to include community consultation and notification to affected residents to advise on the anticipated construction traffic.
Traffic			
T-1	Impact of construction traffic on road safety and network performance	Pre-construction Construction	Preparation of a Construction Traffic and Pedestrian Management Plan (CTPMP) in consultation with TfNSW and Council to detail the arrangement for construction vehicle routes and access to the construction sites including arrangements for pedestrian safety along streets used by pedestrians.
T-2	Risk of collision with cyclists or riders on rail bridge	Construction	Increased warning signs for all road users during the construction period and identification of the risk in the Drivers Code of Conduct and daily tool box talks.
T-3	Road safety at Perth Street for BESS unit OSOM movements	Construction	Use of pilot vehicles for the BESS unit OSOM turning movements from New England Highway to Perth Street.
T-4	Roads safety at Perth Street and Campbell Street intersection	Construction	Development of a Traffic Guidance Scheme (TGS) at the intersection of Perth Street and Campbell Street to allow for the swept paths of oversized vehicles and opposing semi-trailers. This TGS will only be required if scheduling sees the need for two opposing semi-trailers or for OSOM movements and shall be in place during construction when these vehicles are scheduled.
T-5	Road safety on Wells Gully Road	Construction	Project construction drivers will be directed through a workplace management plan to limit their speed to 40km/h along Wells Gully Road in response to the unsignposted speed limit and lack of curve delineation on the road. Curve alignment markers will be installed for north and south bound movements at the curve north of the switching station to improve readability of the road alignment in this location.
T-6	Road safety New England Highway / Perth Street intersection	Construction	All heavy vehicles approach from north and execute Basic Left Turn into Perth Street only; light vehicles from south directed via Graeme Street channelised right turn.

Ref	Potential Impact	Phase	Mitigation measures
T-7	Reduce road safety risk associated with High Risk OSOM transformer transport	Construction	Prepare an OSOM Transport Management Plan (TMP) to confirm the OSOM route and associated escort arrangements.
T-8	Road pavement damage	Construction	Pre and post-construction dilapidation survey of Perth Street and approximately 200 m southbound on New England Highway to determine the scope of any required make good works.
T-9	Improve road safety through community awareness	Construction	Provide regular community updates for residents along the New England Highway in the vicinity of the site and on Perth Street and surrounding local roads to advise of construction activities and increased heavy vehicle movements along this route
T-10	Road safety for OSOM	Construction	Obtain the necessary permits for the movement of high risk OSOM prior to OSOM movements, including a Class 1 Heavy Vehicle Access Permit and Transport Management Plan.
T-11	Road safety for OSOM	Construction	Prior to OSOM movements, undertake a powerline survey to confirm any overhead powerlines along the route which may need to be lifted, and on-site assessment of any overhanging vegetation (e.g. tree branches) may also be required.
T-12	Road / rail safety for OSOM	Construction	Prior to OSOM movements, consult with rail authorities to confirm any specific conditions or traffic management measures to be adopted during railway crossing manoeuvres in relation to the Selwyn Street crossing.
Water			
W-1	Flood risk	Operations	Installation of flood warning signs and depth markers along access road in vicinity of the expected flood area to raise awareness of flood risk.
W-2	Flood risk	Operation	Provide suitable culverts under the access road to minimise flood risk to the access road.
W-3	Flood risk	Operation	All BESS enclosures will be elevated above the surrounding ground. Elevation will be increased where unites are located in localised overland flow paths running across the site area.
W-4	Hydrology	Operation	Inclusion of suitable onsite detention within proposed retention pond to mitigate changes to peak flow as a result of the development.
W-5	Hydrology	Operation	Use of subgrade, gravel or vegetation where possible on the bench to increase roughness and reduce flow velocities.
W-6	Hydrology	Operation	Use of grass swale, sump or similar to mitigate flow increases at the switching station as required.

Ref	Potential Impact	Phase	Mitigation measures
W-7	Erosion and sediment during construction	Pre-construction Construction	Preparation of an Erosion and Sedimentation Control Plan (ESCP) to detail measures to minimise erosion and mobilisation of sediment to waterways.
W-8	Pollution due to spill risk	Construction Operation	Chemicals and hydrocarbon fuels will be stored in bunded areas in accordance with Australian Standards. Substations, transformers and other infrastructure that store or use oil will be bunded. A Spill Response Plan will be prepared including emergency response and EPA notification procedures. Infrastructure to be regular inspected to identify any issues with leakage and test the effectiveness of the spill response plan.
W-9	Minimise erosion and sedimentation during decommissioning	Decommissioning	Prepare an Erosion Sediment Control Plan (ESCP) for the decommissioning phase to identify temporary ground cover and revegetation arrangements after removal of BESS and Transmission Line infrastructure.
W-10	Water quality	Construction Operation Decommissioning	All site runoff to be discharged via the site retention pond with requirements for water quality monitoring incorporated into the site Operational Environmental Management Plan (OEMP).
W-11	Water quality / riparian land	Construction	Retain the base structure of any large riparian vegetation to be cleared under transmission lines.
Bushfire			
BF-1	Effective emergency response management	Pre-construction	An emergency management plan will be prepared in consultation with the NSW RFS for the management of a bushfire incident and include the following: • Detailed measures to prevent or mitigate fires igniting such as hot works permits for works which may result in the ignition of fire and a ban on hot works on Total Fire Ban days, or when local authorities or the Site Manager deems weather conditions too dangerous. • 24-hour emergency contact details including alternative telephone contact • Inductions for construction personnel on bushfire risk management, other fire related risks, and emergency response procedures that could present during construction and operation • Availability of fire-suppression equipment, access, and water including site infrastructure plans and site access and internal road plans • Location of hazards (physical, chemical, electrical) that will impact on the firefighting operations and procedures to manage any identified hazards during firefighting • Storage, maintenance and appropriate signage of any flammable or hazardous materials

Ref	Potential Impact	Phase	Mitigation measures
			• Notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a high fire danger period (as declared by the NSW RFS) to ensure weather conditions are appropriate • Situational awareness and evacuation planning, including: ○ how situational awareness will be managed (bushfire alert levels, local fire weather information sources and details) ○ fire response and evacuation matrix ○ evacuation procedures, evacuation routes, and neighbourhood safer places.
BF-2	Infrastructure exposure to radiant heat	Operation	Implementation of minimum 10 m Asset Protection Zone (APZ) between infrastructure and the bushland interface in accordance with the Bushfire Report. Minimum 10 m defensible space to be established around the Switching Station. The APZs must be managed and maintained for the life of the development to the standard of an Inner Protection Area (IPA).
BF-3	Increased fire risk from landscaping	Operation	The entire BESS Area and Switching Station APZ should be established and managed to the prescribed standards for an Inner Protection Area (IPA) as detailed in PBP 2019 Appendix 4. The landscaping and vegetation will be managed for the life of the Project under a landscape or vegetation management plan to the standards of an IPA to ensure the activities are delivered with regularity and the above criteria can be consistently achieved. The transmission easement should be maintained in a reduced fuel condition by avoiding tree growth. Any fencing and gates installed for the Project need to be made of non-combustible material only.
BF-4	Bushfire risk to temporary construction facilities	Construction	Implement the following bushfire protection objectives for temporary construction offices and amenities: • Provision for safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupant egress for evacuation • Provide suitable emergency and evacuation arrangements for occupants of the development • Provide adequate services of water to assist management of fire risk, during and after the passage of bushfire • Storage of combustible materials away from the hazard and asset wherever possible
BF-5	Water supply for fire fighting	Operation	The Project will include a water supply dedicated for RFS use at the BESS via a minimum 20,000L volume water tank (Static Water Supply) dedicated for bushfire protection or extension of the reticulated water supply to the site. Connection to the water supply to be in accordance with RFS requirements.

Ref	Potential Impact	Phase	Mitigation measures
BF-6	Risk of ignition due to transmission line contact with vegetation	Operation	No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines. The transmission easement should be maintained in a reduced fuel condition avoiding tree growth.
Hazards			
H-1	Impacts from project hazards or incidents	Operation	Implementation the controls identified in the project HAZID register provided in the PHA.
H-2	Unauthorised access and vandalism	Operation	Secure perimeter fencing, security cameras and warning signage around BESS compound
H-3	Risk of BESS unit fire propagation	Operation	Battery units will be installed in accordance with OEM clearance requirements identified in the PHA to minimise the risk of propagation of BESS unit fires.
H-4	Transformer fire.	Operation	AS 2067 horizontal clearances will be maintained for all BESS MV transformers. Where clearances cannot be maintained, fire walls will be provided.
H-5	EMF exposure - general public	Operation	Perimeter fencing will be installed and maintained to limit general public access to distances where International Commission on Non-Ionizing Radiation Protection (ICNIRP) general public reference levels are not exceeded. The project will procure electrical equipment designed and procured to comply with relevant international and Australian standards
H-6	EMF exposure - on-site workers	Operation	The site will be operated to ensure ICNIRP occupational reference levels are not exceeded including warning signage and training in relation to high-field areas.
H-7	Emergency response	Pre-construction, Operation	An Emergency Response Plan will be developed prior to construction commencement, in consultation with Fire and Rescue NSW and the NSW RFS, covering fire response, evacuation procedures and hazardous materials management.
Social and Economic			
SE1	Community	Construction and operation	Ensuring the Community Benefit Scheme (CBS) is finalised and operational upon the project reaching final investment decision.
SE2	Accessibility	Operation	Ensuring the Community Benefit Scheme (CBS) is finalised and operational upon the project reaching final investment decision and includes provision for energy diversification and access to renewable energy upon the project reaching final investment decision

Ref	Potential Impact	Phase	Mitigation measures
SE3	Culture	Construction and operation	Ensuring the CBS is finalised and operational upon the project reaching final investment decision and includes provision for the following nonpecuniary and in-kind initiatives preferred by the LALC: • Support for WLALC to establish an Indigenous Nursery • Support for the LALC Black Roo initiative and Indigenous Artwork procurement for Project • Participation in and support for Cultural Heritage training provided by the LALC.
SE4	Livelihoods	Construction and operation	Develop and implement Workforce Recruitment Strategy with local employment targets
SE5	Livelihoods	Construction and operation	Ensuring the CBS is finalised and operational upon the project reaching final investment decision and includes the provision of financial support for the LALC and Wonnarua Nation Aboriginal Corporation.
SE6	Way of life	Construction	Develop a Traffic Management Plan (TMP) that enables uninhibited rifle club member access to the rifle club property during Project constructions. Continued liaison with rifle club management and advanced notification about any construction activities.
SE7	Accessibility	Construction	Develop and implement a Project Workforce Accommodation Strategy which does not increase demand on local accommodation.
SE8	Health and wellbeing	Operation	Preparation of a succinct, plain-English summary of the preliminary hazards assessment report, including fire risk, EMF and gas exposure, to be made available on the Project website and emailed to all people that participated in SIA engagement activities and raised the concerns.
SE9	Surroundings	Operation	Address perceived aquatic ecosystem impacts by preparing a succinct, plain-English summary of the SLR (2025) reports and make it available on the Project website and emailed to all people that participated in SIA engagement activities and raised the concerns.
SE10	Surroundings	Construction and operation	Implement on-site runoff controls per surface water assessment (Appendix L); prepare plain-English summary of findings for distribution via Project website
SE11	Surroundings	Construction and operation	Implementation noise and visual mitigation measures identified in the EIS.
Waste Management			
WM1	Inappropriate management of waste	All	The Preliminary Waste Management Plan will be updated and reissued for the construction, operation and decommissioning phases to reflect final design, contractor methodologies and phase-specific waste requirements.

Ref	Potential Impact	Phase	Mitigation measures
WM2	Incorrect disposal	All	Classify all waste in accordance with the NSW EPA Waste Classification Guidelines (2014) to identify the appropriate management and disposal pathway.
WM3	Insufficient resource recovery	All	Apply the waste hierarchy (Avoid, Reduce, Reuse, Recycle, Dispose) when making purchasing decisions and selecting and implementing waste management measures across all waste streams.
WM4	Mixing of waste reducing resource recovery	Construction	Provide labelled and colour-coded receptacles for construction and operational waste streams in accordance with AS 4123.7-2024
WM5	Release of hazardous waste to the environment	All	Store hazardous and special waste in bunded, covered areas where applicable, in accordance with AS 1940, AS 5139 and relevant Dangerous Goods requirements
WM6	Inappropriate management of waste	All	Engage only licenced contractors for waste transport, recycling and disposal to ensure waste is handled, transported and managed in accordance with applicable legislation and industry standards.
WM7	Inappropriate management of waste	All	Maintain a Waste Register recording waste type, volume, classification, and disposal destination to provide traceability of waste once it leaves site.
WM8	Inappropriate handling and separate of waste	Construction	Include waste handling and storage procedures in site inductions and toolbox talks
WM9	Lost opportunity for resource recovery	Construction	Maximise on-site reuse and return-to-supplier schemes for pallets, cable drums and packaging
WM10	Long distance transport of waste	Construction	Consult with Council and relevant waste facility operators prior to construction to confirm acceptance pathways and any constraints.
WM11	Inappropriate management of specialist waste	Decommissioning	Direct large-format BESS components (e.g. batteries, inverters) to licenced specialist processors
WM12	Inappropriate management of specialist waste	Construction	Collect and dispose of liquid waste from amenities and washdown areas via licenced liquid waste contractors
WM13	Lost opportunities for resource recovery	Construction	Break up and recycle concrete footings and pads off site or reuse as engineered fill where suitable
WM14	Lost opportunities for resource recovery	Construction	Recover and recycle metals including cabling, transformers, structural steel and transmission line conductors where suitable; salvage copper conductors and precious metals for resale where recoverable

Appendix D Biodiversity Development Assessment

Appendix E Aboriginal Cultural Heritage Assessment

Appendix F Historical Heritage Assessment

Appendix G Land and Agriculture Assessment

Appendix H Visual Impact Assessment

Appendix I Noise Impact Assessment

Appendix J Traffic Impact Assessment

Appendix K Oversize Overmass Assessment

Appendix L Surface Water Impact Assessment

Appendix M Bushfire Assessment

Appendix N Preliminary Hazard Assessment

Appendix O Social Impact Assessment

Appendix P Estimated Development Cost

Appendix Q Preliminary Accommodation Strategy

Appendix R Engagement Materials and CSEP

Appendix S VPAs



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