Premise

FIRM POWER

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Environmental Impact Statement

BERESFIELD BATTERY ENERGY STORAGE SYSTEM

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17 May 2023

DOCUMENT AUTHORISATION					
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Prepared By		**Reviewed By**		**Authorised By**	
Daniel Drum		Mark Raikhman		David Walker	

CERTIFICATION

Role	**Project Manager** **EIS Verifier**	**EIS Lead Author**	**EIS Author**
Name	David Walker	Daniel Drum	Mark Raikhman
Position	General Manager – Central NSW	Environmental Team Manager	Senior Town Planner
Qualifications	B. Urban and Regional Planning	B. Urban and Regional Planning B. Natural Resources (Hons)	B. Planning
Address	154 Peisley Street, Orange, NSW, 2800		

Project details	
Project name	Beresfield Battery Energy Storage System
Application number	SSD-31940756
Address of the land in respect of which the development application is made	53 Weakleys Drive, Beresfield, being part Lot 6 DP1160356 and part Lot 630 DP1180006
Applicant details	
Applicant name	Firm Power
Applicant address	Suite 203, 213 Miller Street, North Sydney, NSW, 2060
Declaration by Registered Environmental Assessment Practitioner	
Name	David Walker
Registration number	7333
Organisation registered with	Planning Institute of Australia
Declaration	The undersigned declares that this EIS: • has been prepared in accordance with Division 5 of 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; and • contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.
Signature	
Date	17 May 2023

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ABBREVIATIONS

Term	Definition
AADT	Annual Average Daily Traffic
ABS	Australian Bureau of Statistics
AC	Alternating Current
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCRP	Aboriginal cultural heritage consultation requirements for proponents
AEMO	Australian Energy Market Operator
AEMC	Australian Energy Market Commission
AEP	Annual Exceedance Probability
AER	Australian Energy Regulator
AGO	Australian Greenhouse Office
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
ARI	Average Recurrent Interval
APZ	Asset Protection Zone
ARENA	Australian Renewable Energy Agency
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASRIS	Australian Soil Resource Information System
AV	Articulated Vehicle
BAL	Basic Left Turn
BAM	Biodiversity Assessment Methodology
BAR	Basic Right Turn
BC Act	*Biodiversity Conservation Act 2016*
BCSD	Biodiversity Conservation and Science Division (formally within Office of Environment and Heritage (OEH))
BDAR	Biodiversity Development Assessment Report
BFMC	Bush Fire Management Committee
BFSA	Bush Fire Safety Authority
BOM	(Australian) Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land

Term	Definition
CCP	Community Consultation Plan
CCTV	Closed-circuit television
CEC	Clean Energy Council
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CER	Clean Energy Regulator
CHMP	Cultural Heritage Management Plan
CIV	Capital Investment Value
CML	Concessional Mass Limit
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DA	Development Application
DAWE	(Commonwealth) Department of Agriculture, Water and the Environment (Formally Department of Energy and Environment (DoEE))
dB(A)	Decibels, a measure of A-weighted *(c.f.)* sound levels.
DC	direct current
DECC	Department of Climate Change (now DPE)
DECCW	Department of Climate Change and Water (now DPE)
DEMP	Decommissioning Environmental Management Plan
DoA	(NSW) Department of Agriculture
DP	deposited plan
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EES	(NSW) Environment Energy and Science
EIS	Environmental Impact Statement
ELF	Extremely low frequency, in relation to Hz *(c.f.)*
EMFs	Electric and magnetic fields
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
EP&A Regulation	(NSW) *Environmental Planning and Assessment Regulation 2021*
EPA	(NSW) Environment Protection Authority

Term	Definition
EPBC Act	(Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999*
EPC	Engineering Procurement and Construction
EPI	Environmental Planning Instruments
ERP	Emergency Response Plan
ESD	Ecologically sustainable development
GDE	Groundwater Dependent Ecosystems
GHG	Greenhouse gas
GML	General Mass Limit
GRP	gross regional product
GWh	Gigawatt hours
ha	hectares
HBT	Hollow Bearing Tree
Heritage NSW	The Heritage Council of NSW
IBRA	International Bioregions of Australia
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IPA	Inner protection area
kl	kilolitres
km	kilometres
kV	kilovolts
kW	kilowatts
LALC	Local Aboriginal Land Council
LEMC	Local Emergency Management Committee
LGA	Local Government Area
LSC	Land and Soil Capability
LUCRA	Land Use Conflict Risk Assessment
m	metres
mm	millimetres
ML	Megalitres
MNES	Matters of National Environmental Significance, under the EPBC Act (*c.f.*)
MSDS	Material and Safety Data Sheet
MW	Megawatt

Term	Definition
MWh	Megawatt hours
NEG	National Energy Guarantee
NEM	National Electricity Market
NCC	Newcastle City Council
NML	Noise Management Level
NPfI	NSW Policy for Industry (2017)
NPW Act	National Parks and Wildlife Act 1974
NSW	New South Wales
NRET	National Renewable Energy Target
O&M	Office and Maintenance
OEMP	Operation Environmental Management Plan
PBFP	Planning for Bushfire Protection
PCT	Plant Community Type
PCU	Power Conversion Unit
PHA	Preliminary Hazard Analysis
Planning Systems SEPP	*State Environmental Planning Policy (Planning Systems) 2021*
PMF	Probable Maximum Flood Level
POEO Act	(NSW) *Protection of the Environment Operations Act 1997*
PV	Photovoltaic
RAPs	Registered Aboriginal Parties
RBL	Rating Background Level – the level of background noise
RE Act	(Commonwealth) *Renewable Energy (Electricity) Act 2000*
RET	Renewable Energy Target
REZ	Renewable Energy Zone
RFS	(NSW) Rural Fire Service
RNP	Road Noise Policy
Roads Act	(NSW) *Roads Act 1993*
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	Socio Economic Indexes for Areas
SEPP	(NSW) State Environmental Planning Policy
SHI	State Heritage Inventory

Term	Definition
SSD	State Significant Development
SWMP	Soil and Water Management Plan
TEC	Threatened Environmental Communities
TfNSW	Transport for New South Wales
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
VIA	Visual Impact Assessment
V	Volts
WA	Water Assessment
WAD	Works Authorisation Deed
WAL	Water Allocation License
WARR Act	Waste Avoidance and Resource Recovery Act 2001
WMP	Waste Management Plan

EXECUTIVE SUMMARY

Introduction

Firm Power (ABN: 18 631 500 519), the Applicant, is an Australian owned and operated company seeking to develop strategically located and scaled energy delivery solutions. Through careful site selection, rigorous constraints analysis and diligent impact assessment, Firm Power conceive, investigate, design and deliver electricity projects.

Firm Power seeks to develop a 170 Megawatt (MW_{AC}), 340 Megawatt hour (MWh) Battery Energy Storage System ('BESS') on part Lot 630 DP1180006 and part Lot 6 DP1160356, known as 53 Weakleys Drive, Beresfield within the Newcastle City Council Local Government Area ('LGA'). The proposed development is characterised as State Significant Development ('SSD') as the proposal is for the purpose of electricity generating works with a capital investment value ('CIV') more than $30 million, pursuant to Section 20 of Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021*.

Proposal

The Beresfield BESS project comprises a BESS with a capacity of 170 MW_{AC} and 340 MWh and includes the following key infrastructure:

- Enclosed lithium-ion batteries;
- Power conversion systems including associated switchgear, protection and control equipment, transformers and enclosures for housing equipment;
- Underground power and fibre optic cabling interconnecting the equipment;
- Grid connection equipment including switchgear, protection and control equipment, metering, reactive power equipment, filtering equipment, auxiliary/earthing transformers and enclosures/buildings for housing equipment;
- Underground or overhead 132kV sub-transmission line to connect the BESS to the adjacent Beresfield substation;
- Earthing and lightning protection systems;
- Site office, storage area/enclosure, internal access tracks, on-site parking, security fencing, CCTV, lighting and temporary construction laydown area;
- Permanent noise barrier on the northern and western boundary; and
- Utilisation of existing site access arrangements.

It is expected that augmentation work within the Ausgrid substation site would be required to facilitate connection of the BESS.

The area of the site that will be impacted by the development ('the project area') occupies the entirety of the site.

The primary components associated with the installation of the BESS are as follows:

- Site investigations, vegetation clearing, levelling, bench and access way construction, drainage system installation and installation of foundations/supports to install equipment on;
- Transport to site and installation of equipment;
- Testing and commissioning of the equipment; and
- Operation and maintenance.

Environmental issues

An analysis of site constraints via an environmental risk assessment process has identified the following key environmental issues for which specialist technical reports were prepared:

- Biodiversity;
- Traffic and access;
- Visual impacts;
- Noise and vibration;
- Aboriginal cultural heritage and historic heritage ;
- Technological hazards;
- Bushfire;
- Water and soils;
- Contamination;
- Social and economic impacts; and
- Land.

Other matters requiring qualitative assessment in the body of the EIS include other land resources, waste management, air quality and cumulative impacts.

Comprehensive engagement has been completed with the community, agencies and other relevant stakeholders to ensure that the project objectives are clearly understood and so that any feedback on the project can be considered and incorporated where necessary.

Mitigation measures outlined in relation to each of the above listed matters would be addressed in a construction environmental management plan or operational environmental management plan as appropriate.

The following sections provide a high level summary of each key impact area.

BIODIVERSITY

A streamlined Biodiversity Development Assessment Report ('BDAR') was prepared for the project by EMM and is attached as **Appendix D**.

EMM ecologists completed a number of surveys across the site throughout October 2021 and September 2022 and as result have identified that the 4.3 hectare (ha) project site contains:

- Exotic grasslands (1.84 ha) and exotic hedges (0.02 ha);
- A single patch of native woodland, consisting of Plant Community Type (PCT) 1592 (0.15 ha).

The remainder of the site is cleared, hardstand areas of road and gravel.

Desktop searches revealed 44 threatened species with the potential to occur on site, however this was reduced to nine (9) potential species based on habitat features. Targeted searches confirmed that none of the nine (9) species occur on the site. The Powerful Owl was considered as having potential to utilise the hollows within the subject land, due to its mobile nature and ability to breed in more fragmented vegetation, compared to the other threatened forest owls. However, due to its history of disturbance, severe fragmentation and ongoing disturbance related to the land use in the immediate surrounds, the subject land is unlikely to be of great value to the movement of threatened species in the landscape, and therefore its removal is unlikely to have an impact. Offsets are nevertheless proposed in this regard. Targeted searches for the Powerful Owl during the BAM specified survey period (May through to August) identified two potential nesting sites (two suitable hollows in a Spotted Gum), however, monitoring efforts did not identify the presence of the species.

Through project design, direct and indirect impacts to native species have been largely avoided or, where not avoided, impacts minimised. The location of surface infrastructure has been conceptually located in areas which are devoid of native vegetation. The BDAR confirms that there is limited potential for prescribed and uncertain impacts and serious and irreversible impacts.

To compensate for the minor residual impacts to PCT 1592, two (2) ecosystem credits are required to be discharged.

A range of mitigation measures to address residual impacts have been identified in the BDAR and these are summarised in **Appendix C** and would be incorporated as required into a project Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP).

TRAFFIC AND ACCESS

A Traffic Impact Assessment (TIA) was prepared for the project by Amber and is provided at **Appendix E**.

The TIA includes an assessment of traffic generation and distribution, cumulative traffic impacts, route and intersections. The TIA provides a summary of the local and regional traffic environment.

Access to the site would be provided through an existing sealed access driveway via the New England Highway, Weakleys Drive, and Whites Road. The TIA concludes that State and local roads along the access route can accommodate the volume, loads and type of vehicle movements generated during construction of the project. The project would generate traffic during the construction phase, including for oversize and overmass vehicles (OSOM).

The TIA identifies that the current arrangement of the site access from Whites Road to the south-west of the site is capable of accommodating site traffic without the need for upgrade. With respect OSOM , the TIA notes that OSOM vehicles are expected to be able to suitably travel to the intersection of Weakleys Drive and Whites Road given the route has been utilised by a high number of other renewable projects in the wider area. Swept path analysis for these intersections confirm that they are able to accommodate the project vehicles.

The TIA anticipates that light and heavy vehicles accessing the site will come from both a northern and southern direction along Weakleys Drive before accessing Whites Road. The following provides a breakdown of the anticipated access distribution for each of the vehicle classifications:

- Light Vehicles: It is anticipated that most of the workforce would travel from Newcastle and the surrounding area, with 50% of staff travelling from the north and 50% from the south on Weakleys Drive.
- Heavy Vehicles: All plant would be transported from Newcastle and the wider area to the site, with approximately 50% of staff travelling from the north and 50% from the south on Weakleys Drive.

A Construction Traffic Management Plan (CTMP) is recommended, including but not limited to:

- Consultation is to be undertaken with developers of other nearby major projects, particularly relating to renewable energy, in order to limit the potential for cumulative traffic impacts during any construction overlap.
- Neighbours of the BESS be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Loading and unloading is proposed to occur within the work area. No street or roads will be used for material storage at any time.
- All vehicles will enter and exit the site in a forward direction.
- Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site:
    - Utilisation of only the designated transport routes.

  - Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas.
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing.
- A map of the primary haulage routes highlighting critical locations.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all project phases (e.g. fog, wet and significant dry, dusty weather).

Engagement with Transport for NSW (TfNSW) has confirmed a preference for managing impacts through measures rather than via upgrades to the site access point.

VISUAL IMPACTS

A Visual Impact Assessment (VIA) has been prepared for the project by Iris Visual Planning and Design and is provided at **Appendix F**.

The visual catchment for the project extends to the west including industrial land along Weakleys Drive, north and northwest to adjoining industrial land and the access road, and east to a short section of the New England Highway. The site is located within the IN2 zone and the locality is characterised by predominantly industrial land uses. There are a number of residential receivers within the IN2 zone that are understood to pre-date the IN2 zone, and which benefit from existing use rights. The majority of these are on the western side of Weakleys Drive (refer **Figure 5**), with R1 being the closest receiver, directly to the north. Given the change in zoning, it is likely that these receivers will gradually transition to industrial receivers in time. It is worth noting that a development application was lodged with NCC for this purpose in relation to the land on which R1 is located, however this was refused. Engagement with this landowner (refer **Table 6**) confirms this intention.

In views from the east, the project site is glimpsed through the existing Ausgrid substation, and in views from Weakleys Drive and other surrounding areas, the site is viewed across or from land zoned IN2.

Given the industrial location and absence of residential zoned receivers in proximity of the site, representative viewpoints selected for further consideration are associated with nearby road locations. Three (3) viewpoints have been selected for assessment via the project VIA. From these viewpoints, there would be a minor adverse to negligible visual impact. Visibility from the highway is limited to glimpses through mature vegetation, noting that any remaining views are seen in the context of the existing substation and network of overhead transmission lines.

Further, with continued development of light industry on the land surrounding IN2 zoned land, visual impacts in the local context would continue to reduce as the site would become enclosed by industrial development.

Views at night would not be demonstrably altered by the proposal, noting the existing substation and surrounding light-industrial land uses. Night lighting associated with the project is limited to minor security lighting and potentially some sensor lighting.

In the context of views from the private domain, the VIA identifies negligible visual impact from the existing dwellings to the west, northeast and east. There would be the potential for a minor visual impact from the existing dwelling directly to the north of the site (R1, 179 New England Highway), however, this impact would be reduced to negligible with the likely redevelopment of the lot for industrial purposes.

The project is located on land zoned IN2 and is proposed to be located adjacent to the existing Ausgrid substation which has minimised visual impact relative to a greenfield development. The proposal would be in

keeping with the character of this industrial area. Subject to the implementation of recommendation mitigation measures, significant visual impacts are not anticipated.

NOISE AND VIBRATION

The Noise Impact Assessment (NIA) was prepared for the project by Assured Environmental and is provided at **Appendix G**.

Construction and operational noise associated with the proposed BESS have been assessed in the context of the requirements of the Noise Policy for Industry (2017).

With respect to construction noise, the NIA makes the following conclusions:

- All residential receptors exceed the noise affected criteria of 58 dB(A) during the first three stages of construction (site establishment, build BESS and build substation);
- R5 exceeds the commercial use criteria of 70 dB(A) during the first stages of construction (Site establishment, build BESS, and build substation);
- R2 exceeds the industrial use criteria of 75 dB(A) during the BESS build stage of construction; and
- The highest predicted noise is 76dB(A) at R1 during construction of the BESS. This is also the closest receptor located to the north of the project site.

A road traffic noise assessment, in accordance with the provision of the NSW Road Noise Policy, confirms that compliance is achieved at all receivers assuming that heavy vehicles are limited to two heavy trucks per hour during the night.

With respect to operational noise, the NIA confirms that compliance with adopted criteria is achieved subject to installation of a minimum 3 metre high noise barrier on the northern and western boundaries of the property – refer **Figure 7**. The final location and design of the noise barrier is subject to detailed design, however as a minimum it should be at least 3m high, with a density of 12/kg m^2 and free of any gaps.

Construction vibration is not predicted to exceed the continuous maximum vibration nuisance and building damage for the closest receiver (R1).

A range of mitigation measures are proposed for inclusion in a Construction Noise and Vibration Management Plan (CNVMP). Included within these recommendations is the need for the installation of a temporary 2m high noise barrier along the northern boundary of the site (to be constructed of individual acoustic panels such as Echo Barriers, which attach to fencing, or similar). Subject to implementation of recommended measures, significant residual impacts during construction are not anticipated.

HERITAGE

An Aboriginal Cultural Heritage & Historic Heritage Assessment (ACHHHR) was prepared by OzArk and is provided at **Appendix H**.

A search of the Aboriginal Heritage Information Management System confirms 103 Aboriginal sites within 10km of the site, one of which (Site 38-4-0798) is within the eastern portion of host Lot 630.

Based on a review of the regional archaeological context, OzArk note that the most frequently recorded site types in the vicinity of the study area are isolated finds and artefact scatters. Other site types recorded in the region, but to a lesser extent, include modified trees and associated PAD, often recorded in association with isolated finds or artefact scatters. The types recorded are mostly found in association with watercourses, particularly perennial watercourses.

As a result of field survey completed on the 4 October 2022 with the Mindaribba Local Aboriginal Land Council (LALC), it is confirmed that the project area does not contain any Aboriginal sites or areas with subsurface potential. Given its proximity to the study area, the area in which Site 38-4-1798 is recorded was inspected

during the survey. The survey confirmed that Site 38-4-0798 does not extend into the study area. Site 38-4-0798 would not be impacted by the project as it is located outside of the project site area and all land disturbing activities would be confined to the project site and assessed area.

In the context of historic heritage, the site is not mapped as containing any items of heritage significance and is not located in or adjacent to a heritage conservation area under the NLEP. The only mapped heritage item in proximity to the project area is the 'Government Railway' (1.1km north of the study area). A site survey by OzArk confirmed that the site does not contain any historic heritage sites or historic archaeological deposits.

The outcome of the ACHHHR is that works may proceed with caution, subject to the implementation of recommended mitigation measures as summarised in **Appendix C**.

TECHNOLOGICAL HAZARDS

A Preliminary Hazard Analysis (PHA) was prepared for the project by Riskcon Engineering and is provided at **Appendix I**.

The character and level of development/activity occurring in the surrounding locality is relevant to hazard and risk analysis. The PHA notes that the site is generally surrounded by roads to the south and west, a landscaping business to the north and the Ausgrid depot to the east.

The project PHA completed a Multi-Level Risk Approach analysis of risks and identified a number of risks that were carried forward for further assessment, including:

- Li-ion battery fault, thermal runaway and fire;
- Victorian Big Battery fire review;
- Li-ion battery fire and toxic gas dispersion;
- Electrical equipment failure and fire;
- Transformer internal arcing, oil spill, ignition and bund fire;
- Transformer electrical surge protection failure and explosion; and
- Electromagnetic field impacts.

As a result of the assessment contained within the PHA, the above potential risks were ruled out and further analysis is not required.

The Riskcon PHA provides the following recommendations:

- The minimum separation distance between BESS units shall be 3.1m in compliance with the NFPA 855 guidelines;
- Prior to construction, the total area required for the BESS units shall be verified against the available space to demonstrate that there is adequate area to achieve the required spacing;
- The BESS containerised units shall be provided with the fire protection system specified by the BESS manufacturer and UL9540A report.
- UL testing information shall be made available to the certifying authority. It is noted that a confidentiality agreement may be required.

Subject to the implementation of the above, it is considered that the project may proceed.

BUSHFIRE

A Bushfire Assessment Report (BAR) has been prepared for the project by Cool Burn Fire and Ecology and is provided at **Appendix J**.

The site is partially mapped as category 1 vegetation bushfire prone land and vegetation buffer land. Land to the east and south is mapped as category 3 vegetation (grassland). The majority of the site is not impacted by the bushfire prone land mapping.

The site has been cleared and developed as a result of current and historic land uses and features very little by way of native vegetation. As noted via the project BDAR, the site (4.3 ha) comprises exotic hedges (0.02 ha) and exotic grassland (1.84 ha), with a single patch of PCT 1592 (0.15 ha). The balance of the site is cleared, comprising hardstand, road and gravel.

In the context of the objectives of PBP, Cool Burn Fire and Ecology note that the project would comply with the aims and objectives of PBP, subject to the implementation of the recommended bushfire protection methods as summarised in **Appendix C**.

WATER AND SOILS

A Water Assessment (WA) has been prepared for the project by SLR and is provided at **Appendix K**.

The project site is situated directly northwest of Viney Creek, which intersects with Francis Greenway Creek and ultimately the Hunter River further downstream. However, there are no defined watercourses that intersect the site. A review of flood modelling information confirms that the south-eastern corner of the project site (limited to the existing access driveway and proposed sub-transmission line) is inundated by 1% Annual Exceedance Probability (AEP) floodwaters. However, it is assessed that floodwaters present a very low risk in terms of flood water depth and velocity, noting the separation distance between these floodwaters and the proposed development footprint. As the ground levels will remain unchanged the proposal will not affect the flood behaviour along Viney Creek.

The proposed development will not involve any substantial change to the existing site surface and rather use the existing paved area (where possible) and existing stormwater management system (including an existing stormwater dam). There will therefore be no impact on the volume of stormwater runoff reporting to Viney Creek, and the peak discharges of runoff will also be unchanged. As such, SLR estimates negligible hydrological effects on Viney Creek hydrology downstream of the Project site.

The remainder of the site is located outside any risk ratings. No batteries or electrical infrastructure such as transformers are proposed to be located within the flood zone.

Subject to the implementation of the mitigation measures outlined, impacts to the local water environment are not predicted.

Noting the existing and former industrial use of the site, impacts to soils are expected to minor to negligible, with a range of standard mitigation measures expected to be sufficient to address any residual concerns. Subject to implementation of these measures, including preparation of an acid sulfate management plan if required as a result of detailed design, residual impacts through construction are not expected to be significant. Implementation of a spill management plan via an Operational Environmental Management Plan (OEMP) would ensure impacts are minimised during operation to an acceptable level.

CONTAMINATION ASSESSMENT

A Soil Contamination Assessment (SCA) was completed for the project by SLR (2023) and is provided at **Appendix L**.

The site is currently vacant with all infrastructure from the previous site use removed, except for a small slab with rail lines, which remains in the north-western portion of the site.

The site generally slopes from the north-west to the south-east with surface water discharging to the wetlands along the south-eastern boundary. A large stockpile of approximately 600-700^3 m is located in the north-eastern portion of the site, with anecdotal evidence suggesting this material was sourced during remedial

works of the former pole yard. A review of past land uses confirms that the site was historically used as a Copper Chrome Arsenate timber treatment plant, and based on this use, SLR noted the following chemical of concern with the potential to occur on site:

- Copper chromium and arsenic from timber treatment.
- Polyaromatic hydrocarbons (PAHs) (including benzo(a)pyrene), phenols and diesel used in the timber treatment and the workshop.
- Organochlorine and organophosphate pesticides used in timber treatment.
- Cyanide, PAHs, fluoride in fill sourced from the aluminium smelter site

As a result of the collection and analysis of soil samples, it is confirmed that concentrations of all contaminants of potential concern in all samples were less than the relevant human health investigation criteria for a commercial industrial site. Concentrations of copper, chromium, and arsenic exceeded the environmental criterion in only three samples. Based on the analytical results being reported as less than the relevant criteria HIL D for a commercial/industrial site, site observations and review of site conditions, SLR consider that the site does not represent a significant risk of harm to site users and is suitable for proposed commercial/industrial development.

The site is therefore suitable for the proposed purpose without the need for remediation.

SOCIAL AND ECONOMIC IMPACTS

A Social and Economic Impact Assessment (SEIA) has been prepared for the project by bd Infrastructure Pty Ltd and is provided at **Appendix M**. The SEIA provides an assessment of the social impacts of the proposed development during the construction, operation and decommissioning phases, categorised as *accessibility*, *way of life*, *health and wellbeing*, *livelihoods* and *surroundings*.

Key potential social impacts identified via the SEIA include:

- Temporary changes due to construction traffic (short term, negative, low impact)
- Temporary changes due to construction noise (short term, negative, low impact)
- Air quality impacts during construction (short term, negative, low impact)
- Direct employment from construction workforce (local) (short term, positive, medium impact)
- Direct employment from construction workforce (regional) (short term, positive, low impact)
- Increased network resilience (long term, positive, medium impact)
- Decline in way of life and associated health and wellbeing for local residents due to noise annoyance (long term, negative, low impact)
- Permanent changes to the aesthetic value of the area (long term, negative, low impact).

From an economic perspective, the project is expected to:

- Directly strengthen and support the construction industry within the Newcastle and Lake Macquarie Region, an important industry of employment for residents
- Indirectly support future capital investment in renewable energy projects in the Region and across NSW, further stimulating regional and State economies
- Indirectly support the viability of cheaper electricity generation cost sources, such as wind and solar, by contributing to network firming with the potential to provide cheaper household electricity costs to households in the Region, and to a lesser extent NSW.

The SIA recommends that the following actions be adopted to enhance potential benefits and mitigate potential social impacts:

- Develop and implement a local procurement policy that aims to engage the local construction workforce and relevant suppliers.
- Develop and implement a complaint handling process prior to construction.
- Develop a website as a central source of information
- Adopt the technical mitigation measures identified in other technical reports.

Subject to the implementation of these measures, the project would not result in significant or unreasonable social impacts and economic impacts will be generally positive.

With respect to benefit sharing, direct discussions have taken place between the Applicant and NCC. A draft offer associated with benefit sharing has been submitted to NCC, to be managed as a voluntary planning agreement (VPA). The terms of the offer have been discussed with NCC and the Applicant will continue to work towards an acceptable agreed outcome prior to determination.

LAND

A summary of various land use impact and conflicts is provided in **Section 6.11**. It is noted that the site is located in an area underlain by the Donald Mining Seam, with evidence of historic mining activities. No current mining licences apply to the site. It is understood the seam has a depth of cover of approximately 18 metres.

Land within 1 km of the site is predominately manufacturing and industrial (31% of the land), with other minimal uses representing the next largest proportion (17%). The land is not mapped as Biophysical Strategic Agricultural Land (BSAL) and the land has a Land Capability Class (LSC) Class 4 (moderate agricultural capability) and LSC Class 8 (extremely low agricultural capability) land.

The access road to the project area and substation is shared with the neighbouring industrial estate containing multiple receivers to the south (R2, R6, R7, R9, R14, R15, R21, R39, and R43) – refer **Figure 5**. During construction, controls would be implemented to ensure that access to the industrial estate is not reduced or significantly impacted because of construction activities.

By reference to the historic mining activities, and the known presence of underground workings, a mine subsidence assessment has been prepared by Douglas Partners (**Appendix N**). This recommends that all trafficable and building areas that are affected by past mining should be grouted. Through application of this remediation measure, the land will be suitable for the proposed purpose and the risk of subsidence is effectively minimised. The Applicant will continue to liaise with Subsidence Advisory NSW to ensure that the steps taken are adequate and acceptable.

By reference to the range of assessments completed in support of this EIS, the nature of the proposed land use does not preclude the carrying out of permissible industrial developments on surrounding industrially zoned land.

A range of other mitigation measures are outlined in this EIS to manage residual land use impacts. Subject to the carrying out of the recommended grouting program, and the implementation of the recommended measures, the project may proceed without risk of significant impact.

ENGAGEMENT

bd Infrastructure Pty Ltd completed engagement activities in conjunction with Firm Power, and with support from Premise, with the outcomes of engagement summarised in **Section 5** of this EIS.

The engagement process included direct and indirect engagement with the community and receivers in proximity to the project, together with discussions with regulatory agencies, elected officials and Council staff.

The main areas of feedback identified throughout the engagement process were:

- Interest in traffic , transport and access arrangements during the construction phase;

- Interest around construction noise;
- Impacts to the landscape as a result of dust and air quality impacts during the construction phase;
- Interest in opportunities for local and regional employment during the construction phase;
- Interest in network resilience and how projects of this nature contribute to improved resilience, once the project is operational;
- Interest around how society transitions from fossil fuel being the primary energy source to relying more on renewable and other solutions, and how this transition is managed;
- Interest in levels of operational noise;
- Low levels of interest in how the project may lead to changes in the visual environment; and
- The safety of BESS operations and how this is managed.

The above concerns are addressed throughout the technical reports appended to this EIS and summarised in **Section 6**. Subject to the implementation of the mitigation measures recommended throughout Section 6, and summarised in **Appendix C**, the project is assessed as being unlikely to lead to significant negative impacts, with positive impacts being sufficient to outweigh and residual concerns.

A range of ongoing measures are proposed throughout project delivery to ensure the community and neighbours remain engaged by the project and that clear lines of communication between the project developers and community are maintained.

Justification

The NSW Government has recognised that the NSW electricity system needs to change, acknowledging that traditional generators are ageing, and the State's transmission system is congested. Further, electricity prices are putting pressure on households and businesses. This realisation has informed the preparation of Government policies and documents, the provisions of which have filtered to the local scale and informed local plan making.

The project will contribute to the provision of renewable energy in NSW and facilitate private investment in the state's electricity system over the next decade and beyond, a key consideration of the NSW Electricity Strategy. The BESS has an anticipated lifespan in the order of 15-20 years and will contribute to the NSW Government's three objectives for the electricity system: reliability, affordability and sustainability.

The project would support the electricity supply market shift from a centralised power generation system, overly reliant on fossil fuels, to a dispersed and smaller scale system. The project provides firming capacity to the market by filling supply gaps when renewable energy sources are not producing.

The project is contributing to the enhancement of the existing Ausgrid Substation infrastructure, through the provision and operation of the BESS, which will serve to balance the grid and support the performance and future uptake of renewable energy. The project seeks to invest in and contribute to the local economy through the creation of jobs and provision of affordable electricity.

The project has been sited and designed to minimise environmental impacts. Where impacts cannot be avoided, mitigation measures have been proposed.

Conclusion

The assessments presented in the EIS indicate that the proposed Beresfield BESS should be approved on the basis that it provides a range of benefits to the local region, the state and the country, in the context of meeting renewable energy targets.

The technical studies supporting the EIS confirm that the proposed development would not lead to any significant or detrimental impacts to the environment and that residual impacts are manageable through the implementation of standard measures.

The Proposal is consistent with the objects and matters for consideration in the EP&A Act and with the principles of Ecologically Sustainable Development.

The EIS concludes that the Proposal would not significantly affect environmental, cultural, social and economic values at the local or regional scale and is therefore considered to be in the public interest.

1. INTRODUCTION

1.1 The Applicant

Firm Power (ABN: 18 631 500 519) is an Australian owned grid flexibility company which operates from the Sydney CBD with operations across the east coast.

Firm Power develops large-scale smart battery projects across the country, to support reliability under the changing face of Australia's energy supply. Utilising advanced technology ensures energy supply and demand can be dynamically balanced, creating a more flexible electricity grid and allowing for continued renewable energy integration and power price reduction.

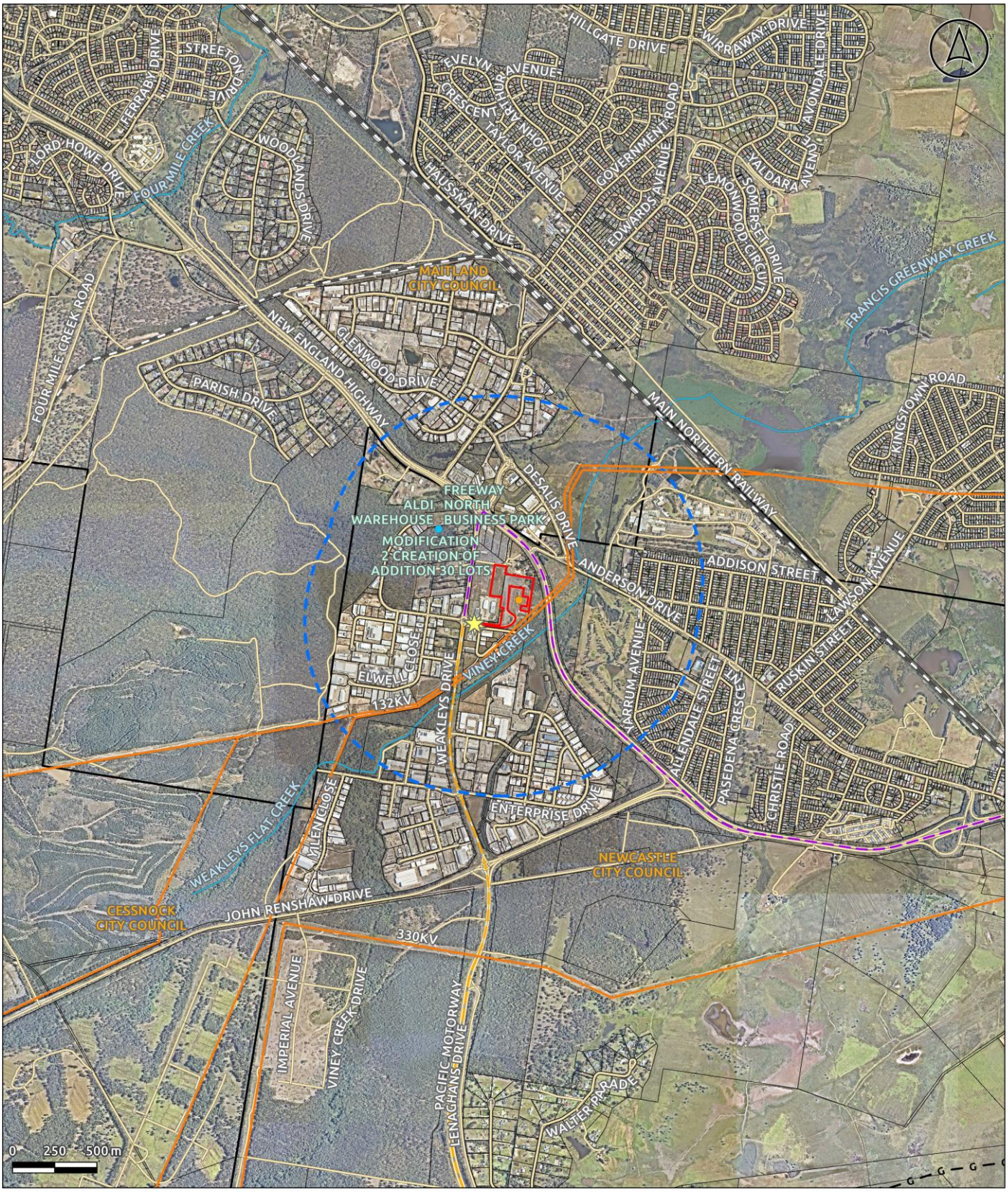
Firm Power recently received approval from the Sydney Western City Planning Panel on 11 May 2021 for the Western Sydney Smart Battery, a 20MW Battery Energy Storage System (BESS) to be located adjacent to the Penrith Zone Substation at 2235 – 2249 Castlereagh Road, Penrith.

Firm Power are currently working to deliver the Hunter Dispatchable Energy System, a portfolio of large-scale dispatchable energy systems for the Hunter Region of NSW. The project will seek to deliver BESSs at three locations throughout the Hunter Region, being Beresfield, Awaba and Muswellbrook. The Beresfield BESS is the site for which this EIS has been prepared. While the Beresfield BESS forms part of the Hunter Dispatchable Energy System, it would operate as a standalone project and would not rely on development of the BESSs at the Awaba or Muswellbrook sites, both of which are subject to separate development applications. The Awaba and Muswellbrook DA's have been lodged with DPE, with Awaba in the Response to Submissions phase and Muswellbrook in the Assessment phase.

1.2 Simple Description of the Project

Premise has been commissioned by Firm Power (the Applicant) to prepare an Environmental Impact Statement (EIS) to support a State Significant Development Application (SSDA) for an approximately 170 MW_{AC}, 340 MWh Battery Energy Storage System (BESS) and associated works at part Lot 630 DP1180006 and part Lot 6 DP1160356 (otherwise known as 53 Weakleys Drive, Beresfield) hereafter referred to as 'the site'. This site is in the Newcastle City Council (NCC) Local Government Area (LGA) (refer to **Figure 1**) and is to be known as the Beresfield BESS.

The Beresfield BESS development footprint is to occupy up to 4.3 ha, adjacent to the existing Ausgrid substation, also referred to as the 'project area'. As shown in **Figure 1**, and described in greater detail in **Section 3** of this report, the project area is located to the west of the existing Beresfield Ausgrid Substation.



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
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GDA2020 MGA Zone 56 File: 221313_01.aprx Prepared By: zindia.nanver Date: 07/03/2023

Legend

- Site Access
- Locality 1 km
- Development Site
- Cadastre
- LGA Boundary
- Roads
- Railway
- Major Watercourse
- Proposed Materials Transport Route (From Port Botany)
- Proposed Materials Transport Route (From Port of Newcastle)
- National Onshore Gas Pipelines
- Electricity Transmission Line
- Nearby State Significant Development
- Beresfield Subtransmission Substation

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 1 - Local Context

The BESS will include enclosed batteries; power conversion systems including associated switch gear, protection and control equipment, transformers and enclosures for housing equipment; underground power and fibre optic cabling interconnecting the equipment; grid connection equipment including switchgear, protection and control equipment, filtering equipment, auxiliary/earthing transformers and enclosures/buildings for housing equipment; underground or overhead 132kV sub-transmission lines to connect the BESS to the Beresfield substation; earthing and lighting protection systems; site office, storage area/enclosure, internal access tracks, on-site parking, security fencing, CCTV, lighting and temporary construction laydown area; a noise barrier/embankment, vegetation screening and utilisation of existing site access. The project has the objective of delivering a distributed stand-alone battery system for the Hunter region, designed to balance the grid and support the performance and future uptake of renewable energy in NSW.

The delivery of the project will provide a range of electricity and power market services to support Firm Power's mission to power the clean energy transition.

This EIS is prepared after a Scoping Report, also prepared by Premise, submitted to the Department of Planning and Environment (DPE) on 16 November 2021. This EIS has been prepared pursuant to Part 5, Division 5.1, Subdivision 3 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), Part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021* (the EP&A Regulation), *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPE, July 2022) and SEARs issued by DPE on 20 December 2021 in response to the Scoping Report (refer to **Appendix A**).

1.3 Background to the Project

The existing Beresfield Substation is located adjacent to the site, which is owned and operated by Ausgrid.

The Beresfield BESS is designed to provide grid flexibility services and will support the efficiency of the existing electrical network. The BESS would cycle in response to pricing signals, typically charging when prices are low and discharging during peak periods. Through regulating the availability of energy, the development will have the capacity to store unutilised energy during low demand and enhance the total supply of energy during high demand. This will benefit the existing electrical grid, improving the efficiency of electrical generation and provide consumers with a more consistent and reliable supply of energy.

The BESS facility will utilise lithium-ion technology batteries installed in prefabricated enclosures similar in size to standard shipping containers. During periods of low demand, power will generally flow from the Ausgrid substation 33kV switchyard to the BESS facility via a new 132kV sub-transmission line. The power conversion systems convert the power into a form that is suitable for storage in the facility's batteries. During periods of high demand, the stored energy in the batteries will generally flow back through these systems to the Ausgrid substation and ultimately the broader grid.

The BESS, through its connection to the substation, would possess the ability to store power and release it to the network at times of peak demand or critical need. It would also have the capacity to charge or discharge when power system services are required to maintain the stability of the broader electricity grid. The BESS strengthens the power network by providing greater flexibility in grid management.

A range of strategies have been employed through project conception, development and delivery, with the aim of avoiding, minimising and offsetting residual impacts associated with the project. In this context, the following is noted:

- Site selection has included identifying a site that is immediately adjacent to an existing substation, generally well separated from residential zoned land, separated from dwellings and located wholly on land zoned IN2 – Light Industrial, with suitable existing access arrangements; and
- The project has been refined to respond to the outcomes of technical studies, including installation of a noise barrier to provide noise attenuation to the dwelling to the north.

1.4 Any related development

A review of the Newcastle City DA tracker on 10 March 2023 for the site address of 53-55 Weakleys Drive confirms that the site has been the subject of a range of applications and approvals over a period of approximately 32 years. These consents are associated with the original development of the land in the early 90s, and ongoing throughout the 90s and 2000s, as a timber preservation/treatment facility.

An application was approved in 2008 for the demolition of buildings (DA2008/0710) and subsequent applications in 2010 (DA2010/1719 and DA2010/1721) sought approval to subdivide and remediate the land.

In 2018 applications were approved (DA2017/00402 and CDC2017/00045) to demolish further buildings, and build storage buildings, administration buildings, depot, wash bays etc. These approvals related to the use of the site for the purposes of an Ausgrid storage and staging area.

Ausgrid have advised that the substation was erected on the land in approximately 2004.

1.1 Restrictions or covenants that apply to the site

A search of land titles that apply to the site has been completed and the results are provided at **Appendix O**. From a review of the titles, it is noted that:

- Lot 630 is affected by:
  - An easement 30.48 metres wide for transmission line (easement vested in Shortland Electricity);
  - An easement 1 metre wide in relation to water services;
  - An easement 69 metres wide for transmission line;
  - An easement 3 metres wide to drain water;
  - A lease to Blue Asset Partner Pty Ltd, Eric Alpha Asset Corporation 2 Pty Ltd, Eric Alpha Asset Corporation 3 Pty Ltd & Eric Alpha Asset Corporation 4 Pty Ltd, expiring in 30/11/2115, with an option for renewal for 99 years;
  - A mortgage; and
- Lot 6 is affected by:
  - An easement 1 metre wide in relation to water services;
  - An easement 3 metres wide to drain water;
  - A lease to Blue Asset Partner Pty Ltd, Eric Alpha Asset Corporation 2 Pty Ltd, Eric Alpha Asset Corporation 3 Pty Ltd & Eric Alpha Asset Corporation 4 Pty Ltd, expiring in 30/11/2115, with an option for renewal for 99 years;
  - A mortgage.

The detailed design of the BESS will take these easements into consideration and ensure that project does not impact on their operation.

1.2 Report Structure

In accordance with the *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPE 2022), this EIS has been prepared and is provided in the following format.

- **Section 1 (Introduction)** of this report sets the context for detailed assessment of the project in the following sections of the EIS and includes a description of the applicant, the project, the background to the project, any related development and any restrictions or covenants that apply to the site.

- **Section 2 (Strategic Context)** of this report provides the strategic context and includes any supporting strategies, policies or plans, key features of the site and surrounds, likelihood of generating cumulative impacts any agreements entered into with other parties.
- **Section 3 (Project Description)** outlines the proposed development, including the project area, physical layout and design, uses and activities and timing.
- **Section 4 (Statutory Context)** details the statutory context relevant to the justification and evaluation of the project.
- **Section 5 (Engagement)** identifies the key stakeholders for the project and describes what actions were taken with respect to community engagement in accordance with *Undertaking Engagement Guidelines for State Significant Projects* and SEARs.
- **Section 6 (Assessment of impacts)** identifies the impacts of the proposed development, including the condition of the existing environment, the ability to avoid, mitigate and/or offset the impacts of the development, the scale and nature of the predicted impacts, key uncertainties associated with the assessment and proposed measures to deal with these uncertainties.
- **Section 7 (Justification of the project)** provides the justification for the proposed development, including impact avoidance or minimisation measures, consistency with the strategic context, compliance with any relevant statutory requirements, outcomes of community engagement, the scale and nature of the impacts of the project, how compliance will be monitored and how key uncertainties will be addressed.

2. STRATEGIC CONTEXT

This section identifies key strategic considerations that are of relevance to the assessment of the project.

2.1 Justification of the Project

The NSW Government has recognised that the NSW electricity system needs to change, acknowledging that traditional generators are ageing, and the State's transmission system is congested. Further, electricity prices are putting pressure on households and businesses. This realisation has informed the preparation of Government policies and documents, the provisions of which have filtered to the local scale and informed local plan making.

The project supports the electricity supply market shift from a centralised power generation system, overly reliant on fossil fuels, to a dispersed and smaller scale system. The project provides firming capacity to the market by filling supply gaps when renewable energy sources are not producing

In the following sections is a discussion of the applicable state and local strategies, policies and plans and how the project is facilitating the objectives of each as they relate to the delivery of renewable energy.

2.1.1 NSW ELECTRICITY STRATEGY & ELECTRICITY INFRASTRUCTURE ROADMAP

To address pressing matters around reliability, affordability and the fostering of a sustainable electricity future that supports a growing economy, the NSW Government has formed the NSW Electricity Strategy.

The NSW Electricity Strategy strives to:

- Deliver Australia's first coordinated Renewable Energy Zone in the Central-West Orana region;
- Save energy, especially at times of peak demand, via the Energy Security Safeguard;
- Support the development of new electricity generators;
- Set a target to bolster the state's energy resilience; and
- Make it easier and more efficient to do energy business in NSW.

The strategy encourages new private investment in NSW's electricity system over the next decade to support an estimated 1200 jobs, primarily in regional NSW. The strategy closely aligns with the NSW Government's 'Net Zero Plan Stage 1: 2020–2030'.

In November 2020, the NSW Government released the Electricity Infrastructure Roadmap, enabled by the *Electricity Infrastructure Investment Act 2020*. The Roadmap builds on the foundations of the Electricity Strategy and is expected to attract up to $32 billion of private investment in regional energy infrastructure by 2030 and support over 9000 jobs, mostly in regional NSW.

The NSW Electricity Strategy acknowledges that firmed renewables are now the most cost-competitive form of new generation and cost less than the current wholesale electricity price.

The project will contribute to the provision of renewable energy in NSW and facilitate private investment in the state's electricity system over the next decade and beyond, a key consideration of the NSW Electricity Strategy. The BESS has an anticipated lifespan in the order of 15-20 years and will contribute to the NSW Government's three objectives for the electricity system: reliability, affordability and sustainability.

The location of the site in the context of the declared Hunter-Central Coast Renewable Energy Zone (REZ) is shown in **Figure 2**.

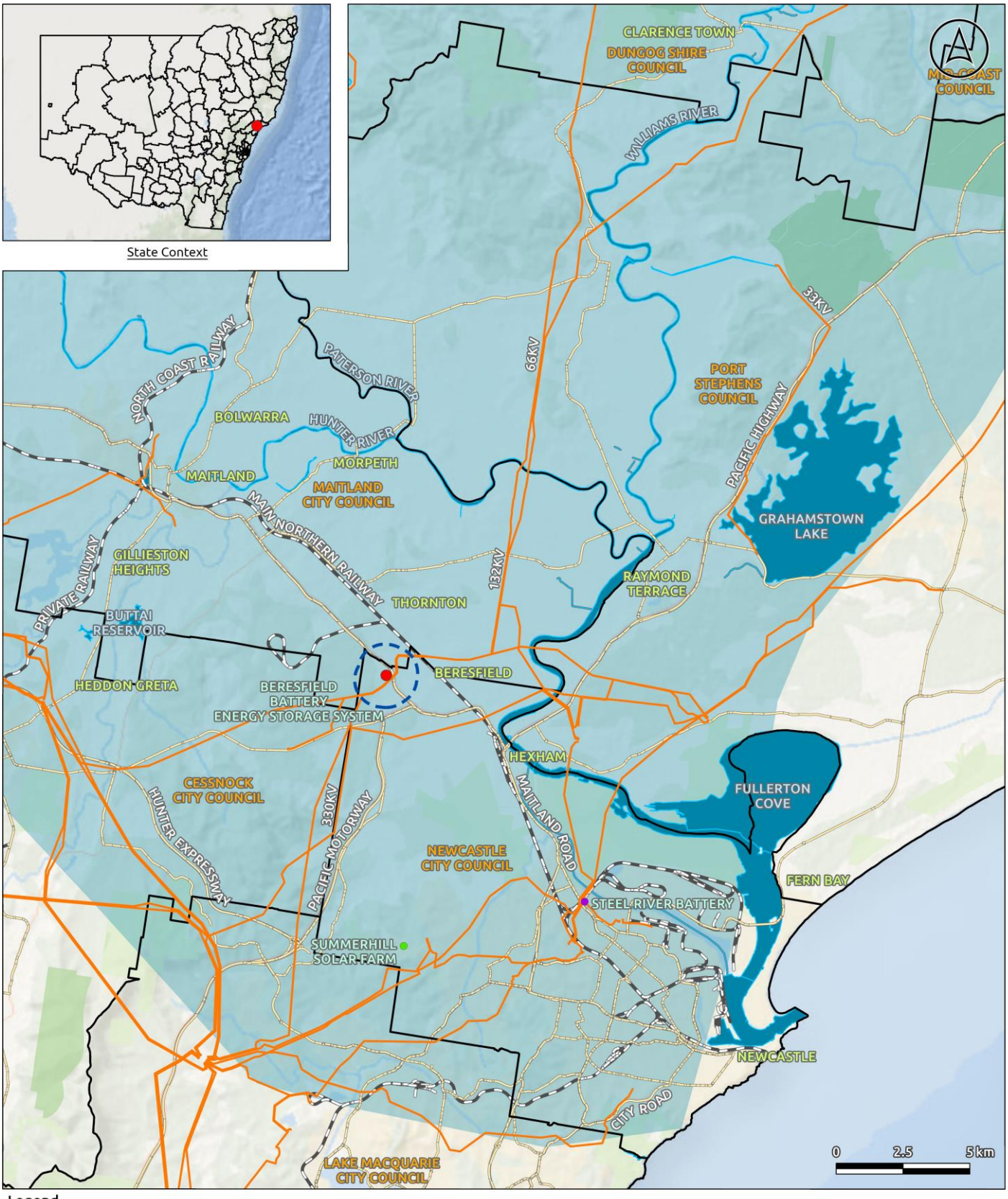

Figure 2 - Renewable Energy Zone Context

2.1.2 HUNTER REGIONAL PLAN 2041

The Hunter Regional Plan 2041 ('Regional Plan') sets the strategic land use framework for continued economic growth and diversification of the broader Hunter region, including the Local Government Areas (LGA's) of Cessnock, Dungog, Lake Macquarie, Maitland, Mid-Coast, Muswellbrook, Newcastle, Port Stephens, Singleton and Upper Hunter.

The Regional Plan draws from each council's local strategic planning statements and acknowledges common interests without duplicating effort

The Regional Plan adopts the United Nations Sustainable Development Goals, a cornerstone for planning, the second of which is 'affordable and clean energy'.

The following objectives are relevant to the proposed development:

- Objective 1: Diversify the Hunter's mining, energy and industrial capacity, acknowledges that the Hunter has the infrastructure assets and skilled workforce to support more renewable energy production and highlights the importance of developing the Hunter-Central Coast Renewable Energy Zone (REZ).
- Objective 7: Reach net zero and increase resilience and sustainable infrastructure, identifies that there is a growing risk of climate-related impacts on people, cultural, natural and economic systems and the built environment. Embedding resilience in strategic planning and identifying workable adaption and mitigation measures will be the key to the future.

In particular, Objective 7 highlights that the NSW Governments 20-year plan for the generation, storage, firming and transmission infrastructure can reduce the impact of rising energy prices and the cost of transition to a net-zero emissions economy while making NSW the national leader in energy efficiency, including through programs for vulnerable households.

The project is consistent with these objectives through providing improved firming capacity in the network and supporting the take up of renewable forms of energy generation.

2.1.3 NEWCASTLE LOCAL STRATEGIC PLANNING STATEMENT (LMC 2020)

In accordance with Section 3.9 of the Act, Newcastle City Council adopted the *Planning Newcastle 2040: Global City, Local Character Local Strategic Planning Statement* (LSPS) in 2020. The LSPS establishes 16 Planning Priorities with supporting Actions. The following Priorities and Actions are relevant to the proposed development:

- Planning Priority 6: Reduce carbon emissions and resource consumption
  - Action 6.3: Complete the review of the Carbon and Water Management Plan (Climate Action Plan) to provide a framework for reducing carbon emissions and resource consumption.

In addition, the LSPS identifies how the foregoing action and priority is consistent with other State and local policies, including the following:

- Newcastle 2030
  - 2.1a Improve waste minimisation and recycling practices in homes, workplaces, development sites and public places.
  - 2.1b Investigate and implement renewable energy technologies.
  - Encourage energy and resource efficiency initiatives.
  - 5.4a Advocate for implementation of energy and resource efficiency in new developments.
- Greater Newcastle Metropolitan Plan 2036
  - 15. Plan for a carbon neutral Greater Newcastle by 2050.

- Sustainable Development Goals
  - 7. Ensure access to affordable, reliable, sustainable and modern energy for all.
  - 11. Make cities and human settlements inclusive, safe, resilient and sustainable.
  - 12. Ensure sustainable consumption and production patterns.

The project will support planning priority 7 through the provision of improved resilience and reliability within the energy network.

2.2 Key features of the site and surrounds

2.2.1 DESCRIPTION OF THE SURROUNDING AREA

As shown in **Figure 2**, the town of Beresfield is located approximately 1.2 km to the east of the site, Newcastle is located about 20 km southeast of the site and Maitland is located about 11 km to the northwest.

The site is located on Weakleys Drive and accessed via Whites Road in an industrial area bordered by the New England Highway to the north and east and John Renshaw Drive to the south. The Beresfield Golf Course is located to the east.

Weakleys Drive forms the north-south spine of the industrial precinct, linking Raymond Terrace Road to the north (enabling connections to Raymond Terrace, RAAF Base Williamtown/Newcastle Airport and towns and villages surrounding Port Stephens to the east) to the Pacific Motorway to the south via Thornton, the New England Highway and John Renshaw Drive.

The Pacific Motorway facilitates access to Sydney approximately 145 kilometres to the south whilst the New England Highway and John Renshaw Drive connect to Newcastle approximately 20 kilometres to the south-east. The Pacific Highway connects to Brisbane approximately 780 kilometres to the north via Port Macquarie, Coffs Harbour, Grafton, Byron Bay and the Gold Coast. The New England Highway also forms the spine of a corridor of development between the towns of Beresfield/Taro and Rutherford and including Maitland and Thornton, whilst John Renshaw Drive connects to Kurri Kurri and Cessnock via the Hunter Expressway.

The Main Northern Railway line is located approximately 1.2 km to the north of the site. The Main Northern Railway line connects from Sydney in the south (via Newcastle) to Maitland in the north-west. At Maitland, the Main Northern Railway line connects with the North Coast Line, connecting to Brisbane in the north.

As shown in **Figure 4** the site and immediate surrounding land is zoned IN2 – Light Industrial. Weakleys Drive, to the west, and the New England Highway, to the north and east, are zoned SP2 – Infrastructure. Land to the east is zoned RE1 – Public Recreation (Beresfield Golf Club), whilst land to the north of the highway is zoned a mixture of business and environmental zones. The proposed development is wholly contained within IN2 zoned land.

The surrounding locality is characterised by predominantly industrial land uses, including logistics companies, wholesale businesses, kitchen and joinery businesses and engineering firms.

Whilst the locality is predominantly industrial, there are nine (9) residential dwellings within 500 m of the site and located southwest of the New England Highway – refer **Figure 5**. The closest of these is R1, located at 179 New England Highway. R1 is currently in use for residential purposes but engagement with the landowner has confirmed the intent to redevelop the site for industrial purposes. Nonetheless, R1 has been treated as a residential receiver for the purposes of this assessment. The western extent of the Beresfield residential area is located between 500 m and 1 km east of the site, with intervening land features including the New England Highway, the Beresfield Golf Course and a thick stand of vegetation.

Other non-industrial uses in proximity including a business at 179 New England Highway (on the land immediately north of the site, being the same site as R1) and a Sikh Temple at 167 New England Highway (90

m northwest of the site). It is anticipated that the land surrounding the site will be developed over time in accordance with the adopted land use zoning.

As shown in **Figure 3**, numerous high voltage transmission lines traverse the landscape. These transmission lines form part of the transmission and distribution networks. The project would connect to the distribution network via the Beresfield Substation.

Approximately 6 km to the west of the site is the former Donaldson Coal Mine, closed in remediated in 2013. The Tomago Aluminium Smelter is located approximately 7 km to the east of the site.

National Parks in the vicinity of the site include Hunter Wetlands National Park and Pambalong Nature Reserve, both located approximately 4.5 kilometres to the south-east of the site.

Figure 3 - The Project Site

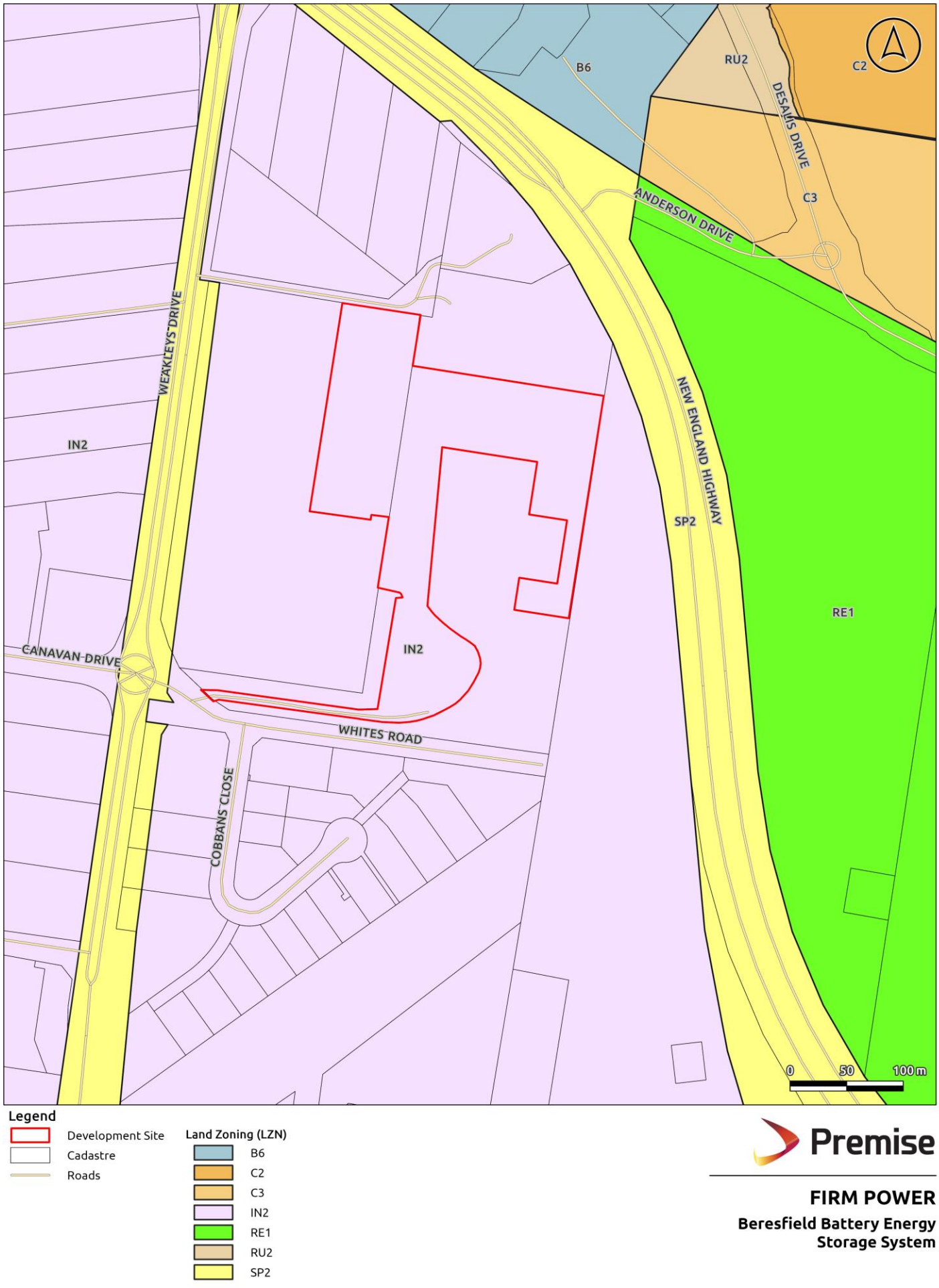

Figure 4 - Land Zoning

Figure 5 - Receivers within 500 metres

2.2.2 SITE DESCRIPTION

The project area has an area of 4.3 hectares. The eastern portion of the site features the Beresfield substation, which occupies an area of approximately 1.54 ha. The western and northern portion of the site is used as an Ausgrid construction storage depot, which occupies an area of approximately 1.7 ha. Four (4) 132 kV powerlines run within a south-west to north-east alignment in an easement in the south-eastern corner of the site and connect to the substation. There is an existing access driveway within the site.

The site features a developed hard stand in the east and north and is therefore largely devoid of vegetation in this area, with only a small area of residual vegetation remaining in the north-east of the site (refer **Figure 8**). The west of the site has been cleared as a result of historic activities and features exotic grasslands.

The site falls from its north-western corner (RL 15 metres) to its south-eastern corner (RL 3 metres).

There are no mapped waterways within the site, however Viney Creek is located approximately 60 metres to the south-east of the site. An unnamed tributary to Viney Creek is located close to the south-eastern corner of the site, draining in a south-westerly direction to join Viney Creek.

2.3 Agreements with other parties

To facilitate the construction and operation of the project, a lease deed has been negotiated with Ausgrid.

No other agreements have been entered into.

2.4 Analysis of feasible alternatives to the project

This section provides an analysis of feasible alternatives to the project, having regard to the objectives of the development, including the consequences of not carrying out the development.

Table 1 – Development Options

Alternatives		Description
Option 1	Base Case, Do Nothing	Option 1 would involve not installing and operating a BESS at the site or elsewhere.
Option 2	Alternative Site	Option 2 would involve installing and operating a BESS at an alternative site.
Option 3	BESS Technology and Provider Alternatives	Option 3 would involve using alternative technology at the site.
Option 4	BESS at 53 Weakleys Drive, Beresfield, 'Preferred Option'	Option 4 would involve the installation and operation of a BESS at the site.

Of the above, Option 4 is the preferred option, and this is discussed in further detail in the following sections.

2.4.1 OPTION 1

Option 4 is preferred over Option 1 on the grounds that the latter is:

- Inconsistent with the strategic context set by State and local policy, including:
  - Goal 22 of the NSW 2021 Plan (NSW Government 2011) which seeks to "promote energy security through a more diverse energy mix, reduce coal dependence, increase energy efficiency and move to lower emission energy sources";

- Goal 1 of the *NSW REAP* (NSW Government 2013) which seeks to attract renewable energy investment;
- Objectives of the Energy Security Safeguard legislation to improve the affordability, reliability and sustainability of energy by addressing the shortfall in firm capacity during times of peak demand;
- Investment in the preparation of the Hunter REZ in accordance with the *NSW Electricity Strategy and Electricity Infrastructure Roadmap* (DPIE 2020) as a critical region for renewable energy due to strong investor interest and availability of existing infrastructure due to the area's history of supplying electricity for the network;
- Direction 12 of the *Hunter Regional Plan* (DPE 2016) which seeks to "diversify and grow the energy sector;

2.4.2 OPTION 2

Option 4 is preferred over Option 2 as the latter would result in increased costs and environmental impacts associated with the acquisition of a suitable property (Firm Power has entered into an agreement to lease the project site of the proposed BESS from Ausgrid). It would also entail the construction of increased lengths of connecting infrastructure (likely to include earthworks and vegetation removal). By comparison to the site of the proposed development, the length of connecting infrastructure is expected to be minimal due to the proximity to the existing Ausgrid substation.

By locating the BESS project adjacent to Ausgrid's substation, the project is also sympathetic to the existing power infrastructure setting and the industrial use of the current land.

2.4.3 OPTION 3

Option 4 is preferred over Option 3 as:

- Option 4 provides the most reliable way, using current technology, to regulate electricity supply in a network which is expected to become increasingly variable due to the transition from traditional to more sustainable, renewable sources in the region; and
- Option 3 may not be suitable to the site due to its limited area or other reasons, requiring the seeking out and acquisition of an alternative site and construction of connecting infrastructure.

3. PROJECT DESCRIPTION

3.1 Project Summary

The Beresfield BESS project comprises a BESS with a delivery capacity of up to 170 MW_{AC} and useable energy storage of 340 MWh and includes the following key infrastructure:

- Enclosed lithium-ion batteries;
- Power conversion systems including associated switchgear, protection and control equipment, transformers and enclosures for housing equipment;
- Underground power and fibre optic cabling interconnecting the equipment;
- Grid connection equipment including switchgear, protection and control equipment, metering, reactive power equipment, filtering equipment, auxiliary/earthing transformers and enclosures/buildings for housing equipment;
- Underground or overhead 132kV sub-transmission lines to connect the BESS to the Beresfield substation;
- Earthing and lightning protection systems;

- Site office, storage area/enclosure, internal access tracks, on-site parking, security fencing, CCTV, lighting and temporary construction laydown area;
- A permanent 3m high noise barrier on the northern and western boundaries; and
- Utilisation of existing site access arrangements.

Works will be required within the existing Ausgrid substation to enable connection of the BESS to the grid. These works are noted and assessed in this application as they are related to the project, but it is expected that Ausgrid will perform their own assessments, approval and setting of conditions for the works.

The area of the site that will be impacted by the development ('the project area') occupies the entirety of the site the subject of the application.

The primary components associated with the installation of the BESS are as follows:

- Site investigations, vegetation clearing, levelling, bench and access way construction, drainage system installation and installation of foundations/supports to install equipment on;
- Transport to site and installation of equipment;
- Testing and commissioning of the equipment;
- Operation and maintenance.

Key features of the project are summarised in **Table 2** and shown in **Figure 7**.

Table 2 – Project Summary

Project Element	Summary of the Project
Site and project area	4.3 ha
Site details	53 Weakleys Drive, Beresfield, being part Lot 630 DP1180006 and part Lot 6 DP1160356
Project area	The development footprint of the BESS and associated operational and construction infrastructure
Battery storage capacity	170MW/340MWh
BESS Lifespan	20 years, with the possibility of upgrades to extend the operational life
Infrastructure	• Enclosed lithium-ion batteries with a capacity of up to 170 MW and 340 MW-hours, with associated power conversion systems, switchgear and a control building; • An underground or overhead transmission line (approximately 200 m long) to connect the BESS to the adjacent Ausgrid substation; • Cabling and collector units, storage area, internal access tracks, on-site parking, security fencing, lighting, temporary construction laydown area, a noise barrier/embankment and vegetation screening.
Site Access	• Utilisation of an existing site access driveway from Whites Road
Access route	• Vehicles accessing the site from the north would travel via the New England Highway, Weakleys Drive and Whites Road and the existing site access from Whites Road.

Project Element	Summary of the Project
	• Vehicles accessing the site from the south would travel via the Pacific Motorway, Weakleys Drive and Whites Road and the existing site access from Whites Road. • In is anticipated that the BESS Infrastructure would be delivered to the Port of Newcastle or Port Botany and transported to the site via roads approved for heavy vehicle use and then the existing access driveway (refer **Figure 3** and **Figure 10**)
Construction	• Construction is expected to commence in early 2024 and occur over a 10-month period, including a peak period of 5 months. • Construction would occur during standard construction hours. However, it is anticipated that some activities that are inaudible, and would not result in amenity impacts to surrounding receivers, may be required to occur outside of standard hours in accordance with an Out-of-Hours Construction Protocol. • Approximately 20,000 L of water per day would be required during construction, delivered to site via water haulage trucks.
Operations and maintenance	The project would be operated remotely with occasional maintenance activities generally be undertaken by 2-3 personnel within the following hours, the exception being where urgent emergency maintenance is required: • Weekdays: 7am to 6pm • Saturday: 8am to 6pm • Sundays and Public Holidays: no work Any works outside of the above hours would be carried out in accordance with an out-of-hours works protocol, and agreed with Council and adjacent landowners, and detailed in a CEMP.
Decommissioning and rehabilitation	• The site would be progressively rehabilitated during and following the construction period, including removal of the temporary construction facilities. • At the end of operational life, above ground components would be removed, and land rehabilitated to pre-development conditions.
Workforce	Up to 75 construction jobs and 1-2 operational jobs
Hours of Operation	24 hours, 7 days a week
Capital Investment (ex GST)	$203,313,000.00

3.2 Project refinements

The concept layout and design of the site has been considered in detail since issue of the SEARs as a result of design development, engagement with regulators and landholders, with the aim of reducing environmental and amenity impacts.

Through ongoing discussions with the landowner (Ausgrid) a change to the project was proposed after the issue of SEARs to extend the site area. Key changes include developing into the adjacent lot (Lot 6 DP1160356).

This proposed change increased the development footprint by 1.5 ha, increased the capacity from 100 MW to 170 MW and reduced the usable capacity of the battery from 400 MWh to 340 MWh.

These changes were communicated to DPE, government agencies, NCC and surrounding residential and industrial receivers; no concerns were raised. DPE and government agencies agreed that they had no additional comments and that the existing SEARs would continue to inform preparation of the EIS. This EIS reflects the above described arrangement.

The inclusion of noise barriers was identified as necessary in the north and west of the BESS infrastructure to ensure that the relevant noise criteria could be achieved for the residential property located to the north. It is noted that this dwelling is located in the industrial zone and the landowner has confirmed their intention to develop the land for an industrial purpose in the near future. Nonetheless, the application has been prepared on the basis that this is receiver is of a residential nature.

No other project refinements are noted.

Figure 6 depicts the original site layout (as lodged at the Request for SEARs stage), with **Figure 7** showing the current proposed layout including the proposed conceptual location of the required noise barrier.

The noise barriers would be a minimum of 3 metres high (above natural ground) and would be constructed of a solid material with a minimum density of 12kg/m3 and free of any gaps.

LEGEND

- Subject Site
- Development Area
- Cadastre
- Road
- Property Access
- Mapped Aboriginal Heritage Sites
- Easement
- Connecting Electricity Transmission Line

Transmission Lines

- 132kV

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Source: © State Government of NSW, Department of Customer Service, Spatial Services 2021

Figure 6 - Original site layout concept

Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
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Legend

- Site Access
- Development Site
- Cadastre
- Road
- Waterbody

Watercourse Strahler Stream Order

- 1
- 4
- Electricity Transmission Lines
- Noise Wall
- Grid Connection Route
- Ausgrid 132kV line
- BESS Area
- Substation Area
- Works Area in Existing Substation
- Grid Connection Investigation Area
- O&M Compound
- BESS Access Shared
- Temp Construct Compound
- Development Site

Receivers

- Indicative Associated Non-residential
- Indicative Non-residential
- Non-Residential
- Residential

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 7 - Proposed layout

3.3 Uses and Activities

The project comprises the development of an electricity generating works, meaning a building or place used for the purpose of making or generating electricity, or electricity storage.

The existing Beresfield Substation will continue to operate, and the BESS will operate in conjunction with the substation to manage and store electricity generated by the substation.

Upon the commencement of operation, the only time personnel will be required on the site is for maintenance works. Personnel will access the site via the existing access driveway in standard sized vehicles and occasionally a heavy vehicle may need to access the site for maintenance.

Specific project elements are discussed in the following sections.

3.3.1 BATTERIES

The proposed BESS contains enclosed lithium-ion type batteries which will be manufactured offsite and delivered to the site for installation. The number and exact layout of battery modules would be confirmed during detailed design. However, the location of this equipment would be limited to the areas shown on **Figure 7.**

For the purposes of the assessment of the BESS, a conservative approach was taken, whereby the maximum area and quantities of this infrastructure was considered, subject to this infrastructure being located wholly within the identified areas.

3.3.2 UNDERGROUND CABLING

Underground cabling would be designed in accordance with the relevant Australian and international standards and manufacturer's specifications and installed in trenches. The cabling would be installed over a thermally stable backfill (such as sand or similar) and backfilled with fill obtained on site.

3.3.3 SUB-TRANSMISSION LINE

The electrical connection from the BESS to the adjacent Beresfield Substation would be via a 132kV powerline (overhead/underground) running entirely within the site (up to 200 m in length).

The approximate location of the sub-transmission line has been identified but would be subject to detailed design considerations in consultation with Ausgrid. Land within the nominated area predominantly comprises exotic hedges and exotic grassland, and a small patch of native woodland. The balance of the site is cleared, comprising hardstand, road and gravel.

3.3.4 AUSGRID SUBSTATION AND GRID CONNECTION

The existing substation would require some minor internal augmentation to accommodate the BESS infrastructure. The new feeder connection to the existing Beresfield Substation 132kV busbar is expected to comprise a single dedicated feeder bay and suitable overhead or underground conductor to which the required throughput meets Ausgrid thermal rating standards. Ausgrid standard design 132kV feeder protection shall be installed for the new feeder. Modifications to the SCADA equipment at Beresfield Substation may also be required.

3.3.5 INVERTERS, TRANSFORMERS AND SWITCHGEAR

Inverter stations would be installed and located at regular intervals across the site. Each would contain an inverter, switchgear and a step up transformer. The inverter stations would measure up to approximately 13 metres-long by 3 metres-wide by 4 metres-high.

3.3.6 ACCESS AND INTERNAL TRACKS

The existing access driveway from Whites Road would be utilised to provide access to the BESS. The TIA concludes that the existing access driveway and roads along the proposed access route can accommodate the traffic generated by the development during the construction, operation and decommissioning stages.

Therefore, access treatment upgrades are not required or proposed.

It is proposed to implement traffic management measures as outlined in **Section 6.2.4** to ensure the appropriate manage of vehicles arriving at and departing from the site. The impacts associated with traffic would be concentrated during the short construction period. Post construction, vehicle visitation to the site would be limited to no more than 1-2 light vehicles per week.

3.3.7 ANCILLARY TEMPORARY FACILITIES AND CONSTRUCTION COMPOUND

Ancillary facilities include:

- Material laydown areas;
- Temporary construction site offices;
- Car and bus parking areas for construction workers' transportation;
- Staff amenities including sanitary modules with septic tank, water tank, changing rooms, administrative office, undercover storage area, emergency muster point and genset for electricity supply, each with capacity to accommodate up to 65 staff on-site; and
- Parking for staff and visitors.

3.3.8 SECURITY FENCING

The site and substation would be secured by up to 3 metre-tall chainmesh security fencing and access gates.

3.3.9 NOISE BARRIER/EMBANKMENT

Permanent noise barriers would be installed on the northern and western boundaries of the property with a minimum height of 3 metres and constructed from solid material, free of gaps, and with a minimum density of 12kg/m^3. Detailed design will confirm the final location, length and height of the noise barriers to meet the project criteria.

3.4 Timing

3.4.1 STAGES

The project would be delivered within a single construction program of approximately 10 months (5 months of peak activity). Specific construction elements are discussed further below.

Subject to approvals, construction is expected to commence mid-2024.

3.4.2 PHASES

The project would involve 3 phases:

- Construction;
- Operation; and
- Decommissioning & Rehabilitation.

Each phase is discussed in detail below.

3.4.2.1 Construction

3.4.2.1.1 Construction Activities

It is anticipated that the construction phase will last approximately 10 months, with a five-month peak construction period. The construction program is expected to feature six specific construction stages, as follows:

1. Site establishment (i.e., vegetation clearing, earthworks and a temporary construction compound);	Month 1
2. BESS installation and construction (i.e., leveling of the site to accommodate the BESS units and installation of the BESS units);	Months 2-9
3. Sub-transmission line construction;	Month 5
4. O&M compound construction;	Month 5
5. Testing and commissioning activities; and	Month 10
6. Removal of construction equipment and rehabilitation of construction areas.	Month 10

Stages 2-5 would be expected to overlap during the peak five-month construction period.

3.4.2.1.2 Ground disturbance

The extent of the earthworks required will be determined at the detailed design phase of the project, noting that the extent of ground disturbance would not exceed the areas identified in **Figure 7**. Erosion and sediment control measures would be installed prior to the commencement of works for the project.

Given the slope of the land, excavation would be kept to a minimum, with the majority of work entailing the importation of fill material from offsite to create level, flat pads for battery installation.

3.4.2.1.3 Construction Hours

Construction works are to be undertaken during standard working hours:

- Weekdays: 7am to 6pm
- Saturday: 8am to 6pm
- Sundays and public holidays: no work

It is anticipated that some inaudible activities, or activities that would not result in amenity impacts to surrounding receivers, may be required to occur outside of standard hours in accordance with an Out-of-Hours Construction Protocol. This protocol would detail any proposed works and include consultation with relevant authorities and neighbouring residents.

Any night lighting required during above inaudible construction activities would be directed away from native vegetation, surrounding streets and neighbouring properties.

3.4.2.1.4 Personnel and Equipment

It is anticipated that a maximum of approximately 75 construction personnel would be required on site during the peak construction period (approximately 5 months). Construction supervisors and the construction labour force, made up of construction labourers and technicians, are to be hired locally where possible. Workers would be accommodated in existing accommodation.

Equipment used during construction is anticipated to include earth-moving equipment for civil works, diesel generators, trucks and cranes.

3.4.2.1.5 Materials and Water Use

The following materials would be transported to the site from nearby towns and regional centres, including Newcastle. Quantities would be determined at the detailed design phase of the project:

- Gravel for BESS area;
- Sand for burying of cables;
- Metal for the mounting system, inverters and enclosures;
- Concrete for the foundations; and
- Approximately 20,000 L of water per day, sourced locally, trucked to site via water haulage trucks and stored using a water-tank for:
  - dust suppression depending on weather conditions;
  - vehicle washdown; and
  - drinking water.

3.4.2.2 Operation

Upon completion of the construction works and connection to the Ausgrid Beresfield Substation, the BESS would commence operation. Operational activities would include daily routine operations and maintenance by one to two personnel, including:

- Routine visual inspections and general maintenance;
- Site security; and
- Replacement of equipment and infrastructure, as required.

During operation the BESS is expected to generate a minimal level of traffic associated with maintenance and operation services. The BESS is expected to be operated by up to 3 staff resulting in a traffic generation of up to 6 light vehicle movements per day and 2 heavy vehicle movement per week which would result in a negligible change to the traffic environment.

Maintenance operations are to be undertaken during standard working hours (unless emergency works are urgently required):

- Weekdays: 7am to 6 pm
- Saturday: 8 am to 6 pm
- Sundays and public holidays: no work

Night lighting would be used during operation for security and safety purposes and would be installed to be directed away from native vegetation, the surrounding road network and neighbouring properties.

The operational phase of the project would have a lifespan of up to 20 years but there is the potential for the development to be upgraded to extend the operational life (subject to appropriate approvals at that time).

3.4.2.3 Decommissioning & Rehabilitation

At the BESS end of life, all above ground infrastructure would be removed. Key elements of decommissioning include:

- Removal of the BESS, including any foundation posts, for recycling or reuse;
- Removal of site amenities and equipment for recycling or reuse;

- Removal of fencing including small concrete footings; and
- Rehabilitation of disturbed soils in consultation with the landowner.

The sub-transmission line and substation connection may be decommissioned or may continue to be operated by the electricity supply authority for public power supply. If the decision is made to decommission the sub-transmission line, above ground infrastructure and posts would be removed, and the land would be returned to its pre-construction condition.

In consultation with the landowner, above ground concrete slabs would be left in place where they do not impact ongoing operations. Cables deeper than 500mm may also be left in place to reduce the impact on land capability.

Traffic required for decommissioning would be similar in type but of shorter duration than that anticipated during the construction phase.

3.4.3 SEQUENCING

The construction program is anticipated to occur over a 10-month period and a peak 5-month construction period with:

- Construction commencing Q2 2024;
- Commissioning in Q1 2025;
- Operations commencing in Q2 2025; and
- Decommissioning in Q2 2045.

4. STATUTORY CONTEXT

4.1 Summary

In accordance with Section 3.5 of the *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPIE 2022), the statutory requirements for the development are set out in **Table 3.**

Further discussion around statutory requirements and pre-conditions to approval are discussed in **Table 4**.

Table 3 – Statutory Requirements

Category:	Assessment
Power to grant approval	The proposed development is characterised as SSD as the proposal is for the purpose of electricity generating works with a capital investment value ('CIV') more than $30 million, pursuant to Section 20 of Schedule 1 of the Planning Systems SEPP. On the basis that reportable political donations have not been made in connection with the DA, the consent authority will be the Minister in accordance with Section 4.5(a) of the EP&A Act. In the event submissions by way of objection are received (of the type or number described in clause 2.7 of the Planning Systems SEPP), the consent authority would be the Independent Planning Commission. This will not be known until the public exhibition period has completed.
Permissibility	The proposed development is permitted with consent in the IN2 zone by reference to the LEP and by reference to clause 2.36 of the Transport SEE.

Other approvals	Relevant to the project, no other approvals are required by reference to NSW legislation. For the avoidance of doubt: • An approval under section 138 of the *Roads Act 1993* is not required on the basis that no changes to the access arrangements are proposed; • An EPA licence is not required on the basis that the works do not entail a scheduled activity by reference to Schedule 3 of the *Protection of the Environment Operations Act 1997*; and • An approval under the *Coal Mine Subsidence Compensation Act 2017* is not required on the basis that the project is not within a mine subsidence district.
Pre-condition to exercising the power to grant approval	Pre-conditions to approval include consideration of the following: • Consideration as to whether the project site is suitable in its contaminated state - or will be suitable, after remediation - for the purpose for which the development is proposed to be carried out. • Consideration as to whether the project represents potentially hazardous or offensive development. • Consideration of impacts associated with development with a frontage to a classified road. • Impacts associated with developing land mapped as containing acid sulfate soils. • Impacts associated with carrying out earthworks These matters are discussed in further detail in **Table 4**.
Mandatory matters for consideration	Pursuant to Section 1.7 of the EP&A Act, the *Biodiversity Conservation Act* 2016 (the BC Act) is a mandatory matter for consideration. Section 7.9 of the BC Act provides that any application under Part 5 of the EP&A Act for SSD must be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the Planning Agency Head and Environment Agency Head determine that the development is not likely to have any significant impact on biodiversity values. Refer to **Section 6.1** of this EIS for a summary of the conclusions of the BDAR.
	Biosecurity matters as per the NSW *Biosecurity Act 2015*
	Pursuant to Section 4.15 of the EP&A Act, the following mandatory matters for consideration apply: • Relevant environmental planning instruments, including: – *State Environmental Planning Policy (Resilience and Hazards) 2021;* – *State Environmental Planning Policy (Transport and Infrastructure) 2021;* – *State Environmental Planning Policy (Biodiversity and Conservation) 2021; and* – *Newcastle Local Environmental Plan 2012.* The above matters are discussed in **Table 4.** • The relevant development control plan is the *Newcastle Development Control Plan 2012.* The application of development control plans is excluded from SSD under Clause 2.10 of the Planning Systems SEPP), this is therefore not further discussed.

	• The likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality – this is discussed in **Section 6**; • The suitability of the site for the development – this is discussed in **Section 7.10**; and • The public interest – this is discussed in **Section 7.8**.

4.2 Pre-conditions to approval

Table 4 – Pre-conditions table

Statutory reference	Pre-condition	Assessment
State Environmental Planning Policy (Resilience and Hazards) – section 4.6(1)(b)	A consent authority must be satisfied that the land is suitable in its contaminated state - or will be suitable, after remediation - for the purpose for which the development is proposed to be carried out.	The contamination report prepared by SLR confirms that the project site is suitable in its contaminated state to be used for the proposed purpose. Further discussion is provided in **Section 6.10**.
State Environmental Planning Policy (Resilience and Hazards) – Chapter 3	Section 3.7 of the Hazards SEPP requires consideration of relevant circulars and guidelines in consideration of whether a proposed development represents potentially hazardous or offensive development. Where a conclusion is reached that a project is either, or both, a potentially hazardous or offensive development, must prepare a PHA in relation to the project.	Whilst the project is not assessed as representing potentially hazardous or offensive development, by response to the SEARs, a project PHA has been completed – refer **Section 6.7** and **Appendix I**. This PHA concludes, based on the identified hazards and the postulated scenarios, that there were no observed offsite impacts and that the project does not exceed the acceptable risk criteria. A range of recommendations are provided in **Section 6.7.3.8** that will ensure that any residual impacts are managed to an acceptable level.
State Environmental Planning Policy (Transport and Infrastructure) 2021 – Section 2.119	Development with frontage to a classified road	The subject site is accessed from Whites Road, which is not identified as a Classified Road. Notwithstanding, the project TIA considers the impacts of the project in the context of the operation of Whites Road and the nearby Weakleys Drive, which is identified as a classified road – refer **Section 6.2** and **Appendix E**.
State Environmental Planning Policy (Resources and Energy) – Section 2.19	Section 2.19(1) of the Resources SEPP requires consideration of a number of factors in relation to a development proposed on land in the vicinity of an	The project site is located within an area known to have been mined in the past. Further consideration of this issue is provided in **Section 6.11**.

Statutory reference	Pre-condition	Assessment
	existing mine, petroleum production facility or extractive industry.	
Newcastle LEP 2012	The Newcastle LEP sets out the environmental planning provisions applicable to the Newcastle LGA and is administered by Newcastle City Council	The project is wholly located within the IN2 – Light Industrial zone. Within the IN2 zone, the carrying out of electricity generating works is permitted with consent. The objectives of the IN2 zone are: • *To provide a wide range of light industrial, warehouse and related land uses.* • *To encourage employment opportunities and to support the viability of centres.* • *To minimise any adverse effect of industry on other land uses.* • *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.* • *To support and protect industrial land for industrial uses.* The project is permissible with consent in the IN2 zone and is not inconsistent with the objectives of the zone. The project enables other land uses that rely on electrical power and minimises off-site impacts.
	Section 6.1 of the LEP relates to works within an area mapped as containing acid sulfate soils and requires consideration of a range of factors prior to consent being granted.	The host lots are mapped as containing class 2 , 3 and 5 acid sulfate soils. The portion of the site impacted by class 2 mapped land is in the south-east of the site and would not be impacted by the project. Project impacts are limited to class 3 and 5 land. The is further discussed in the water and soils section of the EIS – refer **Section 6.9**.
	Section 6.2 of the LEP requires consideration of a range of factors prior to the grant of consent for earthworks.	Relatively minor earthworks are required to provide a level development site to accommodate the proposed battery arrangement. Relevant heads of consideration are discussed in **Section 6.9**

4.3 Other Environmental Planning Instruments

4.3.1 NEWCASTLE LOCAL ENVIRONMENTAL PLAN 2012

Section 1.2 sets out the aims of the Newcastle LEP. The project is not antipathetic to the aims of the LEP, and is particularly aligned with the aims (2)(a), (b) and (c) on the basis that:

- The project has demonstrated through a thorough assessment of potential impacts that the project can be developed with nothing other than minor impacts to the natural and cultural heritage of the locality. It is also noted that the project is an industrial facility within an industrial locality and is therefore consistent with the character of this area. Thus, impacts to identity, image and sense of place are not expected.
- As outlined in **Section 7.9**, the project is aligned with the principles of ESD.
- As outlined in **Sections 6.12** and **6.13**, the project positively contributes to the economic and social wellbeing of the City and does not result in significant negative consequences.
- As outlined, the project is a permissible use within the IN2 zone subject to consent.

Relevant sections of the LEP requiring further consideration are with respect to acid sulfate soils (Section 6.1) and earthworks (Section 6.2). These matters are further considered in **Section 6.9** of this report.

By reference to the assessment within this EIS, the project is not antipathetic to the aims and objectives of the LEP, and the IN2 zone specifically, and provides adequate consideration of relevant pre-conditions to approval to demonstrate that the development can be achieved without resulting in significant or detrimental impacts to the locality or region. Taken in the round, the assessment confirms that the range of impacts are acceptable, and any residual impacts are adequately managed via recommended mitigation measures.

5. ENGAGEMENT

This section summarises the findings of the community and agency engagement carried out for the project during the preparation of this EIS by bd Infrastructure. This section also details what further community engagement will be carried out if the project is approved. A summary of engagement carried out during the development of the Scoping Report is included for context.

5.1 Scoping Report Engagement

To inform preparation of the Scoping Report, the Applicant carried out preliminary engagement with surrounding landowners, community groups and regulatory bodies. The aims of engagement during development of the Scoping Report were to:

- build an awareness of the project and proposed development
- establish communication channels with the local community, and
- respond to any questions or concerns the community may have and ensure these are considered during development of the project.

The engagement is summarised in **Table 5** and included:

- letters and notifications to landowners surrounding the development, community groups and regulatory bodies.
- a project 1800 Infoline, email and website.
- Doorknocking of properties surrounding the development.
- Meetings with key stakeholder including the City of Newcastle Council and regulatory bodies.

Table 5 provides a summary of engagements carried out to help inform the Scoping Report.

Table 5 – Scoping Report engagement summary

Timing	Engagement activity	Audience and purpose
September - October 2021	Meetings and liaison	Key stakeholders including Department of Planning and Environment, Ausgrid, Subsidence Advisory NSW, and Newcastle City Council: to determine project feasibility and assessment requirements
September 2021 onwards	Project website	All stakeholders: source of up-to-date information on the project.
22 September 2021	Notification	500 metres surrounding the proposal site (41 residential properties): to introduce the project and seek feedback. No responses received.
27-29 September 2021	Email	Engagement advice sent to five regulatory bodies, six community groups, three state government agencies and the Local Aboriginal Land Council to inform them of the Scoping Report development and seek feedback on the proposal. No responses received.
27 October 2021	Door knocking	500 metres surrounding the proposal site (41 residential properties). 12 residents were briefed on the project and potential impacts during doorknocking.

5.2 EIS Engagement

During the preparation of the EIS, the applicant has built on the engagement carried out during the Scoping phase with surrounding landowners, community groups and regulatory bodies. This engagement was carried out in accordance with the SEARs and DPE's *Undertaking Engagement Guidelines for State Significant Projects*, and to ensure that the EIS was developed with due consideration of community and stakeholder views.

The aims of community engagement during development of the EIS were to:

- grow awareness of the project and proposed development
- maintain communication channels
- identify issues requiring consideration, and
- deepen understanding of local views and values to be considered during development of the project, and
- support the assessment of potential project impacts and benefits.

The Applicant implemented the following forms of engagement:

- letters and emails to local stakeholders, community groups and regulatory bodies;
- stakeholder meetings and interviews;
- distribution of a project Fact Sheet;
- advertising in local media;
- community survey;
- a project 1800 number Infoline and email;
- a project website; and

- doorknocking.

Table 6 provides a summary of engagements carried out during development of the EIS.

Table 6 – EIS engagement summary

Timing	Engagement activity	Audience and purpose
March to April 2022	• Provision of draft assessment methodology • Field assessment	13 registered RAPs: • Consultation on the method of Aboriginal Cultural Heritage Assessment. • A representative of Mindaribba Local Aboriginal Land Council assisted with the field assessment.
May 2022	• Meeting	Ausgrid: • Consultation on construction planning and design interfaces.
May 2022 – present	Project website update & QR code: https://firmpower.com.au/project/beresfield-bess/	All stakeholders: • Providing a source of up-to-date information on the project including the Project Fact sheet, 1800 number and community survey. • Website URL and QR code used on other promotional materials including project update letters, fact sheets, Sorry We Missed You cards and emails.
May 2022 – present	• 1800 number (1800 224 273)	• Included on all communications materials to provide a point of contact for feedback and/or enquiries. • Two calls received: community member and one from the local NSW State Member of Parliament (MP) office.
May 2022 - present	• Project email: info@firmpower.com.au	Included on all communications materials to provide a point of contact for feedback and/or enquires. No emails have been received.
November – December 2022	• Online survey	General and local community • Consultation to support assessment of social and economic impacts. Seven surveys completed by members of the community.
November 2022	• Project update letter and Factsheet sent via Australia Post	Previously contact receivers within 500m of project site (n=12)

Timing	Engagement activity	Audience and purpose
November 2022	• Project update letter and Factsheet sent via Australia Post	Other receivers within 500m of project site (n=112): • Promote awareness of the proposal, seek feedback via the community survey and inform them of planned doorknocking dates.
December 2022	• Project update emails	Government agencies and Newcastle City Council were sent emails detailing the project updates since SEARs were issued. No concerns were raised, and agencies confirmed that the existing SEARs continued to apply to the preparation of the EIS.
December 2022	• Local media advertising in the *Newcastle Herald* (six days excluding a Sunday)	General community (readership: approx. 40,000): • Promote awareness of the proposal and seek community feedback via the online survey.
December 2022	• Doorknocking	Nearby residents and businesses within 500m of the site (9 residential properties and 19 non-residential properties including sub-divisions): • Provide information about the proposal (update letter and factsheet) and seek community feedback. • 13 receivers engaged face-to-face and provided with Factsheets. 15 'Sorry We Missed You' cards and Factsheets left.
December 2022	• Emails containing project update letter and Factsheet to request interviews	Newcastle City Council, Business Hunter and Maitland Business Chamber. No response to the interview requests were received.
February 2023	• Emails containing updated project details, Factsheets and website URL sent to members of the nearby Sikh Temple requesting interviews. • Email copy of noise report.	• Consultation to support assessment of social and economic impacts. • Two phone interviews conducted with President and member of the Sikh Temple with follow up emails sent.
February 2023	• Follow up phone call with office of State Member of Parliament (MP) Sonia Hornery	• One phone call with an Office of MP employee to follow up on their social media posts to promote the project. • One follow up email sent to provide project updates and link to project website.

Timing	Engagement activity	Audience and purpose
July 2022 – March 2023	• Phone calls and email with landowner on which R1 is located	• Throughout this period, the Applicant has exchanged emails and phone calls with the owners of the land to discuss the project. • The landowner has confirmed their intention to develop the land for industrial purposes, subject to Council approval.
May 2023	• Provide draft specialist assessment reports to regulators for their review and comment	• Responses/acknowledgements have been received from DPE Water, TfNSW and Heritage NSW and updates to this EIS have been provided to address these comments. Other regulatory agencies have not responded. From previous experience, commentary received at this point of the project is generally limited to generic responses, with agencies preferring to address the matter through the statutory consultation period. Further responses are not expected.

5.3 Community and Stakeholder Views

Engagement assisted in gaining a balanced understanding of community and stakeholder views relevant to the construction and operation of the proposal. This engagement was instrumental in completing a Social Economic Impact Assessment (SEIA) (**Appendix M**), along with other technical studies.

A description of community and stakeholder views on project benefits and construction and operational impacts is included below.

5.3.1 COMMUNITY VALUES

5.3.1.1 Local community values

The local community surrounding the Beresfield Ausgrid substation site is a diverse one but various stakeholders, including the City of Newcastle Council, the Sikh Temple and community survey respondents, suggested the area has a rich and diverse history which should be protected, if not enhanced where possible. Further feedback suggests many in the community like to support one another and come together for a variety of different reasons (such as religious, cultural and/or social events), and that any new infrastructure projects should consider ways in which the strong community spirit and togetherness can be strengthened. Capturing and sharing learnings around community engagement methods, outcomes and how these might be enhanced or applied to other infrastructure solutions was identified as being important by the City of Newcastle Council.

The office of Sonia Hornery, the NSW State MP for Wallsend, suggested it was important that community members and residents are aware of proposed plans and projects like the Beresfield BESS so they have an opportunity to contribute to the planning, design and construction phases wherever possible as the infrastructure may affect them once it is built and operational.

5.3.2 CONSTRUCTION IMPACTS

5.3.2.1 Traffic, transport and access

Although the Traffic Impact Assessment noted that the proposal is expected to have minimal cumulative traffic impacts on the road network in the surrounding areas, some stakeholders made enquiries in relation to traffic, the entry and exit of construction and delivery vehicles onto the project site and construction times/ shifts.

One nearby receiver (a local business) within 500 metres of the proposed site, enquired about the approach road that would be used by construction workers and delivery drivers to enter and exit the Ausgrid substation. Specifically, they were interested in how traffic would feed off or onto Weakleys Drive (which is already quite busy as it is a four-lane road – two lanes in each direction – where it passes the Ausgrid substation) and how this might impact local businesses in the area.

The Sikh Temple, also located within 500 metres of the Ausgrid substation, enquired about how and where the Ausgrid substation would be accessed. After learning that Whites Road (running off Weakleys Drive at the southern end of the Ausgrid substation) would be used, the two members of the Sikh Temple interviewed expressed support noting that this would not impact the use of the approach road to the Sikh Temple that runs off Weakleys Drive at the northern end of the Ausgrid substation site.

A few community survey respondents provided qualitative feedback suggesting the general need to enable accessibility to/ from the site and reduce traffic congestion in the area.

Support was expressed for a site-specific Construction Traffic Management Plan and the display and use of clear signage and communication materials to ensure road users and the local community are sufficiently educated in terms of the changes associated with the additional traffic movements.

5.3.2.2 Construction noise

Noise concerns and impacts related to the proposed construction of the project were identified by some stakeholders.

When asked to rate the impact of construction impacts (noise, light and dust caused by construction activities such as earthworks and civil works), on a scale of 1 to 5 (with 1 being 'Not at all concerned' and 5 being 'Very concerned'), 50 percent of community survey respondents suggested they were 'Concerned' and 10 percent 'Very concerned.' Similarly, when asked to rate the impact of construction traffic and heavy vehicles on local roads, on the same rating scale, equal numbers (30 percent) of community survey respondents suggested they were 'Concerned' or 'Very concerned.'

Feedback from the two members of the nearby Sikh Temple who were interviewed suggested it was important to ensure that construction (and operational) noise would not impact the weekly services they run on Sunday evenings. They suggested it would be challenging if noises from the arrival or exit of vehicles and/or construction works were to impact the ability of Temple members and visitors to attend and/or participate in religious and cultural services they deliver.

5.3.2.3 Dust and visual landscape

Dust and visual landscape concerns expressed related to the air quality associated with construction works were identified as a potential concern by some stakeholders.

Two nearby residential receivers located on Weakleys Drive directly opposite the existing Ausgrid substation made enquiries about the visual landscape of the proposed project although it should be noted that their view of the substation is partially restricted by existing vegetation on their properties, Weakleys Drive (two lanes of traffic in each direction) and the outer substation barrier that runs alongside Weakleys Drive.

The Beresfield Golf Club suggested their members and golf club players would not be heavily impacted by construction activities as their view is constrained by both existing vegetation (shrubs and trees) on the golf course along with the distance between the golf club and the existing Ausgrid substation (the two sites are separated by the multilane New England Highway).

5.3.2.4 Local and regional employment

The generation of new local and regional employment, contracting and/or tendering opportunities was identified as being important for a battery project of this size and nature.

Feedback from an 1800 hotline caller and engagements with local businesses suggests there is both support for the project, interest in it being planned and developed but some lack of awareness or concern around how they could get involved with the project.

Engagement with local stakeholders through the online survey, interviews, the 1800 hotline and doorknocking suggested that there is a need for the creation of additional and well-paid employment opportunities in and around the Beresfield area through investment in infrastructure design and development.

Both individuals and local businesses expressed an interest in learning more about the project and any potential employment and/or contracting and tendering opportunities that may arise during the construction and operations phases. For example, one local construction and engineering business within 500 metres of the proposed project site enquired if there would be any opportunities for local small to medium enterprises (like themselves) that are involved in construction and engineering to bid for tenders to carry out construction and/or engineering works on the proposal. One caller to the 1800 hotline (who resides within 30-50 kilometres of the proposed project site) who is a qualified electrician and has a background in construction projects, was interested in working on the proposal himself as he is a local resident and has previously worked on large scale construction projects designed and built in the broader region.

General feedback provided by some of the community survey respondents suggested that one way of maintaining the strong community spirit and togetherness that exists in the local area was to provide new employment and/or contracting opportunities. Furthermore, it was suggested that generating new local employment opportunities might help address instances of crime that have occurred in the area which have occurred partly as a result of not having enough local, well-paying jobs.

Table 7 summarises the potential construction impacts identified during engagement and the interested stakeholders.

Table 7 – Construction impacts identified through engagement.

Construction impacts	Interested stakeholders
Traffic, transport and access: • Increased local traffic	• Construction company/ companies • Sikh Temple • General community
Construction noise: • Noise from the enclosures of batteries	• Sikh Temple
Dust and visual landscape	• Sikh Temple • Beresfield Golf Club • General community
Local and regional employment	• Nearby businesses • 1800 hotline caller

Construction impacts	Interested stakeholders
	• General community

5.3.3 OPERATIONAL IMPACTS

5.3.3.1 Network resilience

There is currently heightened public awareness of network resilience and supply issues across NSW and other east coast states and territories.

Feedback from the City of Newcastle Council and the office of the MP for Wallsend noted the importance of enhancing the resilience of the network and promoting sustainable technologies and solutions. They indicated that it's important for community members and stakeholders to be aware of proposed solutions (such as, but not limited to, the Beresfield BESS) along with capturing the lessons from the planning, development, construction and operations of such projects.

Having an opportunity to generate renewable energy and potentially feed that into the proposed project (and be reimbursed financially for it) was identified by a residential receiver engaged during the doorknocking.

A commercial receiver located within 500 metres of the proposed site suggested improved network resilience would be beneficial because the business has multiple industrial freezers for cold storage. As such, they expressed for any infrastructure projects that might enhance electricity reliability and/or help reduce electricity costs.

5.3.3.2 A just transition

The rising cost of electricity was identified as an issue by some stakeholders. During doorknocking, general support was expressed for the proposal, in terms of enhancing the electricity supply and trying to reduce energy costs for people and households in the local area.

The importance of promoting and adopting sustainable solutions and technologies that can contribute to reducing climate change impacts and achieving Net Zero objectives was raised and mentioned by some stakeholders, such as the City of Newcastle Council and the local NSW State Member of Parliament (MP) for Wallsend. The proposed project aligns with other energy- and climate-related programs, policies and objectives these organisations have. Furthermore, being able to learn from the design and development of such projects and share key lessons internally and with other stakeholders was important for overcoming any project challenges/ issues, maximising funding and resources and/or raising awareness about the need for, and benefits, of projects like large battery energy storage systems.

One nearby residential receiver indicated they had solar panels on their garden shed and suggested they might be able to feed some renewable energy into the proposed project once it becomes operational. As such, the receiver was supportive of the proposed project.

One community survey respondent suggested a benefit of the proposed project could be the increased uptake and use of electric vehicles (EVs).

5.3.3.3 Operational noise

During interviews, two members of the nearby Sikh Temple enquired about operational noise levels of the proposed battery and whether the noise levels would impact the weekly services they run on Sunday evenings (along with ad hoc cultural events). If operational noise levels affected their ability to deliver services, they suggested they would be concerned, but if measures were taken to limit/ reduce the noise, such as the installation of a noise barrier, their level of support for the proposed project would increase.

The engagement team advised the Sikh Temple members that a Noise Impact Assessment had been conducted by an external organisation (Assured Environmental), that a noise barrier was being planned to reduce any noise impacts and that operational noise levels, as predicted in the Noise Impact Assessment, are expected to comply with the assessment criteria established in accordance with the Noise Policy for Industry (NPfI) during all time periods (day, evening and night), A copy of the Noise Impact Assessment was emailed to the interviewed Sikh Temple members on 20 February 2023.

When asked to rate the impact of operational noise on a scale of 1 to 5 (with 1 being 'Not at all concerned' and 5 being 'Very concerned'), 60 percent of community survey respondents suggested they were 'Concerned' (30 percent) or 'Very concerned' (30 percent). No additional qualitative feedback was provided to explain why they were concerned about operational noise and/or what they were most concerned about.

5.3.3.4 Changes to visual aesthetics

One local resident within 500 metres of the proposed site suggested it would be nice to see the currently vacant land within the existing Ausgrid substation used for a project that she believed would be beneficial to the local community.

Although they won't have a direct view of the proposed project within the existing Ausgrid substation site, two members of the nearby Sikh Temple indicated the inclusion of a noise barrier would be beneficial for both noise and visual purposes. If the project battery units are not multi-storey in size and height, they would not be directly impacted by the proposed project.

The Beresfield Golf Club indicated that golf course players only had a visual view of the existing Ausgrid substation site from some of the holes located closer to the New England Highway which runs between the substation and the golf course. Their current view is restricted by existing vegetation (shrubs and trees) along with the New England Highway and because the proposed project would be constructed inside the existing substation site, their view would not be affected.

Other receivers indicated they were not concerned about the visual aesthetics because their property (or the view from it) did not directly face the Ausgrid substation site. They do not own their current properties so they may not be there long-term and/or they support the development of infrastructure that will provide various community (and broader) benefits.

When asked to rate the impact of visual impacts (such as being able to see the batteries once completed), on a scale of 1 to 5 (with 1 being 'Not at all concerned' and 5 being 'Very concerned'), 40 percent of community survey respondents suggested they were 'Not at all concerned' while another 40 percent were 'Neutral'. The remaining 20 percent suggested they were 'Very concerned.'

5.3.3.5 Safety of battery energy storage systems

Although not a widely mentioned issue, the safety of battery energy storage systems was identified as a potential operational impact by some stakeholders.

One of the two interviewed members of the nearby Sikh Temple, located within 500 metres of the proposed project site, enquired about electromagnetic pulses or vibrations produced by the battery project during its operations.

One community survey respondent expressed some qualitative concerns about the safety of the battery units, whether they are a fire risk and whether any native animals located nearby to Beresfield could be severely impacted if a fire did take place. Another community respondent expressed some qualitative concerns about:

- the risk of the battery banks exploding
- the sourcing and use of the rare earth minerals required to build the battery banks
- whether and how the batteries would be recycled once they reach the end of their life

- how a fire would be contained if one were to break out
- whether battery units would be sourced locally
- the risk(s) of pollution due to the use of heavy metals in the batteries.

Table 8 summarises the potential operational impacts identified during engagement and the interested stakeholders.

Table 8 – Operational impact mitigations identified through engagement

Impact	Interested stakeholders
Network resilience	• City of Newcastle Council
A just transition	• City of Newcastle Council • The Sikh Temple • Community survey respondents
Operational noise	• The Sikh Temple • General community
Changes to visual aesthetics	• The Sikh Temple • Beresfield Golf Club • General community
Safety of battery energy storage systems	• Sikh Temple • Community survey respondents

5.4 Engagement to be Carried Out

Community engagement will continue to be undertaken if the project is approved, having regard to the community participation objectives in the 'Undertaking Engagement Guidelines for State Significant Projects.'

Table 9 details the proposed activities to be undertaken following project approval.

Table 9 – Post-approval engagement activities

Stakeholder	Purpose	Method
Ausgrid	• Confirm project design interfaces and connection requirements	• Meetings (online and/or face to face) • Letters / emails • Sharing of project website
The Hon. Dan Rephacoli MP, Federal Member for the Hunter	• Update on project progress • Advise on community issues or benefits	• Meetings (online and/or face to face) • Letters / emails • Newsletters / Fact Sheets • Sharing of project website
The Hon. Sonia Hornery MP, NSW Member for Wallsend	• Update on project progress • Advise on community issues or benefits	• Meetings (online and/or face to face) • Letters / emails

Stakeholder	Purpose	Method
		• Newsletters / Fact Sheets • Sharing of project website
Mindaribba Local Aboriginal Land Council	• Update on project progress • Development of management plans	• Letters / emails • Newsletters / Fact Sheets • Sharing of project website
NSW Department of Planning and Environment	• Endorsement of management plans • Update on project progress • Advise of environmental issues arising during construction	• Meetings (online and/or face to face) • Letters / emails • Phone
Transport for NSW	• Update on project progress • Development of management plans • Road access approvals	• Meetings (online and/or face to face) • Letters / emails • Phone • Newsletters / Fact Sheets
Newcastle City Council	• Update on project progress • Development of management plans • Development / implementation of local procurement policy	• Meetings (online and/or face to face) • Letters / emails • Phone • Newsletters / Fact Sheets • Sharing of project website
Community Groups including: • local Landcare groups • Climate Action Newcastle Inc. • Hunter Community Environment Centre • Wilderness Society • Hunter Environmental Institute • Transition Newcastle • Maitland Business Chamber • Business Hunter • Newcastle Chamber of Commerce	• Update on project progress • Development / implementation of local procurement policy	• Meetings (online and/or face to face) • Letters / emails • Newsletters / Fact Sheets • Sharing of project website
Local community (properties within 1.5km of the proposal)	• Update on project progress • Provide contact details for management of community issues	• Newsletters / Fact Sheets • Local advertising

Stakeholder	Purpose	Method
Sikh Temple (167 New England Highway, Beresfield)	• Update on project progress • Provide targeted notification of constructions activities and proposed times (shifts) • Provide contact details for management of community issues • Identify shift workers • Develop approach to managing noise impacts	• Meetings (online and/or face to face) • Letters/ emails • Construction notifications/ emails • Phone
Nearby residents (properties within 650m of the proposal)	• Update on project progress • Provide targeted notification of construction activities and proposed times (shifts) • Provide contact details for management of community issues • Identify shift workers • Develop approach to managing noise impacts	• Newsletters / Fact Sheets • Local advertising • Construction notifications / emails • Doorknocking / home visits • Phone
All	• Update on project progress • Provide a centralised source of information • Provide access to the project team • Ensure timely and effective resolution of complaints	• Project website • 1800 number (free call) • Project email address • Complaints handling protocol

6. ASSESSMENT AND MITIGATION OF IMPACTS

This section provides a detailed summary of the findings of the assessment of the potential impacts of the project. The scale and nature of the impacts of the project on each matter has informed the following table which ranks the matters based on the potential impacts generated by the project; from significant impacts ('high impact matters') through to those with minimal impacts ('low impact matters').

Table 10 – Impact assessment level

High Impact Matters	Medium Impact Matters	Low Impact Matters
Biodiversity	Aboriginal cultural heritage	Historic heritage
Transport, traffic & access	Hazards & risks	Economic
Visual	Bushfire	Soils
Noise & vibration	Water	Air quality

High Impact Matters	Medium Impact Matters	Low Impact Matters
	Land	Waste
	Social	Cumulative impacts

6.1 Biodiversity

6.1.1 INTRODUCTION

A Biodiversity Assessment Report (BDAR, EMM, 2023) is provided at **Appendix D**. It has been prepared in accordance with the provisions of the *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Assessment Method (BAM). The BDAR has been prepared to document the biodiversity assessment method and results, initiatives built into the project design to avoid and minimise biodiversity impacts, and additional mitigation and management measures proposed, including offset requirements, to address any residual impacts not able to be avoided.

The BDAR includes (among other things):

- At Stage 1, a summary of the site context, existing native vegetation and threatened species;
- At Stage 2, an assessment of impacts of the proposed development including an assessment of other relevant biodiversity legislation;
- A conclusion; and
- A biodiversity credit report summary.

A summary of the above BDAR components is provided in the following sections, as well as a summary of the recommended mitigation measures.

6.1.2 EXISTING ENVIRONMENT

The site is located within the Sydney Basin Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the Hunter IBRA subregion, and the Sydney – Newcastle Coastal Ramp NSW (Mitchell) Landscape.

The subject land is located directly adjacent (north-west) to the existing Ausgrid Beresfield Substation and directly east of the existing Ausgrid Beresfield Depot. Due to the mixture of land uses in the immediate area, the subject land has no connectivity with vegetation in adjoining lands.

There are no streams, estuaries, wetlands or areas of outstanding biodiversity value within the site.

While the historical underground workings of both the Abel and Tasman underground coal mines intersect the assessment area, site survey confirmed that subject land and surrounds do not contain any geologically significant features, rocky areas, human-made structures, or non-native vegetation that provide for habitat.

EMM note that the percentage of native vegetation cover is estimated at 40.89% based on the regional mapping dataset.

6.1.2.1 Native vegetation assessment

EMM ecologists completed several site inspections between October 2021 and September 2022 to confirm the vegetation composition of the site.

It was confirmed by surveys that the project area/subject land comprises exotic hedges (0.02 ha) and exotic grassland (1.84 ha), with a single patch of PCT 1592 – Spotted Gum – Red Ironbark – Grey Gum shrub- grass open forest of the Lower Hunter (0.15 ha). The balance of the subject land is cleared, comprising hardstand, road and gravel (2.01 ha)

PCT 1592 is disturbed with the shrub layer being largely absent and the ground layer dominated by exotic species due to past clearing, disturbance and ongoing maintenance.

Figure 8 shows the mapped areas of the PCT and exotic vegetation identified via the site survey as reproduced from the EMM BDAR

Figure 8 - Plant Community Types and Plot Locations (EMM, 2023)

6.1.2.2 Threatened species assessment

As a component of defining the existing environment, EMM have completed an assessment of the potential for threatened species to occur on site. A field assessment of habitat constraints and microhabitats was undertaken to determine the suitability of habitat within the subject land for species credit species (candidate species) by EMM ecologists, who completed several site inspections between October 2021 and September 2022.

EMM identified 44 threatened flora and fauna species that have the potential to occur on the site (Table 5.2 at **Appendix D**). As a result of field assessment of habitat features, nine (9) fauna species require further assessment (refer **Table 11** and **Figure 9**). Further assessment was not required for flora species.

Table 11 – Candidate species requiring further assessment

Scientific name	Common name	EPBC Act status	BC Act status	Flora or fauna
Calyptorhynchus lathami	Glossy Black-Cockatoo (Breeding)	V	-	Fauna
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Fauna
Haliaeetus leucogaster	White-bellied Sea-Eagle (Breeding)	V	-	Fauna
Hieraaetus morphnoides	Little Eagle (Breeding)	V	-	Fauna
Lophoictinia isura	Square-tailed Kite (Breeding)	V	-	Fauna
Miniopterus australis	Little Bent-winged Bat (Breeding)	V	-	Fauna
Miniopterus orianae oceanensis	Large Bent-winged Bat (Breeding)	V	-	Fauna
Ninox strenua	Powerful Owl (Breeding)	V	-	Fauna
Vespadelus troughtoni	Eastern Cave Bat	V	-	Fauna

Further targeted survey efforts for the above listed species occurred with the summarised outcomes as per **Table 12**.

Table 12 – Outcome targeted surveys

Common name	Targeted survey method	Outcome
Glossy Black-Cockatoo (Breeding)	Targeted surveys between June 2022 and September 2022.	Over the four separate visits during breeding/nesting period, there were no signs of Glossy Black-cockatoo breeding in the trees with suitable hollows within or adjacent to the subject land.
Microbats: • Large-eared Pied Bat	• Broad landscape assessment using aerial photo interpretation and GIS for	No suitable breeding habitat was identified within the habitat assessment area. Therefore, the

Common name	Targeted survey method	Outcome
• Little Bent-winged Bat (Breeding) • Large Bent-winged Bat (Breeding) • Eastern Cave Bat	suitable habitat within 2km; and • A site inspection within the site and with a buffer of 100m	species was ruled out and targeted survey was not required.
Raptors (breeding): • White-bellied, Sea-Eagle (Breeding) • Little Eagle (Breeding) • Square-tailed Kite (Breeding)	Survey of suitable nesting trees within the subject land and with a 300m buffer	One small (20-30cm wide) stick nest was detected adjacent to the subject land, between the Ausgrid Beresfield Substation and the New England Highway. The small size of the nest was considered unsuitable for the candidate raptor species' use. In addition, no raptor species were observed at the nest over the five separate visits during their breeding/nesting periods.
Powerful owl	Survey of living or dead trees with hollows greater than 20cm diameter during the BAM specified survey period (May through to August)	The site features one Spotted Gum with two hollows of greater than 20 cm diameter. There is also one Grey Gum with one suitable hollow directly outside the subject site. Over the two separate night monitoring efforts during breeding/nesting period, there were no signs of Powerful Owl breeding in the trees with suitable hollows within or adjacent to the subject land. Additionally, no evidence of Owls such as feathers, white-wash, or regurgitated pellets were observed.

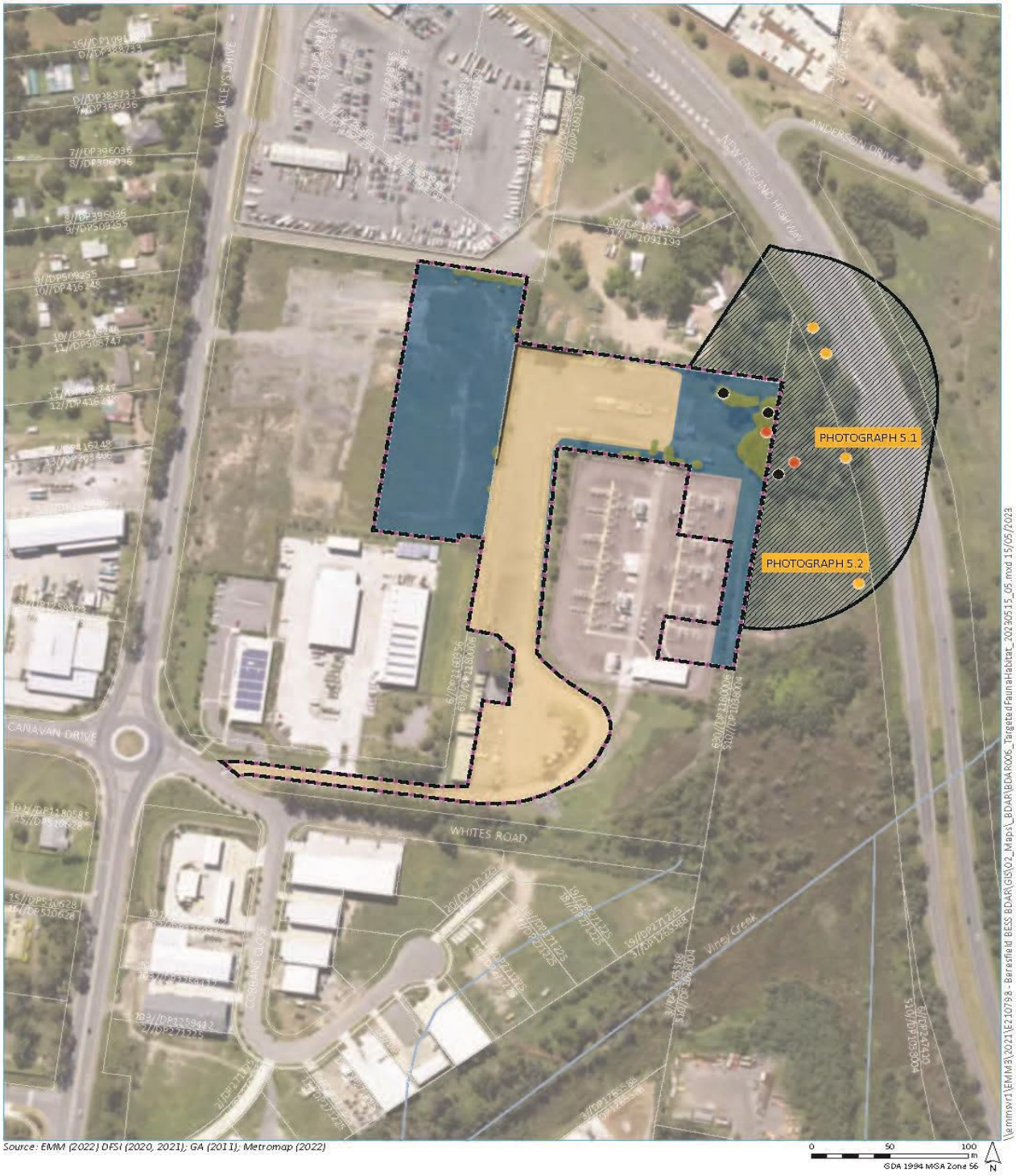


Figure 9 - Fauna habitat assessment

6.1.3 ASSESSED IMPACTS

The BAM considers a project could result in either or both direct or indirect impacts. Impacts can also be either prescribed or uncertain, or serious and irreversible impacts. Each of these impacts is discussed in the following sections.

6.1.3.1 Direct impacts

In the context of this project, direct impacts could include loss of native vegetation because of project development or the loss or degradation of native fauna habitats.

The project will directly impact up to 0.15 ha of native vegetation comprising PCT 1592_Forest_poor, , requiring two ecosystem credits . Whilst the area of PCT 1592 included a single Spotted Gum specimen with two hollows that have the potential to be used by the Powerful Owl for breeding purposes, monitoring during the BAM specified survey period (May through to August) confirmed the absence of the presence of the species. As noted in **Table 12**, of the nine (9) species carried forward for further assessment, all nine (9) can be ruled out.

A primary goal in designing the project has been to avoid direct impacts. Where these cannot be avoided, impacts are minimised. The limitations due to the small size of the project site and minor benefits of small patches of retained vegetation, in an already highly fragmented landscape, should be noted.

Residual impacts would be further managed and mitigated through the development of a biodiversity management plan using the measures recommended. Any residual impacts would be compensated through implementation of the Biodiversity Offset Scheme.

6.1.3.2 Indirect impacts

Indirect impacts could include erosion and sedimentation, weed introduction and spread, removal of habitat resources for threatened fauna, and increased noise, vibration and dust levels resulting in disturbance of fauna species, and consequent abandonment of habitat, or changes in behaviour (including breeding behaviour).

Provided all vehicles and equipment are clean prior to arrival, the interface between retained vegetation and the disturbance footprint is fenced and limited vehicle movement once operation, the potential for significant impacts associated with weed introduction is low. Standard measures would be implemented including preparation and implementation of an erosion and sediment control plan during construction, to ensure that sediment does not runoff to watercourses. Temporary impacts associated with noise, vibration and dust generation during construction are not considered likely to result in anything other than minimal impacts.

Mitigation measures around management of the above matters is provided in **Section 6.1.6.**

6.1.3.3 Prescribed and uncertain impacts

Prescribed and uncertain impacts have been considered by EMM in Section 6.2 (Table 6.1) of **Appendix D**. In respect of these impacts the following is noted:

- Site survey has confirmed that the subject land and surrounds do not contain geologically significant features, rocky areas, human made structures, or non-native vegetation that provide habitat for any of the candidate species.
- The flying arboreal mammals assessed (the bats) may utilise the habitat on the subject land for foraging or roosting (Little Bent-winged Bat and Large Bent-winged Bat). Of the assessed arboreal mammals (the bats), none of the species will use tree hollows for breeding (which is the component at risk of SAII for these species).
- Native vegetation and fauna habitats in the subject land are severely fragmented and likely to be of very limited value with poor levels of connectivity in all directions. Therefore, the subject land does not contribute significantly to species movement.

- The subject land contains a very small (0.15 ha) fragmented and disconnected patch of forest, which limits existing movement of threatened species. As the subject land is fenced (with high fauna exclusion fencing) there is no opportunity for ground dwelling fauna to enter the habitat in the subject land. No breeding habitat of threatened SAII species was found during the assessment.
- The Powerful Owl was considered as having potential to utilise the hollows within the subject land, due to its mobile nature and ability to breed in more fragmented vegetation, compared to the other threatened forest owls. However, due to its history of disturbance, severe fragmentation and ongoing disturbance related to the land use in the immediate surrounds, the subject land is unlikely to be of great value to the movement of threatened species in the landscape, and therefore its removal is unlikely to have an impact.
- No permanent creeks, streams or standing bodies of water are present within the subject land or immediate surrounds. Any impacts of the project on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities within the locality would be minimal.
- Due to the mixture of land uses in the immediate area, the subject land is located adjacent to the New England Highway and Weakleys Drive (a busy arterial road), which already presents a risk of vehicle strikes. Construction and operation of the development would not further increase traffic volumes to a noticeable or measurable degree, and the impact to any species from vehicle strike is also unlikely to be exacerbated. Management of this prescribed impact is not required.

On this basis, it is considered that there is limited potential for prescribed and uncertain impacts to occur

6.1.3.4 Serious and irreversible impacts

Section 6.4 of the EMM BDAR (**Appendix D**) provides consideration of SAII. The following is noted in this respect:

- No threatened ecological communities occur within the subject land, as such, there are no impacts on SAII communities; and
- Based on an assessment of habitat suitability, candidate entities for SAII are unlikely to occur on the site and no further assessment is required.

Based on the above, SAII are not predicted, and further consideration is not required.

6.1.4 AVOIDANCE AND MINIMISATION

The project has been designed, where possible, to avoid native vegetation and hollow-bearing trees.

Additionally, the project site was selected as it is located adjacent to the existing Ausgrid Beresfield Substation, which has limited connectivity with vegetation in adjoining lands due to a mixture of land uses in the immediate area. The New England Highway, Weakleys Drive, the existing substation and storage yard and various powerline easements contribute to a highly fragmented landscape.

Most of the surface infrastructure has been designed to be located within an area which is devoid of native vegetation. The grassland to be impacted is dominated by exotic species while also being used for storage of equipment and materials associated with the substation and power pole storage facility. Specific mitigation measures are discussed in **Section 6.1.6** and summarised in **Appendix C**.

6.1.5 OTHER RELEVANT LEGISLATION

6.1.5.1 Environmental Protection and Biodiversity Conservation Act 1999

EMM carried out a search via the Department of Agriculture, Water and Environment (DAWE) Protected matters Search Tool. A likelihood of occurrence (LoO) assessment was undertaken to assess the likelihood that the MNES could occur within or adjacent to the subject land.

The LoO assessment concluded that majority of MNES have a low to negligible likelihood of occurring within the subject land.

Based on the data collected during the field investigations, EMM considered that some aerial (birds and bat) species may use the forest habitat in the subject land that is the subject to clearance (totalling 0.15ha of native vegetation) for foraging. However, due to the constraints of the subject land, any species that may use it for foraging would not be reliant on it and any impact to the species' habitat would be negligible and does not require further consideration.

These assessments concluded that the project is unlikely to result in a significant impact on the MNES and referral of the project to the Commonwealth Minister for the Environment for assessment is not required.

6.1.5.2 Biosecurity Act 2015

Two state priority weeds identified in the Hunter Regional Strategic Weed Management Plan 2017-2022 (Hunter LLS, 2017) were identified within the subject land:

- Rubus anglocandicans (Blackberry); and
- Senecio madagascariensis (Fireweed).

These weeds are widely distributed in some areas of the state. As Weeds of National Significance (WONS), their spread should be minimised to protect priority assets. The plants should not be imported into the state or sold. The weeds should be managed in accordance with published weed management plans.

One additional species of concern (Hunter LLS, 2017) was recorded within the subject land:

- *Eragrostis curvula* (African Lovegrass).

This species is of concern to the Hunter community or is a high priority for several current programs, though not feasible to contain or eradicate.

6.1.6 MITIGATION MEASURES

To compensate for impacts on native vegetation, two ecosystem credits of PCT 1592 (Spotted Gum – Red Ironbark – Grey Gum shrub- grass open forest of the Lower Hunter) are required.

Firm Power propose to purchase credits from the market or pay into the Biodiversity Conservation Fund (BCF) to fulfil their offset obligations for the project.

The following mitigation measures are also recommended to manage residual impacts:

- Design phase:
  - Detailed design should include adequate design measures for drainage to capture and direct surface flows appropriately.
- Prior to and during construction and vegetation clearing:
  - Clearing limits will be clearly marked to prevent clearing beyond the extent of the disturbance footprint. Tree clearing and disturbance will be limited to the disturbance footprint.
  - A clearing procedure will be implemented during vegetation clearing in the disturbance footprint as follows:
    - felling of hollow-bearing trees within the disturbance footprint (Figure 5.1) will follow a two-stage clearing protocol, whereby surrounding non-hollow vegetation is cleared 24 hours prior to the removal of hollow trees to allow fauna time to move;
    - preclearance surveys will be completed by a suitable quailed person to determine if any nesting birds are present; and

    - a suitably qualified fauna handler will be present during hollow-bearing tree/log/rock clearing to rescue and relocate displaced fauna if found in the subject land.
- Clearing to be undertaken outside of the Powerful Owl breeding period (April-September). Alternatively, a survey is to be undertaken to determine if Powerful Owl is present during breeding period (April-September):
    - if it is determined the species is not present, clearing can proceed during breeding period, following the above clearing procedure, OR
    - if Powerful Owl is determined to be breeding in a hollow within or adjacent to the subject land, clearing must not proceed until young birds have fledged
- All equipment used during the vegetation clearing and construction of the project, is to arrive clean and weed free.
- The interface between the retained vegetation to the east of the disturbance footprint shall be fenced off (as per above requirements) to prevent machinery entering the area.
- Once operational, there will be limited vehicle movement, and it will all be contained within the BESS footprint, therefore introduction of weeds to adjacent vegetation and habitat is not of concern.

6.2 Transport, traffic and access

6.2.1 INTRODUCTION

A Traffic Impact Assessment (Amber, 2023) is provided at **Appendix E**. The assessment has been prepared to assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the BESS.

For the purposes of this assessment, the following terms are used:

- Heavy vehicles means:
    - Medium and Heavy Rigid Trucks (MRV and HRV as defined within AS 2890.2:2018) would be used to deliver materials and smaller plant;
    - Truck and Dog vehicles would be used to transport earthwork material to/from the site; and
    - 19 metre long Articulated Vehicles and 26 metre long B-Doubles (AV and B-Double as defined within AS 2890.2:2018) would be used to transport larger plant.
- Oversize and overmass vehicle (OSOM) means:
    - Any vehicle which exceeds the overall dimensions of vehicles as defined in the Heavy Vehicle National Law (NSW) is considered to be a restricted access/OSOM vehicle. The Law defines the width, height, length and some internal dimensions of vehicles;
- Vehicle movements means:
    - a vehicle travelling in one direction (i.e. a truck accessing the site would generate one movement towards the site and one movement away from the site when it departs).

The assessment responds to the SEARs and details how road impacts of the project traffic, particularly from heavy vehicle use and oversize and overmass vehicles (OSOM), will be avoided or managed using road-use management strategies. The assessment has been prepared in consultation with Transport for NSW and Newcastle City Council.

The Traffic Impact Assessment (TIA) includes (among other things):

- Existing traffic environment;
- A traffic assessment considering traffic generation and distribution;
- Cumulative traffic impacts;

- Route assessment;
- Intersection assessment; and
- Construction management plan.

A summary of the TIA is provided in the following sections, as well as the recommended mitigation measures.

6.2.2 EXISTING ENVIRONMENT

Access to the site is proposed via an existing sealed access driveway associated with the Ausgrid Beresfield Depot and Substation which connects with Whites Road to the southwest of the site (refer **Figure 10**).

The Port of Newcastle or Port Kembla have been identified as the potential ports to which BESS plant will be imported. The roads to be used by project traffic if travelling from the Port of Newcastle are (from the port to the project site):

- Selwyn Road;
- Industrial Drive;
- Pacific Motorway;
- New England Highway;
- Weakleys Drive (southbound);
- Whites Road; and
- Site access driveway.

The roads to be used by project traffic if travelling from the Port of Botany are (from the port to the site):

- Foreshore Road;
- M1, M2, M1;
- Pacific Motorway;
- Weakleys Drive (northbound);
- Whites Road; and
- Site access driveway.

In terms of the above routes, it is noted that the site access driveway connects to Whites Road, which in turn links to Weakleys Drive. Weakleys Drive connects with New England Highway 600 metres north of the site and with the Pacific Motorway and John Renshaw Drive 1.45 kilometres south of the site. The State roads facilitate access to Newcastle to the southeast, Sydney to the south, and other nearby regional towns.

Whites Road is a local road which extends east from Weakleys Drive and terminates at the site frontage where it effectively continues as the site access driveway, providing access to the Ausgrid Beresfield Depot and Substation. It has a sealed carriageway width of 9 metres and accommodates two-way vehicle movement.

Cobbans Close is a local road which extends south from Whites Road for approximately 300 metres where it terminates and is provided with a turning head. It has a carriageway width of 12 metres which accommodates two-way vehicle movements and kerbside parallel parking on both sides of the road.

Weakleys Drive is a classified road under the care and management of Transport for NSW. It runs in a general north-south alignment between Glenwood Drive and Princes Motorway. It has a divided carriageway which typically accommodates two lanes of traffic in each direction, and has a speed limit of 60km/hr. The intersection of Weakleys Drive and Whites Road is controlled by a double laned roundabout. The intersections of Weakleys Drive with New England Highway to the north and Princes Motorway to the south are controlled by signals.

Limited footpaths are provided within the vicinity of the intersection of Weakleys Drive and Whites Road, with no footpaths provided in the wider area.

Amber commissioned a turning movement count survey at the intersection of Weakleys Drive and Whites Road in order to determine the existing traffic conditions at the intersection. The survey results indicate the intersection currently carries a high level of traffic, in the order of 2,694 and 2,469 vehicle movements in the morning and evening peak hour, respectively. The morning peak hour was recorded from 7:30am to 8:30am and the evening peak hour was recorded from 4:15pm to 5:15pm

There are no public transport services provided within the vicinity of the site.

A review of crash history in the vicinity of the site for the period between 2017 – 2021 identified five crashes on Weakleys Drive and no crashes on White Road. Given the road classification and associated traffic volumes, it is concluded that the road network is currently operating in a relatively safe manner.

6.2.3 ASSESSMENT IMPACTS

6.2.3.1 Traffic Generation

6.2.3.1.1 Construction traffic

The TIA summarises the traffic movements generated during the construction period of the BESS, reproduced in **Table 13**. Overall, the site is expected to generate 41 one-way vehicle movements during the morning and evening peak hours during the peak construction period, which would reduce to 20 vehicle movements over the typical construction period.

Table 13 – Traffic generation during construction – on way vehicle movements

Vehicle Type	Average Vehicle Movements		Peak Vehicle Movements	
	Daily (vpd)	Peak Hour (vph)	Daily (vpd)	Peak Hour (vph)
Light Passenger Vehicle (car/4WD)	30	15	60	30
Shuttle Bus	2	1	6	3
MRV/HRV	8	1	10	2
Truck and Dog	10	2	28	4
19m AV / 26m B-Double	6	1	14	2
Total	**56**	**20**	**118**	**41**

6.2.3.1.2 Oversize and overmass vehicles

During construction it is anticipated that the project will trigger the need for a total of six (6) oversize and overmass (OSOM) vehicles (equating to 12 movements).

6.2.3.1.3 Operational traffic

During operation the BESS is expected to generate a minimum level of traffic associated with maintenance and operations services. The BESS is expected to be operated by up to three staff resulting in a traffic generation of up to six light vehicle movements per day and 1 heavy vehicle movement per week which would result in a negligible change to the traffic environment.

6.2.3.1.4 Decommissioning traffic

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive Construction Traffic Management Plan would be prepared prior to the

decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

6.2.3.2 Traffic Distribution

The following provides a breakdown of the anticipated access and distribution for each of the vehicle classifications within **Table 13**:

- Light Vehicles: It is anticipated that most of the workforce would travel from Newcastle and the surrounding area, with 50% of staff travelling from the north and 50% from the south on Weakleys Drive.
- Heavy Vehicles: All plant would be transported from Newcastle and the wider area to the site, with 50% of staff travelling from the north and 50% from the south on Weakleys Drive.

The peak hour for construction would occur at the start and end of the day when staff are transported to/from the site. The majority of staff would typically arrive on-site between 6:00am and 7:00am. However, staff generally have staggered finish times which results in the evening peak hour being less pronounced. For the purposes of this assessment, it has been assumed that all staff depart between 5:30pm and 6:30pm and the evening peak traffic volume is 80% of the morning peak volume.

During the morning peak all vehicle movements would be towards the site an in the evening peak all vehicle movements would be away from the site. Heavy vehicle movements would be distributed throughout the day and would be split evenly between inbound and outbound movements.

Figure 10 - Materials transport route options

6.2.3.3 Traffic Assessment

The TIA includes a summary of the SIDRA analysis of intersections associated with the site access, reproduced in **Table 14**.

Levels of Service (LOS) are designated from A to F from best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays) and represent the perception of the road conditions by motorists including speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety.

Table 14 – SIDRA Analysis Results Summary

Movement		Morning Peak Hour			Evening Peak Hour		
		Average delay (sec)	95% Queue (m)	Level of Service	Average delay (sec)	95% Queue (m)	Level of Service
Weakleys Drive South	Left turn	5.4	18.9	A	4.7	10	A
	Through	5.0		A	4.1		A
	Right turn	10.4		B	9.8		A
Whites Road	Left turn	8.9	3.1	A	5.7		A
	Through	6.9		A	6.3		A
	Right turn	12.7		B	11.6		B
Weakleys Drive North	Left turn	4.9	26.5	A	4.2	8.4	A
	Through	4.9		A	4.1		A
	Right turn	10.2		B	9.6		A
Canavan Drive	Left turn	7.5	4.3	A	5.7	1.5	A
	Through	7.2		A	7.8		A
	Right turn	12.8		B	12.0		B

The SIDRA analysis indicates the following:

- The intersection is expected to operate with minimal que lengths on all legs of the intersection;
- The overall average delay at the intersection is 5.9 and 4.7 seconds in the morning and evening peak hour; and

- The intersection is expected to operate with good level of service.

Accordingly, the road network is able to readily accommodate the traffic generated by the development during the construction and operational periods.

6.2.3.4 Cumulative Traffic Impacts

Given the proposed haulage/access route is clearly understood, and the absence of direct cross over between the proposed haulage route and routes of nearby projects, together with the relatively short construction window, nearby major projects are expected to generate a negligible change in traffic conditions on the surrounding road network.

As such, the cumulative traffic impacts generated by the proposal are expected to be minimal.

6.2.3.5 Route Assessment

The Port of Newcastle or Port Kembla have been identified as the potential ports to which BESS plant will be imported.

The access routes utilise roads that are designated for B-Double vehicles as outlined within the TfNSW Restricted Access Vehicle Map with the exception of Whites Road.

In order to confirm Whites Road is able to accommodate B-Double and OSOM vehicles, a swept path assessment has been undertaken for the intersection of Weakleys Drive and Whites Road. The swept path assessment is provided within Appendix C of **Appendix E** and demonstrates the vehicles are able to suitably travel between Weakleys Drive and the site access. The TIA notes that any OSOM vehicle is expected to be able to suitably travel to the intersection of Weakleys Drive and Whites Road given the route has been utilised by a high number of other renewable projects in the wider area.

Accordingly, the roads along the access route are able to accommodate the loads and type of vehicle movement to be generated during construction of the BESS.

6.2.4 MITIGATION MEASURES

6.2.4.1 Construction

A Construction Traffic Management Plan (CTMP) will be prepared prior to construction of the site, including:

- Road transport volumes, distribution and vehicle types broken down into:
  - Hours and days of construction.
  - Schedule for phasing/staging of the project.
- The origin, destination and routes for:
  - Employee and contractor light traffic.
  - Heavy vehicle traffic.
  - Oversize and overmass traffic.

The following measures will form part of the CTMP to minimise the impact of construction traffic:

- Consultation is to be undertaken with developers of other nearby major projects, particularly relating to renewable energy, in order to limit the potential for cumulative traffic impacts during any construction overlap.
- Neighbours of the BESS be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

- Loading and unloading is proposed to occur within the work area. No street or roads will be used for material storage at any time.
- All vehicles will enter and exit the site in a forward direction.
- Management of vehicular access to and from the site is essential to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site:
  - Utilisation of only the designated transport routes.
  - Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas.
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing.
- A map of the primary haulage routes highlighting critical locations.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all project phases (e.g., fog, wet and significant dry, dusty weather).

6.2.4.2 Decommissioning

A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained during decommissioning.

6.3 Visual

6.3.1 INTRODUCTION

A Visual Impact Assessment (IRIS Visual Planning + Design, 2023) is provided at **Appendix F**. The assessment has been prepared in accordance with the guidance provided in the following:

- *Large-Scale Solar Energy Guideline* (NSW DPE 2022), including the Technical Supplement – Landscape and Visual Impact Assessment,
- Guidance note EIA-N)4 *Guidelines for Landscape Character and Visual Impact Assessment*, TfNSW 2020) and;
- *The Guidance Note for Landscape and Visual Assessment* (GNLVA), Australian Institute of Landscape Architects Queensland (2018).

The assessment has been prepared to assess the visual impact of the Beresfield BESS project. The Visual Impact Assessment (VIA) includes (among other things):

- A summary of the proposal, site and planning context;
- An assessment of potential visual impacts; and
- A summary of the avoidance, mitigation and offsetting of impacts.

A summary of the VIA is provided in the following sections, as well as the recommended mitigation measures.

6.3.2 EXISTING ENVIRONMENT

The VIA identifies that the visual catchment of the project is limited by surrounding infrastructure, built form and vegetation.

Generally, the visual catchment extends to the west including industrial land along Weakleys Drive, north and northwest to adjoining industrial land and the access road, and east to a short section of the New England Highway.

The site is located within the IN2 zone and the locality is characterised by predominantly industrial land uses. There are a number of residential receivers within the IN2 zone that are understood to pre-date the IN2 zone, and which benefit from existing use rights. The majority of these are on the western side of Weakleys Drive (refer **Figure 5**), with R1 being the closest receiver, directly to the north. Given the change in zoning, it is likely that these receivers will gradually transition to industrial receivers in time. It is worth noting that a development application was lodged with NCC for this purpose in relation to the land on which R1 is located, however this was refused. Engagement with this landowner (refer **Table 6**) confirms the intent to develop the site in the future.

In views from the east, the project site is glimpsed through the existing Ausgrid substation, and in views from Weakleys Drive and other surrounding areas, the site is viewed across or from land zoned IN2.

6.3.3 ASSESSMENT IMPACTS

6.3.3.1 Public domain visual impacts

Views have been selected to represent the locations where the proposed development would be seen from the public domain. These viewing locations have prioritised locations where there would be a larger number of potential viewers, such as the highway and surrounding streets. Representative views considered in the VIA include:

- Viewpoint 1: View east from Weakleys Drive
- Viewpoint 2: View south from nearby access road
- Viewpoint 3: View west from the New England Highway

Site investigations confirmed that there would not be a view of the proposed development from the following locations:

- Residential communities of Beresfield, including schools, parks (including Newcastle Memorial Park, a State Heritage Item, sporting fields and golf courses;
- Residential communities of Thornton, including schools, parks and sporting fields;
- Commercial areas north of the New England Highway;
- Hunter Wetlands National Park, including recreational tracks and lookouts

An assessment of views from the public domain is contained in Table 5-6 of the of the Iris (2023) report (**Appendix F**).

The site investigations confirmed that there would be a limited number of locations in the public domain from which the project would be seen. From these locations, there would be a minor adverse to negligible visual impact. Visibility from the highway is limited to glimpses through mature vegetation, noting that any remaining views are seen in the context of the existing substation and network of overhead transmission lines.

Further, with continued development of light industry on the land surrounding IN2 zoned land, visual impacts in the local context would continue to reduce as the site would become enclosed by industrial development.

6.3.3.2 Private domain visual impacts

The VIA considered all potential dwellings within 2 kilometres of the site, with dwellings located to the west, north, northeast and east. The Iris report (at Appendix F) provides at Table 5-9 a summary of the viewpoint assessment from the private domain.

The VIA identified that there would be negligible visual impact to existing dwellings to the west, northeast and east and potential for a minor visual impact to an existing dwelling to the immediate north. Notwithstanding the VIA concluded that any potential impact on the dwelling to the north (R1, 179 New England Highway) would be reduced to negligible with the likely redevelopment of the intervening industrial lot.

6.3.3.3 Night-time visual impacts

The VIA identifies that the development area and surrounding landscape would have relatively high light levels, with light being generated by dense industrial development to the south and southwest of thew site. These areas would include buildings lit at night and vehicles travelling along roads, including the Highway.

There is not expected to be any construction at night. Therefore, there would negligible visual impact at night during construction.

During operation there would be some minor security lighting provided at the BESS facility, with lighting mounted outside the maintenance and operation building. There may also be some sensor lighting associated with the battery storage area.

Notwithstanding, lighting would not noticeably alter prevailing light levels in the area and there would be a negligible magnitude of change and visual impact at night.

6.3.4 MITIGATION MEASURES

Potential impacts have been avoided/minimised by:

- The co-location of the project adjacent to the existing Ausgrid substation has minimised visual impact relative to a greenfield development.
- Additional proposed mitigation measures include:
- During construction:
  - Lighting at the construction compound would be designed and operated in accordance with *AS4282-2019 Control of the obtrusive effects of outdoor lighting*.
- During operation:
  - Lighting at the BESS would be designed and operated in accordance with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.
  - Noise barriers would be painted a dark neutral shade (such as Colourbond Woodland grey) to reduce their prominence in any views to the development.

6.4 Noise and Vibration

6.4.1 INTRODUCTION

A Noise Impact Assessment (NIA, Assured Environmental 2023) is provided at **Appendix G**. It includes an assessment of:

- Construction noise;
- Operational noise;
- Road traffic noise; and vibration impacts.

A summary of each is provided in the following sections, as well as summary of recommended mitigation measures.

6.4.2 EXISTING ENVIRONMENT

The project site is located adjacent to the Ausgrid Beresfield electricity substation and within a light industrial precinct, bounded by the New England Highway to the east and Weakleys Drive to the west. On the western side of Weakleys Drive are a number of residential properties that are located in the light industrial zone. Ongoing residential use has been assumed for the purposes of the assessment.

Within 500 metres of the site, there are approximately 60 existing and proposed receivers, of which nine (9) have been treated as residential receivers, with the remainder treated as commercial or industrial receivers. The closest receiver is R1, located 54 metres to the north of the project. This receiver contains a residential and non-residential receiver and is understood to be the subject of a pending development application to NCC to change the use, and develop the land for industrial/commercial purposes. For the sake of being conservative, this receiver has been treated as residential for the purposes of the NIA.

Terrain with the locality is generally undulating, varying from 2 m AHD to the east of the site to around 26 m AHD to the west of the site. Within the site, elevations range between 10 – 16 m AHD.

Over 500 metres from the site to the east is a residential urban area, characterised by low density residential development. This area is separated from the subject site by the New England Highway and the Beresfield golf course.

6.4.3 ASSESSED IMPACTS

6.4.3.1 Construction Noise

The NIA includes an assessment of construction noise impacts to the nearby sensitive receivers.

With respect to construction noise, the NIA makes the following conclusions:

- All residential receptors exceed the noise affected criteria of 59 dB(A) during the first three stages of construction (site establishment, build BESS and build substation);
- R5 exceeds the commercial use criteria of 70 dB(A) during the first stages of construction (Site establishment, build BESS, and build substation);
- R2 exceeds the industrial use criteria of 75 dB(A) during the BESS build stage of construction; and
- Receptor's R1 and R5 exceeds the commercial use criteria 70 dB(A) during the first three stages of construction (site establishment, build BESS and build substation);
- The highest predicted noise is 76dB(A) at R1 during construction of the BESS. This is also the closest receptor located to the north of the project site.

6.4.3.2 Road Traffic Noise

The NIA includes an assessment of the road traffic noise impacts during the construction phase. Predicted noise levels were modelled for road traffic noise at the closest receptors to Weakleys Drive and the New England Highway (Receptor R1 and R25, respectively).

The assessment confirms that compliance with the NSW Road Noise Policy is achieved at each receptor.

6.4.3.3 Operational Noise

The NIA includes an assessment of operational noise impacts to existing receptors based on sound power levels and source locations of operational equipment and proposed mitigation measures, including noise barriers to be installed to the north and west of the site boundary.

The NIA concludes that subject to the proposed noise barrier, the project will comply with the relevant project noise trigger levels in accordance with the Noise Policy for Industry (NPfI) under noise enhancing meteorological conditions for all existing receptors during day, evening and night-time periods with the exception of R1. The NIA notes that R1 demonstrates a 1 dB(A) exceedance during the evening period only. This exceedance is considered justifiable on the basis of the following:

- *It is the intention to develop the land at R1 as per the IN2 zoning, that is to align with neighbouring industry and commercial premises as it is zoned. When assessed against the criteria for commercial use, predicted noise levels at R1 are in compliance with the assessment criteria.*
- *The model is predicting a 1 dB exceedance during the evening period. This difference in magnitude is barely perceivable to the human ear.*
- *The NPfI is intended to be used as a guideline and is not legally enforceable. The purpose of the NPfI is to ensure all feasible and reasonable noise mitigation measures have been considered. The development has considered optimum design layouts, equipment considerations, as well as the installation of noise barriers has already been proposed as part of the development. Therefore, it is considered that all feasible and reasonable mitigation practices have been actioned.*
- *In the event R1 is not redeveloped for commercial use, it is recommended that attended compliance monitoring at the receiver will be performed to assess noise impacts from the development. Outcomes from this monitoring will determine appropriate noise mitigation measures where applicable.*
- *The modelling results are using the worst-case meteorological conditions.*

On the basis of the above, it is considered that operational noise impacts are acceptable.

6.4.3.4 Vibration

The NIA includes an assessment of the construction and operational vibration impacts of the projects. Construction vibration levels are not predicted to exceed the continuous maximum vibration nuisance and building damage for the closest receiver (R1 – located approximately 54m from the nearest vibration source).

Intermittent vibration associated with construction vehicles, while harder to predict, is predicted to be within the maximum intermittent criteria of 0.2mm/s.

Operational vibration impacts will be minimised due to the separation distance and design of the surface pad.

6.4.4 MITIGATION MEASURES

Controls available to minimise potential construction noise impacts include:

6.4.4.1 Pre-construction

Preparation of a Construction Noise and Vibration Management Plan (CNVMP), to be incorporated into the project CEMP.

6.4.4.2 Construction

- Implement and maintain the CNVMP throughout the construction of the period.
- Limiting the type and scale of concurrent activities undertaken close to sensitive receptors where possible.
- Using broad band reversing alarms on all mobile plant and equipment.

- Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine.
- Operating plant in a quiet and efficient manner.
- Reduce throttle setting and turn off equipment when not being used.
- Regularly inspect and maintain equipment to ensure it is in good working order including checking the condition of mufflers.

The following specific recommendations also apply:

- The highest predicted noise level at receptor R1 exceeds the highly affected noise criteria of 75dB(A). It is recommended that a temporary noise barrier be installed during construction to minimise noise impacts experienced at Receptor 1.
- A temporary 2m high noise barrier be installed along the northern boundary of the site. The noise barrier could be constructed of individual acoustic panels such as Echo Barriers which attach to fencing or similar.
- During work generating high noise levels that have impulsive, intermittent, low frequency, or tonal characteristics, consult with sensitive receptors regularly.
- During working, following best practice mitigation and staff training regarding excessive noise from machinery use is recommended.

6.4.4.3 Operational

- Installation of noise barriers to the north and west of the BESS. The noise barriers are to have a minimum height of 3m with a density of 12/kgm^3 and be free of any gaps. The final height, length and location of the noise barriers will be determined during detailed design to ensure that noise criteria are achieved.
- Attended compliance monitoring will be completed at receiver R1 to assess noise impacts from the development. Outcomes from this monitoring will determine appropriate noise mitigation measures where applicable. In the event R1 is redeveloped for commercial purposes, the need for compliance monitoring would be unnecessary on the basis that the R1 achieves compliance with commercial noise criteria.

6.5 Aboriginal Cultural Heritage

6.5.1 INTRODUCTION

An Aboriginal Cultural Heritage and Historic Heritage Assessment Report, inclusive of an Aboriginal Cultural Heritage Report (ACHAR), prepared by OzArk (2023), is provided at **Appendix H**.

It has been prepared in accordance with the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and the *Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW*.

Consultation has been completed in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

The ACHAR has been prepared to provide:

- A summary of the study area, landscape and archaeological context;
- Summary of relevant legislation;
- A summary of the outcomes of consultation with Registered Aboriginal Parties (RAPs);
- The results of the Aboriginal archaeological assessment;
- Significance and harm assessments;
- A summary of appropriate management principles; and

- Recommendations.

A summary of the ACHAR is provided in the following sections, including a summary of recommended mitigation measures.

6.5.2 EXISTING ENVIRONMENT

6.5.2.1 Site and locality

The ACHAR study area comprises the full extent of the project site (4.3 ha).

A small section of the project site is located within the existing Ausgrid substation (hardstand area). This area was not able to be surveyed as it is within the active substation. Notwithstanding, visual inspection of this area confirmed that it has been totally disturbed, comprising crushed rock surfacing, concrete foundations and other substation. As such, there is no potential for heritage items to be present in this area.

A search of the Aboriginal Heritage Information Management System (AHIMS) has identified 103 Aboriginal sites within a 5km radius of the study area (refer **Appendix H**).

While one site (Site 38-4-0798) is recorded as being adjacent to the eastern portion of the project site (refer **Figure 11**), site survey by OzArk confirmed that site does not extend into the study area as the landform in the eastern portion of the study area has been heavily modified.

6.5.2.2 Archaeological context

As noted above, an AHIMS search has identified 103 Aboriginal sites within the study area.

Based on a review of the regional archaeological context, OzArk note that the most frequently recorded site types in the vicinity of the study area are isolated finds and artefact scatters.

Other site types recorded in the region, but to a lesser extent, include modified trees and associated PAD, often recorded in association with isolated finds or artefact scatters.

The types recorded are mostly found in association with watercourses, particularly perennial watercourses.

No recorded Aboriginal sites were classified as restricted AHIMS.

Sources: © State of NSW, Department of Customer Service, Spatial Services 2022

GDA2020 MGA Zone 56 File: 221313_05.aprx Prepared By: zindia.narver Date: 03/04/2023

Legend

- Locality 1 km
- Development Site
- Cadastre
- Road
- Railway
- Waterbody
- Watercourse

EPI Heritage

- Item - General

AHIMS Sites

- AHIMS Site

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 11 - Heritage

6.5.3 CONSULTATION OUTCOMES

The preparation of the ACHAR comprised four main stages:

- Stage 1 – Identify RAPs who wish to be consulted on the proposal;
- Stages 2 and 3 – Provide information about the proposal to RAPs and acquire information about cultural values. These stages often run together; and
- Stage 4: Issue of the draft ACHAR to RAPs for review and comment.

Stage 1 identified 13 groups or individuals as RAPs.

During Stages 2 and 3, RAPs were provided with information about the project including a draft assessment methodology. One response was received, supporting the proposed assessment methodology.

During Stage 4 the draft ACHAR was supplied to all RAP's.

6.5.4 ASSESSED IMPACTS

A field survey was undertaken by OzArk with the assistance of the Mindaribba Local Aboriginal Land Council on 4 October 2022. No Aboriginal sites or areas with subsurface potential were identified within the study area.

Site 38-4-0798 was inspected during the survey given its proximity to the study area. The survey confirmed that site 38-4-0798 does not extend into the study area. Site 38-4-0798 would not be impacted by the project as it is located outside of the project site area and all land disturbing activities would be confined to the project site and assessed area.

6.5.5 MITIGATION MEASURES

Noting that no Aboriginal sites or specific cultural values were identified within the site, recommended mitigation measures are as follows:

- Following development consent of the proposal, the proposed work may proceed with caution. In the unlikely event that unexpected Aboriginal heritage items are encountered during works, the unanticipated finds protocol must be enacted, including appropriate procedures to be undertaken in the unlikely event that human remains are encountered.
- All land-disturbing activities must be confined to within the study area. Should the parameters of the proposed work extend beyond this, then further archaeological assessment will be required.
- All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal heritage items.

6.6 Historic Heritage

6.6.1 INTRODUCTION

An Aboriginal Cultural Heritage and Historic Heritage Assessment Report (ACHHHAR 2023), inclusive of a Statement of Heritage Impact (SoHI) was prepared by OzArk (2022), is provided at **Appendix H**.

It has been prepared having regard to the NSW Heritage Manual.

The SoHI provides:

- A summary of study area, landscape and context and a description of the project;
- A summary of relevant legislation;
- Results of the assessment;
- A summary of appropriate management principles; and

- Recommendations.

A summary of the SoHI is provided in the following sections, as well as a summary of recommended mitigation measures.

6.6.2 EXISTING ENVIRONMENT

The site is not mapped as containing any items of heritage significance and is not located in or adjacent to a heritage conservation area under the NLEP. The only mapped heritage item in proximity to the project area is the 'Government Railway' (1.1km north of the study area).

6.6.3 ASSESSED IMPACTS

The Historic Heritage Assessment study area and survey area are consistent with the ACHAR, as described in **Section 6.2** of this EIS.

The Historic Heritage Assessment determined that no historic heritage sites or historic archaeological deposits were recorded in the study area. As such, there will be no impact to historic heritage from the proposal.

6.6.4 MITIGATION MEASURES

- If items of historic heritage significance are uncovered during the proposal, then the unanticipated finds protocol must be implemented.
- All land and ground disturbing activities must be confined to within the study area. Should the parameters of the proposal extend beyond the assessed areas, then further assessment may be required.
- All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all historic items.

6.7 Hazards and risks

6.7.1 INTRODUCTION

A Preliminary Hazard Analysis (PHA) has been prepared by Riskcon (2023) in accordance with the Hazard Industry Planning Advisory Paper No. 4 - Risk Criteria for Land Use and Safety Planning, Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DOP, 2011) and Multi-Level Risk Assessment (DOP, 2011). The PHA accompanies this EIS at **Appendix I**.

The PHA has been prepared to provide:

- A summary of the assessment methodology in the context of the site and project description;
- Identification of hazards;
- Analysis of consequences;
- Frequency analysis and risk assessment;
- Conclusions and recommendations.

A summary of the PHA is provided in the following sections, as well as a summary of recommended mitigation measures.

6.7.2 EXISTING ENVIRONMENT

The character and level of development/activity occurring in the surrounding locality is relevant to hazard and risk analysis. The PHA notes that this is generally surrounded by roads to the south and west, a landscaping business to the north and the Ausgrid depot to the east.

The contamination status of the land has been considered in **Section 6.10** and **Appendix L**.

6.7.3 ASSESSED IMPACTS

The key objectives of the PHA are to:

- Complete the PHA according to the Hazardous Industry Planning Advisory Paper *HIPAP) No. 6 – Hazard Analysis;
- Assess the PHA results using criteria in HIPAP No. 4 – Risk Criteria for Land Use Planning; and
- Demonstrate compliance with the relevant codes, standards and regulations (i.e., Planning and Environment Regulation, WHS Regulation, 2017.)

The Multi-Level Risk Approach (MLRA) has been adopted in preparing the PHAS. The MLRA has been prepared in accordance with the Multi-Level Risk Approach Guidelines (DPIE, 2011). The MLRA Guidelines are intended to assist industry, consultants and the consent authorities to carry out and evaluate risk assessments at an appropriate level for the project being studies.

The approach to the MLRA was as follows:

- Hazard analysis – to identify potential hazards in the context of the site, location and project details.
- Consequence analysis – for those hazards identified via the hazard analysis as having a potential impact;
- Frequency analysis – those hazards identified via the consequence analysis of having the potential to occur off-site were then considered in the context of an initiating event and the probability to occur for failure of safeguards;
- Risk assessment and Reduction – the results of the consequence and frequency analysis for those incidents carried forward via the PHA were combined with the risk in the context of HIPAP No. 4 risk criteria. Where this risk was exceeded, a further assessment of the risk was completed in the context of the proposed mitigation measures; and
- Reporting – a summary of the outcome of the assessment.

Via the MLRA number of risks were considered and discounted. Those that were carried forward as having a residual risk requiring further assessment are:

- Li-ion battery fault, thermal runaway and fire;
- Victorian Big Battery fire review;
- Li-ion battery fire and toxic gas dispersion;
- Electrical equipment failure and fire;
- Transformer internal arcing, oil spill, ignition and bund fire;
- Transformer electrical surge protection failure and explosion; and
- Electromagnetic field impacts.

6.7.3.1 Li-ion battery fault, thermal runaway and fire

As noted in the Riskcon PHA, despite improvement in battery technology there are several degradation mechanisms which can result in thermal runaway that are primarily a result of high discharge, overcharging, or water ingress into the battery which results in a host of by-products being formed within the battery during charge and cycles.

As a result, Li-ion batteries are equipped with several safety features to prevent the batteries from overcharging or discharging at voltages which result in battery degradation, leading to shorting of the battery and thermal runaway.

The PHA includes a review of the batteries proposed to be used for the Beresfield BESS, which are based on a battery chemistry of Lithium Iron Phosphate (LiFePO4, or simply LFP). LFP is considered to be one of the safest battery chemistries within the industry, having a thermal rise of 1.5^0C/min. Where other typical lithium ion battery chemistries have a thermal rise of 200-400^0C/min, the gradual temperature rise of LFP does not result in a fire and incident propagation to other batteries.

In the event that LFP chemistries ignite by artificial means, the combustion by-products release carbon dioxide which reduces the oxygen concentration within a confined space reducing the combustion rate. Any fire would be further supressed by a fire suppression system fitted within each container to prevent escalation to other battery units

In the few circumstances where battery modules may catch fire (i.e., due to leaking coolant or electrical fault), fire will be constrained by a stainless-steel fire rated enclosure, which has a 60 minute fire rating, and a deflagration panel on the roof to direct any sudden overpressure upwards.

In addition to these measures, each container is equipped with multiple built-in fire protection devices that work collaboratively, including smoke and thermal sensors, combustible gas detector, pressure relief system, and dry pipe thermally activated sprinkler system.

The Riskcon PHA concludes that LFP technology does not cause fire during thermal runaway and that should fire develop within one container it would not transfer to nearby containers due to fire safety design features. The incident is not carried forward for further analysis.

6.7.3.1 Victorian Big Battery Fire Review

The Riskcon PHA includes a review of the Victorian Big Battery (VBB) Fire to determine whether similar incidents could occur at the Beresfield BESS.

The Riskcon PHA reports that the main reason for fire propagation within the VBB was strong winds blowing flames from one Megapack to the unprotected vent atop an adjacent Megapack, resulting in the ignition of a plastic fan which impacted battery modules directly beneath. Riskcon confirms that the additional safety precautions have been incorporated within the battery technology to be used as part of the Beresfield BESS, with vents being explosion proof and made of flame-retardant materials.

Further, the Riskcon PHA states that the Beresfield BESS layout has been design in accordance with the NFPA 855, which requires a minimum clearance of 3.1m between enclosures. A clearance of 3.1m far exceeds the minimum clearance distance of 160mm (0.16m) which has been demonstrated as the minimum clearance distance to prevent propagation of thermal runaway from one unit to other for similar battery technology.

This incident has not been carried forward for further analysis.

6.7.3.2 Li-ion battery fire and toxic gas dispersion

As noted in the Riskcon PHA, in the event of a BESS fire by-products of combustion toxic gasses may be formed as a by-product of combustion, including:

- Carbon dioxide;
- Carbon monoxide; and
- Fluorine gases.

These gases are discussed in further detail below.

6.7.3.2.1 Carbon dioxide

The Riskcon PHA identifies that while li-ion batteries are predominately composed of metal structures, ancillary equipment and materials include wiring, plastic and anodes etc that would liberate carbon dioxide during a fire.

Notwithstanding, The PHA states that based upon a review of sensitive areas and similar BESS fires (i.e., Victoria BESS fire), it is not considered that that the formation of carbon dioxide would not result in downwind impacts sufficient cause injury or fatality.

This incident has not been carried forward for further analysis.

6.7.3.2.2 Carbon monoxide

The Riskcon PHA identifies that while there is potential for fire to occur within the BESS units which could form carbon monoxide if there is sufficient oxygen to sustain combustion, the combustible load within the BESS which could result in the formation of carbon monoxide is low.

The PHA states that the formation of carbon monoxide at levels which result in a substantial downwind impact are not considered credible and the incident has not been carried forward for further analysis.,

6.7.3.2.3 Fluorine gases

With regard to fluorine gases, the Riskcon PHA notes that hydrogen fluoride (HF) is the main fluorine gas of concern in a Li-ion battery fire.

For toxic gas dispersion of HF to occur, a battery container fire is necessary as the initiating event.

Given that the potential for a fire to occur is considered negligible due to the highly stable and safe battery chemistries used, the initiating event is considered unlikely.

This incident has not been carried forward for further analysis.

6.7.3.3 Electrical equipment failure and fire

With respect to electrical equipment failure and fire, the Riskcon PHA notes that type of equipment used within the project is ubiquitous throughout the world and across industry segments and is not a unique fire scenario.

Although there is potential for equipment within the switch room to fail and result in arcing and overheating, any fire would be relatively slow in growth and would be unlikely to result in substantial impacts in terms of offsite impact or incident propagation.

This incident has not been carried forward for further assessment.

6.7.3.4 Transformer internal arcing, oil spill, ignition and bund fire

As noted in the Riskcon PHA, transformers are fitted with low oil pressure switches and a pressure surge switch which are intended to identify potential oil and pressure events within the transformer, isolating power and alarming operators.

While the PHA reports that there is potential for the oil in a transformer to ignite if pressure rise in a transformer exceeds structural integrity of the reservoir, it is considered that the transformers are common units with a low potential for failure. Further, it is considered that the separation distance to the site boundary and other adjacent units would be unlikely to result in incident propagation and offsite impacts.

This incident has not been carried forward for further analysis.

6.7.3.5 Transformer Electrical Surge Protection Failure and Explosion

The Riskcon PHA states that in order to protect against overheating and explosions, transformers have surge protection which programs them to shut down upon detection of an energy spike.

Notwithstanding, in the case of an electrical overload, such as a major lightning strike, or significant deterioration, leakage of water into the transformer or physical damage, such as a fallen tree, the surge protection may be too slow.

While there is potential for an explosion to occur under these circumstances, the transformers are common units with a low potential for failure.

This incident has not been carried forward for further analysis.

6.7.3.6 Electromagnetic field impacts

The Riskcon PHA states that BESS create Electromagnetic Fields (EMFs) from operational equipment such as transmission lines, transformers and the electrical components found within BESS units, inverters etc. This equipment has the potential to produce ELF EMFs in the range of 30 to 300 Hz.

Riskcon reports that there are currently no standards in Australia to govern exposure limits to Extremely Low Frequency (ELF) EMF. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has provided some guideline which limits exposure to 2,000 milligauss (mG) for member of the public in a 24 hour period.

The PHA concludes that as the strengths of EMF attenuate rapidly with distance, the ICNIRP reference level for exposure to the general public will not be exceeded and impact the general public in surrounding areas would be negligible.

This incident has not been carried forward for further analysis.

6.7.3.7 Assessment Conclusion

The Riskcon PHA concludes that their review of the aforementioned incidents indicates that there was no observed offsite impact and that any risk at the site boundary is not considered to exceed the acceptable risk criteria

6.7.3.8 Mitigation Measures

The Riskcon PHA provides the following recommendations:

- The minimum separation distance between BESS units shall be 3.1m in compliance with the NFPA 855 guidelines;
- Prior to construction, the total area required for the BESS Units shall be verified against the available space to demonstrate that there is adequate area to achieve the required spacing;
- The BESS containerised units shall be provided with the fire protection system specified by the BESS manufacturer and UL9540A report.
- UL testing information shall be made available to the certifying authority. It is noted that a confidentiality agreement may be required.

6.8 Bushfire

6.8.1 INTRODUCTION

A Bushfire Assessment Report (BAR) has been completed for the project by Cool Burn Fire and Ecology (2023) and is provided at **Appendix J**. The BAR was prepared to address the requirements of the Rural Fire Service publication *Planning for Bushfire Protection* (2019).

The BAR has been prepared to provide:

- A summary of the site details;
- An assessment of bushfire risk;
- Recommendations around required bushfire protection measures;
- A summary of recommendations; and
- A compliance summary.

A summary of the BAR is provided in the following sections, as well as a summary of recommended mitigation measures.

6.8.2 EXISTING ENVIRONMENT

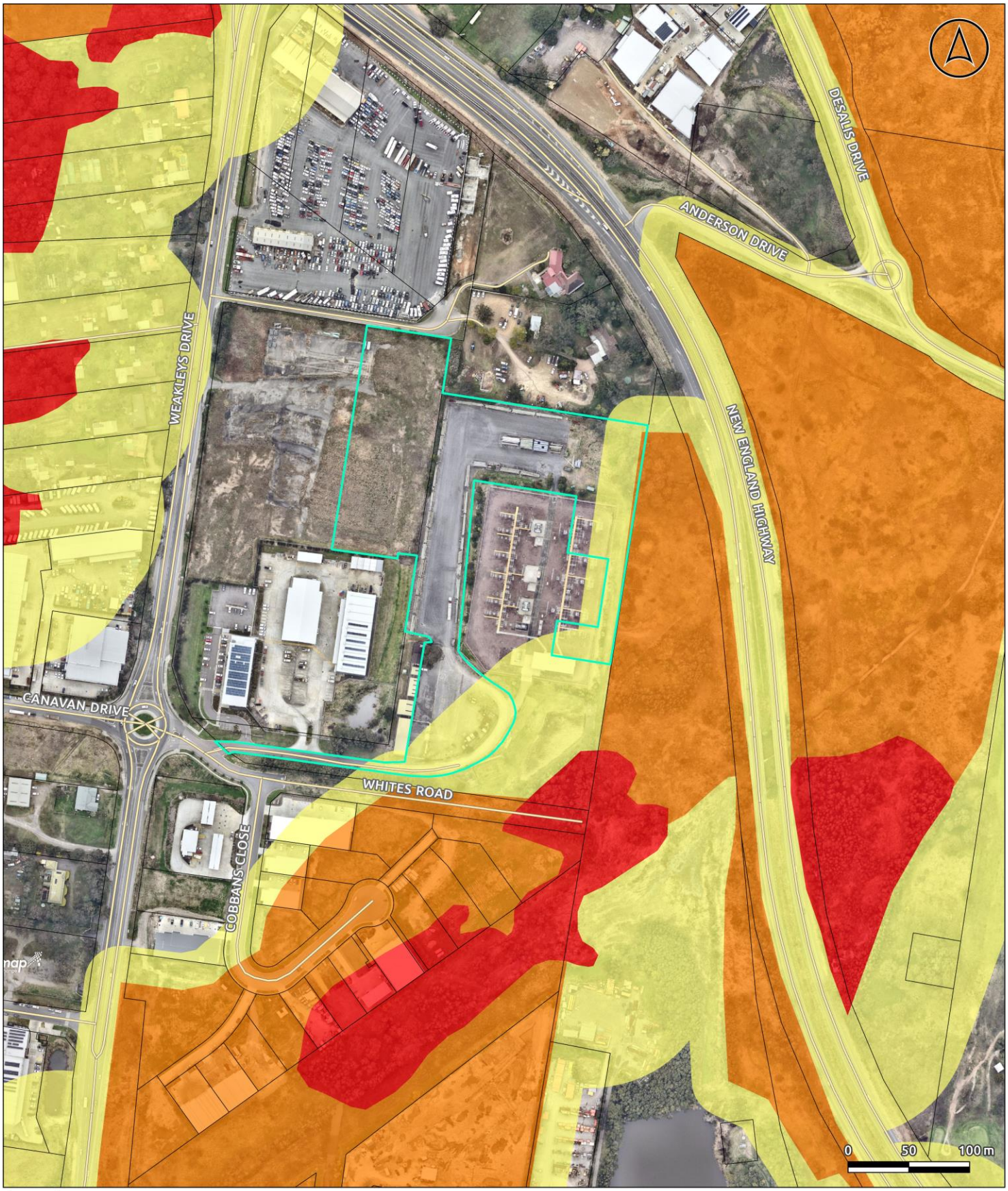
As shown in **Figure 12**, Lot 630 is partially mapped as category 1 vegetation bushfire prone land and vegetation buffer land. Land to the east and south is mapped as category 3 vegetation (grassland). The majority of the site is not impacted by bushfire prone land mapping.

The site has been cleared and developed as a result of current and historic land uses and features very little by way of native vegetation. As noted via the project BDAR (refer **Section 6.1.2**), the site comprises exotic hedges (0.02 ha) and exotic grassland (1.84 ha), with a single patch of PCT 1592 (0.15 ha). The balance of the site is cleared, comprising hardstand, road and gravel.

6.8.3 ASSESSED IMPACTS

The BAR notes that the host lots on which the project is related are:

- Located within the Newcastle LGA being within the 'Greater Hunter Region' fire weather district (District 3) and has a corresponding Forest Fire Danger Index rating of 100 and Grassland Fire Danger Index rating of 130.
- Features the following vegetation types on or within 140 metres of the BESS site:
  - Grassland: up to 6t/ha overall.
  - Forested wetland: 8.2t/ha surface/elevated – 15.1t/ha overall.
- The effective slope of identified bushfire vegetation out to 100m from site is generally flat (0 degrees) in all directions.
- In the context of the objectives of PBP, Cool Burn Fire and Ecology note that the project would comply with the aims and objectives of PBP, subject to the implementation of the recommended bushfire protection methods – summarised in **Section 6.8.4**.



Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
© State of NSW, Rural Fire Service 2022; © Nearmap 2022

GDA2020 MGA Zone 56 File: 221313_01.aprx Prepared By: zindia.nanver Date: 21/02/2023

Legend

- Development Site
- Cadastre
- Roads

Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 3
- Vegetation Buffer

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 12 - Bushfire Prone Land

6.8.4 MITIGATION MEASURES

The following mitigation measures would be implemented as per Section 5 of **Appendix J**.

- A 10m defendable space (APZ) will be provided between the vegetation hazard and the infrastructure. The entire site will be managed as an Inner Protection Area (IPA) for the life of development. Ongoing management of APZ to IPA standards e.g., fuel free (gravel concrete) or low-cut grass (<10cm).
- A Fire Management Plan (FMP) will be developed for the project in consultation with the local NSW RFS District Office.
- All buildings will be constructed to the NCC general fire safety provisions.
- Either hydrants will be installed to satisfy the provisions of AS50 AS 2419.1:2005, or alternatively, a minimum 10kL static water supply and hard stand will be supplied.
- Any electrical sub-transmission lines will either be underground and/or to Ausgrid power line design specifications.
- If gas is installed, its services are to be maintained in accordance to AS/NZS 1496:2014.
- It is noted that the existing access to the site meets the relevant standards and no further actions required.
- Any new internal roads will provide for safe, reliable, and unobstructed passage by a Category 1 firefighting vehicle within acceptable operational limits as per Section 4.7 of the bushfire assessment (**Appendix J**) and will be maintained for the life of the development.
- A Fire Management Plan (FMP) will be developed for the project in consultation with the local NSW RFS District Office at Section 4.8 of **Appendix J**.

6.9 Water and Soils

6.9.1 INTRODUCTION

A Water Assessment (SLR, 2023) is provided at **Appendix K**. The assessment has been prepared to identify potential impacts on surface and ground water and identify mitigation measures to address and potential impacts.

A soil assessment has been prepared by Premise to respond to the requirements of the SEARs and provide an adequate overview of the soil environment to which the project relates. The desktop assessment has used available mapping to determine soil characteristics of the site. This includes (among other things):

- Australian Soil Classification (ASC) (Isbell, 2002) soil types;
- Land and Soil Capability (LSC) (OEH, 2012);
- Biophysical Strategic Agricultural Land (BSAL) Status (OEH, 2013); and
- Acid Sulfate Soils (ASS) Risk (DPE, 1998).

6.9.2 EXISTING ENVIRONMENT

6.9.2.1 Surface water and flooding

The project site is situated directly northwest of Viney Creek which intersects with Francis Greenway Creek and ultimately the Hunter River further downstream. However, there are no defined water courses that intersect the site.

A review of flood modelling information confirms that the south-eastern corner of the project site (limited to the existing access driveway and sub-transmission line) is inundated by 1% Annual Exceedance Probability

(AEP) floodwaters. However, it is understood that the floodwaters present very low risk in terms of flood water depth and velocity.

6.9.2.2 Groundwater

There are no licenced ground water bores associated with the site and no areas of mapped groundwater vulnerability in relation to the site.

A review of registered bores in the locality identified five bores within the immediate vicinity of the site, located to the north/north-west of the site, with all bores being in the ownership of local government and likely installed for the purpose of monitoring – refer **Figure 14**.

Data associated with these bores range in depth from 10.5 to 11.8m , with available information indicating that the localised water table is present from around 7m below ground, increasing in depth to the east.

The groundwater elevation in the respective bores coincides with clay layers, indicating that the local unconsolidated sediments are saturated. The depth to groundwater in one bore was reported as 7.5m, which is at the siltstone and clay interface, suggesting the localised hard rock may also host groundwater.

6.9.2.3 Water quality

Given that there are no defined waterways within the site, no existing water quality data is available.

6.9.2.4 Soils

Mapping for the site indicates that the project area is within the Beresfield and Cockle Creek soil landscapes (**Figure 13**).

The site is mapped as containing Dermosols, Kurosols and Hydrosols under the Australian Soil Classification (ASC) system (Isbell, 2002) (**Figure 13**).

A review of relevant mapping determined the following in relation to the existing environment:

- The majority of the site is mapped as LSC class 4 with a small portion in the southeast of the site mapped as LSC class 8. LSC class 4 land is considered to have moderate agricultural capability with limitations for high impact use, whilst LSC class 8 land is considered to have extremely low agricultural capability with limitations so severe that the land is incapable of sustaining any land use apart from nature conservation.
- A review of relevant mapping indicates that no biophysical strategic agricultural land (BSAL) is located within the project investigation area.
- The site is mapped as containing Dermosols, Kurosols and Hydrosols under the Australian Soil Classification (ASC) system (Isbell, 2002).
- The development lot is mapped as containing Class 2, Class 3, and Class 5 Acid Sulfate Soils (ASS). However, the proposed works will only cover areas containing Class 3 and Class 5 Acid Sulfate Soils. Specific assessments and mitigation measures related to the management of ASS are included in **Section 6.9.4**.

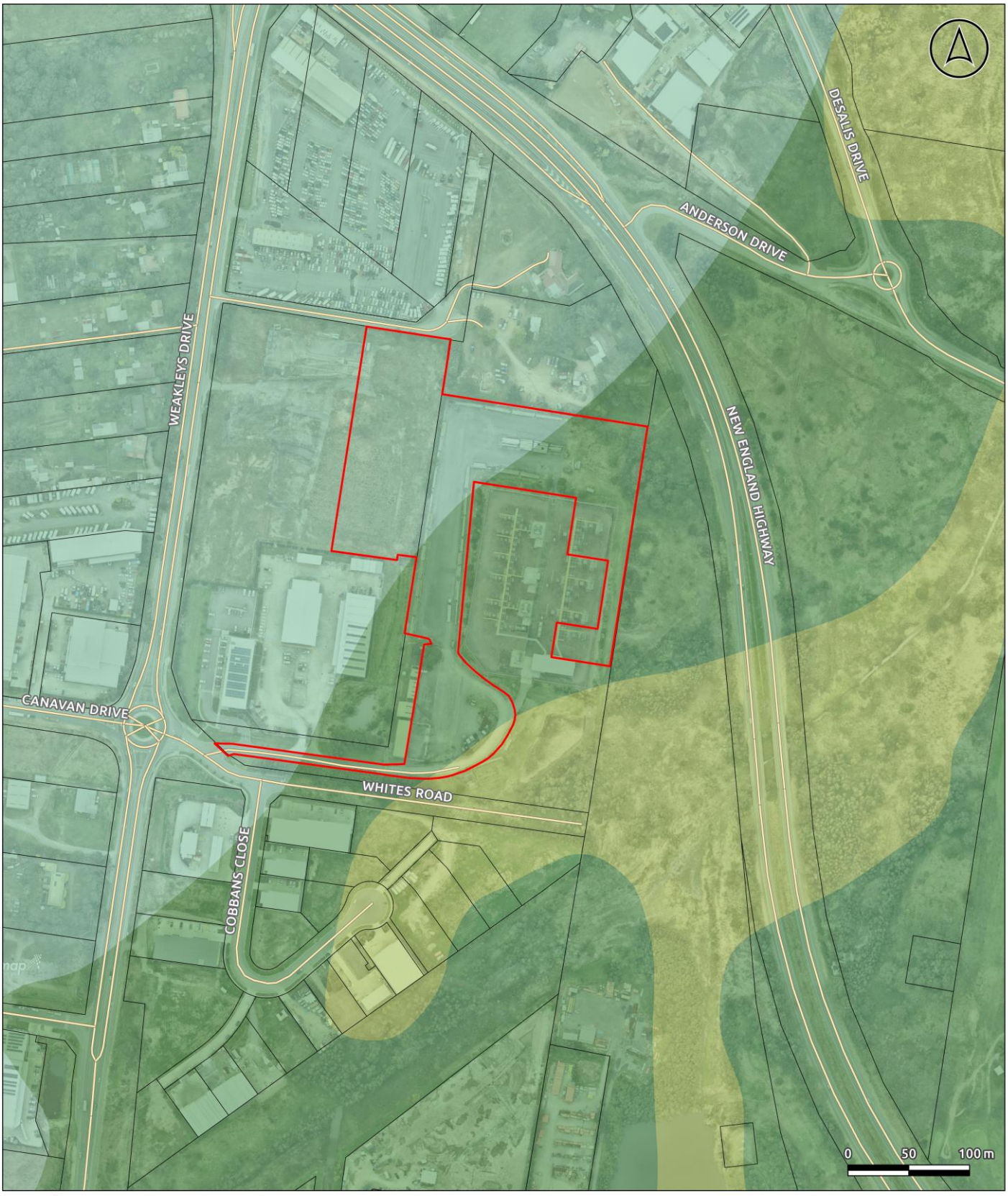


Figure 13 - Soil landscapes

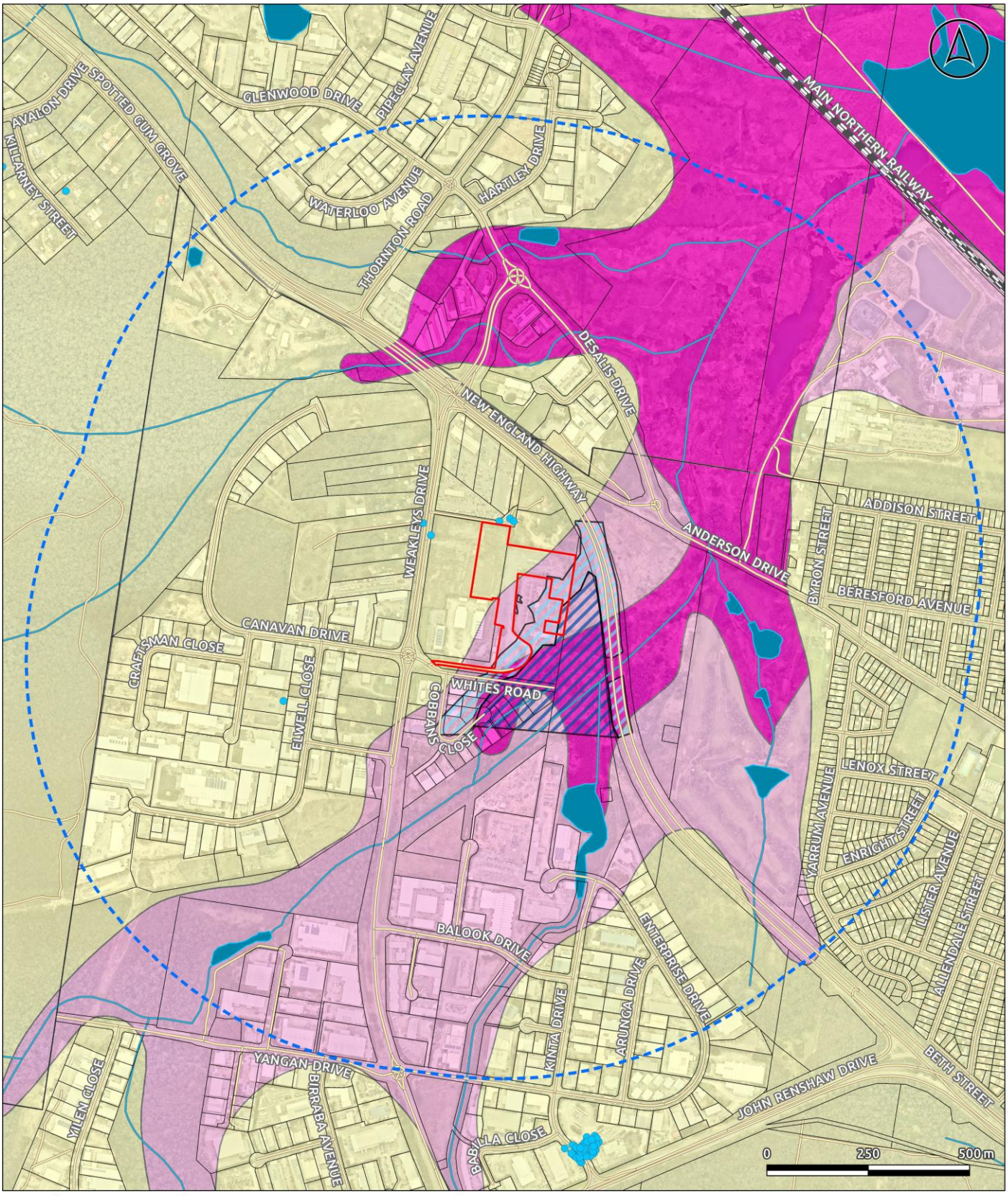


Figure 14 - ASC soil types and water characteristics

6.9.3 ASSESSMENT IMPACTS

6.9.3.1 Surface water and flooding

The proposed development will not involve any substantial change to the existing site surface and rather use the existing paved area (where possible) and existing stormwater management system (including an existing stormwater dam). There will therefore be no impact on the volume of stormwater runoff reporting to Viney Creek, and the peak discharges of runoff will also be unchanged. As such, SLR estimates negligible hydrological effects on Viney Creek hydrology downstream of the Project site.

The Project site access track and a section of the sub-transmission line is located within the Probable Maximum Flood (PMF) fringe; however, the remainder of the site is located outside of the flood extent. As the ground levels will remain unchanged the proposal will not affect the flood behaviour along Viney Creek.

The remainder of the site is located outside any risk ratings. No batteries or electrical infrastructure such as transformers are proposed to be located within the flood zone.

6.9.3.2 Groundwater

The project is not likely to have any impact on groundwater resources. Impacts to groundwater during construction and operation of the battery systems are unlikely to occur due to:

- All potentially polluting facilities will be bunded, and the site is impervious. There is no exposure pathway for pollutants to enter the groundwater system.
- The proposal will not involve any significant change in the level of site imperviousness, and the existing pattern of surface drainage is to be retained. Rates of groundwater recharge will be unaffected.
- Given the generally flat nature of the site, and noting the levels of the adjacent substation, which would be largely matched, the project does not include any deep excavation with potential to interact with groundwater. It is expected that earthworks on site would be minimal.

6.9.3.3 Water quality

The primary risk to surface water quality during construction is ground disturbance associated with site earthworks. Construction works will expose site soils and there is potential for erosion to mobilise sediments into receiving watercourses. Without appropriate controls there is potential for an increase in turbidity and nutrient loads in the receiving watercourses which may cause water quality and ecological impacts

No soil disturbance is planned during the operational phase for the battery systems. It is possible that facility maintenance may require localised trenching or other small, localised disturbance areas on an infrequent basis. Water quality impacts from these minor disturbances is unlikely to have any significant impact on overall site water quality.

6.9.3.4 Soils

Potential impacts to soils include:

- Disturbance of surface and subsurface soils during construction, including because of:
  - Vegetation clearing that exposes soils;
  - Construction (and use) of tracks;
  - Earthworks (cut and fill, grading and compacting);
  - Excavation for trenching and sediment basins (if required);
  - Stockpiling of soils;
- Potential impacts to soils during construction are likely to include:

- Reduced soil stability;
- Mixing of soil horizons, affecting soil quality and impeding vegetation growth;
- Erosion, soil loss and sedimentation;
- Reduced soil permeability and increased run-off;
- Disturbance of Acid Sulfate Soils and exposure to air, resulting in acid and odour generation;

- Operation of the BESS is anticipated to involve minimal disturbance to soils. However, potential impacts may include:
  - Erosion, soil loss and sedimentation;
  - Reduced soil permeability and localised run-off;
- Potential impacts during decommissioning are anticipated to be similar to construction impacts from soil disturbance. Longer term impacts of decommissioning may include:
  - Failure to return the site to existing land and soil capability (as outlined in this report) or improved land and soil capability;
  - Failure to return the site to a safe, stable and non-polluting landform.

6.9.3.4.1 Acid Sulfate Soils

The site is mapped as containing Class 3 and 5 Acid Sulfate Soils (ASS). Section 6.1 of the LEP requires consideration of a range of factors prior to granting consent with respect to development proposed on land mapped as Acid Sulfate Soils.

Subclause 2 of Section 6.1 of the LEP defines the works which may require further assessment on each Class of ASS. The definition is summarised below in **Table 15**.

Table 15 – Acid Sulfate Soils Development Subclause 2

Class of Land	Works which may require a Management Plan or Preliminary Assessment prior to development consent
1	Any works
2	Works below the ground surface Works by which the water table is likely to be lowered
3	Works more than 1 metre below the natural ground surface Works by which the water table is likely to be lowered more than 1 metre below natural ground surface
4	Works more than 2 metres below the natural ground surface Works by which the water table is likely to be lowered more than 2 metres below natural ground surface
5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land

The proposed activity is subject to conditions of Class 3 and 5 Acid Sulfate Soils under Subclause 2 of Section 6.1 of the LEP. As such, an Acid Sulfate Soils Management Plan (ASSMP) or Preliminary Assessment is required for any works more than 1m below the ground surface or by which the water table is likely to be lowered by more than 1m below natural ground surface.

Section 6.1 of the LEP provides the following requirements in regard to Acid Sulfate Soils and is summarised below in **Table 16**.

Table 16 – Acid Sulfate Soils LEP Requirements

Requirement	Comment
Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority.	Detailed design of the site has not yet occurred however it is expected that earthworks on site would include limited cut, with level pads achieved through localised filling as required. Impacts to the watertable are not anticipated due to the nature of the project. Subject to confirmation of design, if cut of greater than 1m is proposed (or any works that would result in lowering of the water table), an Acid Sulfate Soils Management Plan (ASSMP) would be prepared as part of the CEMP and implemented throughout the construction phase.
Despite subclause (2), development consent is not required under this clause for the carrying out of works if— (a) a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works, and (b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person proposing to carry out the works.	As noted above, excavation of greater than 1m or impacts to the water table are not anticipated and therefore a preliminary assessment would suggest that an ASSMP is not required. However, as noted, if detailed design identifies impacts of this nature, an ASSMP would be prepared as part of the project CEMP and implemented throughout the construction phase.
Despite subclause (2), development consent is not required under this clause for the carrying out of any of the following works by a public authority (including ancillary work such as excavation, construction of access ways or the supply of power)— (a) emergency work, being the repair or replacement of the works of the public authority required to be carried out urgently because the works have been damaged, have ceased to function or pose a risk to the environment or to public health and safety, (b) routine maintenance work, being the periodic inspection, cleaning, repair or replacement of the works of the public authority (other than work that involves the disturbance of more than 1 tonne of soil),	Not applicable.

Requirement	Comment
(c) minor work, being work that costs less than $20,000 (other than drainage work).	
Despite subclause (2), development consent is not required under this clause to carry out any works if— (a) the works involve the disturbance of less than 1 tonne of soil, such as occurs in carrying out agriculture, the construction or maintenance of drains, extractive industries, dredging, the construction of artificial water bodies (including canals, dams and detention basins), foundations or flood mitigation works, or (b) the works are not likely to lower the watertable.	As works are not likely to lower the water table, it is not expected that development consent would be required by reference to Section 6.1. However, to ensure a conservative assessment, provision has been made for the development of an ASSMP in the event detailed design identifies that either of the pre-conditions to this Section are satisfied.

On the basis of the above, the proposed development is considered to be acceptable in the context of Section 6.1 and by reference to the range of proposed mitigation measures outlined in **Section 6.9.4**.

6.9.3.4.2 Earthworks

The preparation of the land to accommodate the proposed infrastructure will entail the carrying out of earthworks to provide flat and level surfaces for the BESS installation. Section 6.2 of the LEP requires consideration of a range of factors prior to granting consent with respect to proposed earthworks. These matters are discussed in **Table 17**.

Table 17 – Earthworks

Requirement	Comment
Development consent is required for earthworks unless— (a) the earthworks are exempt development under this Plan or another applicable environmental planning instrument, or (b) the earthworks are ancillary to other development for which development consent has been given.	The development is not exempt but is ancillary to the proposed BESS development, and therefore, consent under Section 6.2 is not strictly required.
Before granting development consent for earthworks, the consent authority must consider the following matters— (a) the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality of the development, (b) the effect of the proposed development on the likely future use or redevelopment of the land, (c) the quality of the fill or the soil to be excavated, or both,	Notwithstanding the above, with the abundance of caution, consideration of the relevant matters identified is provided below: (a) The detailed design of the facility, together with the implementation of standard mitigation measures, will ensure that site drainage within and off site does not result in detrimental impacts to drainage patterns or soil stability; (b) The proposed use and development are permissible in the zone and would not result in impacts that would preclude the future use of

Requirement	Comment
(d) the effect of the development on the existing and likely amenity of adjoining properties, (e) the source of any fill material and the destination of any excavated material, (f) the likelihood of disturbing relics, (g) the proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area. (h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	the land. The proposed level of earthworks is expected to be consistent with adjacent substation and with an equivalent sized industrial development, and thus would not impact on the future use or redevelopment of the land. (c) Minimal excavation is expected, and any fill brought to site would be of suitable standard (i.e., excavated natural material, or virgin excavated natural material). Fill would be sourced from a legal supply and appropriately certified prior to transport. Similarly, any excess fil removed from site would be managed as waste, tested, certified and tracked, and would be disposed of at an approved location, such as the City of Newcastle Summerhill Waste Management Facility. (d) Earthworks would be minimal and would be designed to ensure no offsite impacts (e) See (c) above. (f) By reference to the project ACHHHA report, refer **Section 6.6** and **Appendix H**, and in consideration of the former use of the site, the disturbance of relics is unlikely. Notwithstanding, an unexpected finds protocol would be implemented. (g) As outlined in **Section 6.9**, the receiving environment does not feature any sensitive water environments that would be impacted by the project (h) A range of suitable mitigation measures are provided in **Section 6.9.4** to ensure no residual impacts to the environment as a result of the construction and operation of the development.

On the basis of the above, the proposed development is considered to be acceptable in the context of Section 6.1 and by reference to the range of proposed mitigation measures outlined in **Section 6.9.4**.

6.9.4 MITIGATION MEASURES

The following mitigation measures are recommended with respect to water and soils:

- Prior to construction:
  - Detailed design is to limit excavation to less than 1m. If this level is exceeded, an ASSMP is to be prepared and implemented throughout the construction phase of the project,
  - Ensure the detailed design incorporates all necessary measures from a Construction Erosion and Sediment Control Plan (ESCP) and Soil and Water Management Plan (SWMP) and (if required) an Acid

Sulfate Soils Management Plan (ASSMP). The ESCP/SWMP would include measures to address the following principles:

- Limiting the area and time of disturbed areas.
- Gentle grades, and a combination of progressive revegetation and surface cover across the site once disturbed.
- Sediment sumps (including appropriate drainage).
- Clean water diversions and sediment fencing.
- Prepare a project CEMP to address the above matters together with the following:
  - Ensure adequate provision of accident documentation.
  - Achieve water quality compliance with relevant guidelines.
  - A Spill Management Plan, including emergency response and EPA notification procedures.
  - Speed limit of 40km/hr on site.
  - Application of binders to road surfaces as required.

- During construction:
  - Implement all measures from ESCP and SWMP.
  - Minimise all ground disturbance where possible.
  - Minimise construction activities during wet weather conditions.
  - Retain, stockpile, treat for weeds and ameliorate all disturbed or excavated soil, with all topsoil and subsoils stockpiled separately and returned in order.
  - Return stockpiled soil and cleared vegetation or organic matter to its original location (where possible) as soon as reasonably practicable.
  - Undertake rehabilitation and revegetation in accordance with an appropriate landscape, revegetation or rehabilitation plan prepared by a suitably qualified professional.
  - Ensure rehabilitation is undertaken progressively to minimise the total disturbance area at any one time.
    - Wastewater during construction will be captured and appropriately removed from site/disposed.
    - Toilet facilities will involve waterless toilets that are emptied off-site.
- During operation:
  - Implement and maintain a project OEMP, including:
    - Implement and maintain all operational requirements of the SWMP.
    - Implement and maintain a Spill Management Plan, including emergency response and EPA notification procedures.
    - With respect to the potential for leakage from batteries:
      - All batteries will be enclosed from weather and any fluids will be fully bunded.
      - Regular inspection of batteries which will identify any issues with leakages.
    - With respect to the potential for spillage of hydrocarbons, chemical and fuels
      - Storage of chemicals in accordance with Australian Standards.
      - Storage of hydrocarbon fuels within bunded storage areas.
      - Bunding of substations, transformers or other infrastructure that utilise oil.
      - Minimise usage of herbicides and avoid spraying when rain is predicted.
    - OEMP to identify requirements for water quality monitoring and reporting.

    - Progressive rehabilitation of surfaces as installation and removal of batteries proceeds across the site.
- During decommissioning:
    - Prepare an appropriate decommissioning management plan that incorporates appropriate soil management to return the site to existing or improved land and soil capability.
    - Specific soil management practices should be determined at the time of decommissioning but would include preparation of an ESCP/SWMP
    - Temporary ground cover and revegetation after removal of BESS.

6.10 Contamination

6.10.1 INTRODUCTION

A Soil Contamination Assessment (SCA) was completed for the project by SLR (2023) and is provided at **Appendix L**. Given that the site was historically used as a Copper Chrome Arsenate timber treatment plant, the SCA was prepared to identify the contamination status of on-site soils and the suitability of the site for commercial / industrial use and information on the type, extent and level of shallow contamination of the site.

6.10.2 EXISTING ENVIRONMENT

The site is currently vacant with all infrastructure from the previous site use removed with the exception of a small slab with rail lines which remains in the northern portion of the site.

The site generally slopes from the north-west to the south-east with surface water discharging to the wetlands along the south-eastern boundary. A large stockpile of approximately 600-700^3 m is located in the north-eastern portion of the site, with anecdotal evidence suggesting this material was sourced during remedial works of the former pole yard.

6.10.3 HISTORICAL LAND USE AND FORMER SITE INFRASTRUCTURE

The site was historically used as a Copper Chrome Arsenate timber treatment plant.

Based on a review of previous reports, it understood that the following infrastructure was removed from the site between 2014 and 2015:

- The copper, chromium, and arsenic (CCA) and creosote treatment plant in the north.
- an in-ground pesticide treatment pit.
- a former light organic solvent preservative (LOSP) treatment plant in the south-eastern corner.
- workshops, storage sheds and sawing sheds.
- fuel storage.
- a timber storage area over much of the western half of the site.

6.10.4 CHEMICALS OF CONCERN

Based on the site history and information presented in past reports, SLR identified the following chemicals of concern:

- Copper chromium and arsenic from timber treatment.
- Polyaromatic hydrocarbons (PAHs) (including benzo(a)pyrene), phenols and diesel used in the timber treatment and the workshop.
- Organochlorine and organophosphate pesticides used in timber treatment.
- Cyanide, PAHs, fluoride in fill sourced from the aluminium smelter site

6.10.5 CONTAMINATION STATUS

SLR collected ten (10) representative soil samples from a maximum depth of 0.4m, with sample locations randomly selected within a triangular grid-based pattern across the Site

The reported concentrations all contaminants of potential of concern in all samples were all less than the relevant human health investigation criteria commercial industrial Site, with concentrations of copper, chromium, and arsenic exceeding the environmental criterion in only three samples

Based on the analytical results being reported as less than the relevant criteria HIL D for a commercial/industrial Site, Site observations and review of Site conditions, SLR consider that the Site does not represent a significant risk of harm to Site users and is suitable for proposed commercial/industrial development.

As such, no mitigation measures are recommended in this instance.

6.11 Other Land Resources and Land Uses

6.11.1 INTRODUCTION

The project SEARs issued by DPE on 20 December 2021 (refer to **Appendix A**) require an assessment of the compatibility of the development with existing land uses, including:

- Compatibility during construction, operation and decommissioning of the BESS; and
- Consideration of the zoning provisions applying to the land, including subdivision.

A summary of land resources and land uses are provided in the following sections, together with consideration of other relevant matters.

6.11.2 EXISTING ENVIRONMENT

As noted in **Figure 15**, the project area is located near to the current coal mining title ML1461, held by Donaldson Coal Pty Ltd. The site is underlain by the Donaldson Mining Seam at a depth of cover of approximately 18 metres (Douglas Partners, 2023). These are historic workings with current licences not applying to the site. There is however some low risk potential for subsidence in the project site and as such some remediation through the application of grout is recommended (refer **Appendix N**).

A review of relevant mapping determined that the site is not Biophysical Strategic Agricultural Land (BSAL) and that the land represents LSC Class 4 (moderate agricultural capability) and LSC Class 8 (extremely low agricultural capability) land.

As noted in **Figure 16**, the locality within 1km of the proposed development is predominately manufacturing and industrial (31% of the land), with other minimal uses representing the next largest proportion (17%). As outlined elsewhere, a portion of Lot 630 is occupied by the Beresfield Ausgrid Substation, with the remainder of the host lot occupied by vegetation. The site is not currently utilised in any way for agricultural purposes.

The project area is accessed directly from Whites Road and no change to this is proposed via this application.

Whites Road provides access to the site and substation and is shared with the neighbouring industrial estate containing multiple receivers to the south (R2, R6, R7, R9, R14, R15, R21, R39, and R43) (**Figure 5**). During construction, controls would be implemented to ensure that access to the industrial estate is not reduced or significantly impacted because of construction activities.

Sources: © State of NSW, Department of Customer Service, Spatial Services 2022
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GDA2020 MGA Zone 56 File: 221313_01.aprx Prepared By: zindia.nanver Date: 21/02/2023

Legend

- Locality 1 km
- Development Site
- Cadastre
- Roads
- Railway
- Underground Coal Mining

NSW Exploration and Mining Titles

- ML1461

Drill Holes in Area

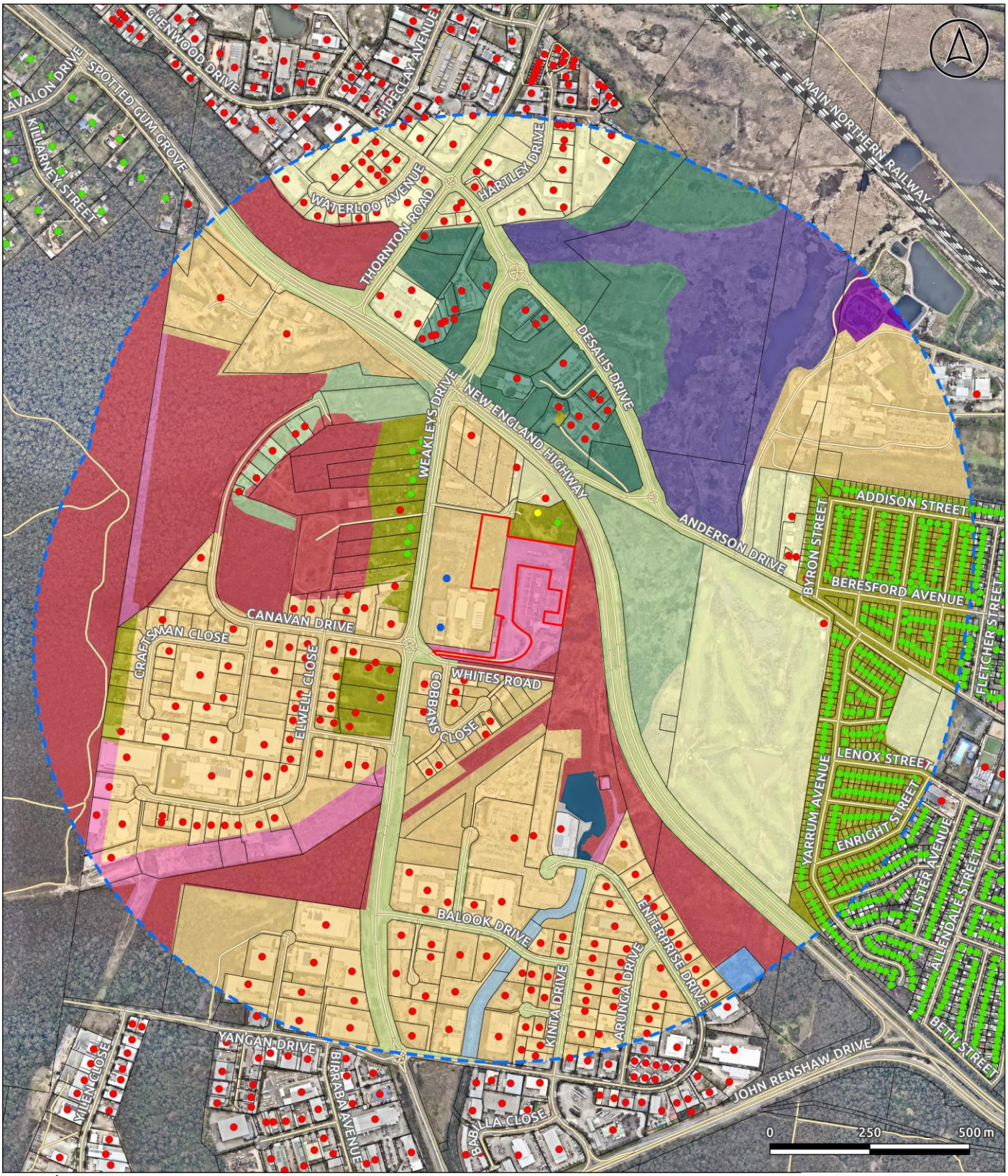
- Coal

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 15 - Mining



GDA2020 MGA Zone 56 File: 221313_01.aprx Prepared By: zindia.nanver Date: 21/02/2023

Legend

- Locality 1 km
- Development Site
- Cadastre
- Roads
- Railway

Receivers

- Indicative Associated Non-Residential
- Indicative Non-Residential
- Non-Associated Non-Residential
- Non-Associated Residential

NSW Landuse 2017

- 1.3.0 Other minimal use
- 2.1.0 Grazing native vegetation
- 3.2.0 Grazing modified pastures
- 3.6.0 Land in transition
- 5.3.0 Manufacturing and industrial
- 5.4.0 Residential and farm infrastructure
- 5.5.0 Services
- 5.6.0 Utilities
- 5.7.0 Transport and communication
- 5.9.0 Waste treatment and disposal
- 6.1.0 Lake
- 6.2.0 Reservoir/dam
- 6.3.0 River
- 6.5.0 Marsh/wetland

Premise

FIRM POWER

Beresfield Battery Energy Storage System

Figure 16 - Land use

6.11.3 ASSESSED IMPACTS

6.11.3.1 Agriculture

The host lot and project area are zoned IN2 via the LEP (**Figure 4**) with no active agricultural uses within the site or on directly adjacent land. Areas to the north are zoned RU2 – Rural Landscape, however active agricultural uses appear minimal.

6.11.3.2 Urban development

The site is unlikely to be used for urban purposes in the short, medium or long term because:

- The IN2 land use zone applying to the site under the LEP does not permit urban land uses;
- No planning proposals are known to have been submitted to NCC to seek rezoning of the site; and
- The site is not identified as an "urban investigation area", "urban release area" or similar under an environmental planning policy or under any of the strategic policies considered in **Section 2.1** of this report.

6.11.3.3 Crown land

No portions of Crown land are contained within the project site or locality within 1km.

6.11.3.4 Mining activities

Clause 2.19(1) of the Mining SEPP seeks to consider whether proposed development is compatible with mining, petroleum production or extractive industry, and applies to development in the following circumstances:

> *(a) in the vicinity of an existing mine, petroleum production facility or extractive industry, or*
>
> *(b) identified on a map (being a map that is approved and signed by the Minister and copies of which are deposited in the head office of the Department and publicly available on the Department's website) as being the location of State or regionally significant resources of minerals, petroleum or extractive materials, or*
>
> *(c) identified by an environmental planning instrument as being the location of significant resources of minerals, petroleum or extractive materials.*

A review of available mapping has identified that the site is not located within a Mine Subsidence District and that approval from Subsidence Advisory NSW is therefore not required.

Notwithstanding, the site is identified as being with the zone of influence of historical mining activities (mid to late 1800s). Impacts associated with the known undermining identify the potential for subsidence. As such, a mine subsidence assessment has been prepared by Douglas Partners (**Appendix N**). his recommends that all trafficable and building areas that are affected by past mining should be grouted. Through application of this remediation measure, the land will be suitable for the proposed purpose and the risk of subsidence is effectively minimised. The Applicant will continue to liaise with Subsidence Advisory NSW to ensure that the steps taken are adequate and acceptable.

The range of matters to be considered by reference to Section 2.19(2) of the Resources SEPP are considered in **Table 18**.

Table 18 – Section 2.19(2) of the Resources SEPP

Before determining an application to which this clause applies, the consent authority must—			**Comment:**
(a)	consider—		
	(i)	the existing uses and approved uses of land in the vicinity of the development, and	Refer to discussion and figures in **Section 6.11**.
	(ii)	whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and	The host lot currently hosts the Beresfield Substation and has done so since 1984. The site is underlain by the Donaldson Mining Seam at a depth of cover of approximately 18 metres (Douglas Partners, 2023). These are historic workings with current licences not applying to the site. As such, the proposal is not likely to have a significant impact on current or future extraction of minerals, petroleum or extractive materials.
	(iii)	any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery, and	The proposal is compatible with the current substation use of the host lot and the proposed BESS does not introduce any additional incompatibility that prejudices the future extraction or recovery of materials from the land. Subject to remediation, the site is suitable for the proposed purpose.
(b)	evaluate and compare the respective public benefits of the development and the uses, extraction and recovery referred to in paragraph (a)(i) and (ii), and		As outlined in **Section 7.8**, the proposal provides for the delivery of an important piece of electrical infrastructure that adds firming capacity to the network and has a positive impact to the public with respect to strengthening and supporting the supply of a power to the local and regional grid. This is a positive impact that outweighs any minor residual impacts.
(c)	evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).		The site would be remediated as required to ensure that the risk of subsidence is removed. The project is co-located with an existing developed substation, and within the area of existing industrial development. Through the application of recommended measures, the project is not incompatible with the land.

6.11.3.5 Subdivision

Notwithstanding the commentary in the SEARs, for the avoidance of doubt, subdivision of the land is not proposed.

6.11.4 MITIGATION MEASURES

Mitigation measures are reflective of those recommended throughout the range of specialist reporting prepared to support the proposal and are summarised in **Appendix C**.

- Grouting of underlying historic mine workings as recommended by the Douglas Partners mine subsidence assessment and through detailed design;
- Consultation with TfNSW with respect to any nearby large projects in the event of construction timing overlaps;
- Ongoing engagement with receivers in the industrial area to the south (R2, R6, R7, R9, R14, R15, R21, R39, and R43) to ensure that access during construction is always maintained;
- Construction of a noise barrier in the north and west of the site to ensure compliance with the relevant noise criteria under the NPfI during operations;
- The OEMP will contain a noise sub plan that will set out a complaint handling procedure. In the event of a complaint being received, compliance monitoring will be completed at the relevant receiver to assess noise impacts from the development. Outcomes from this monitoring will determine appropriate noise mitigation measures where applicable; and
- Implementation of all reasonable and feasible noise management measures during construction of the project in accordance with the ICNG.

6.12 Social

6.12.1 INTRODUCTION

A Social and Economic Impact Assessment (SEIA; bd Infrastructure Pty Ltd 2023) is provided at **Appendix M**. The assessment has been prepared in accordance with the following guidelines:

- Social Impact Assessment Guideline for State Significant Projects (DPE, 2021)
- Technical Supplement: Social Impact Assessment Guideline for State Significant Projects (DPE, 2021)

The social impact component of the SEIA (hereafter referred to as the SIA) has been prepared to provide:

- An introduction and summary of the SIA framework and content;
- A summary of the SIA assessment methodology;
- A social baseline;
- An assessment of social impacts;
- Conclusions and recommendations;

A summary of the SIA is provided in the following sections, as well as the recommended mitigation measures.

6.12.2 EXISTING ENVIRONMENT

The SIA relies on the DPIE's 2023 Social Impact Assessment Guidelines to assess each social and economic impact and benefit, ranking each impact and benefit between low and very high. The former is expected to have a low probability of occurring either/and/or minimal impact/benefit whilst the latter are expected to have a high probability of occurring either/and/or significant impact.

The assessment approach relies on three core metrics to assess the identified social and economic impacts and benefits, as well as develop appropriate mitigation and enhancement measures:

- Nature: impacts/benefits can be negative (impact) or positive (benefit), with varying significance.
- Experience: impacts/benefits can be perceived (intangible or perceptions) or actual (tangible), both carry equal importance.

- Significance: building on an impact/benefit's nature, the Department of Planning's Social Impact Significance Matrix assesses the expected significance of predicted impacts/benefits.

Based on refinement of the SIA scoping tool, the following issues were identified as having a low social impact and were not subject to further assessment:

- Increased demand for temporary accommodation;
- Impacts on Aboriginal heritage and values;
- Operational employment opportunities;
- Operational traffic
- Positive impacts, including:
  - Increased firming of renewable energy projects.
  - Reduction in electricity prices.

Social impacts that were identified as having a moderate or high impact which were carried forward for further assessment include:

- During construction:
  - Increased construction traffic: impact on how residents and the local community move around the local area during construction.
  - Construction noise: Potential decline in way of life and associated health and wellbeing for local residents due to noise annoyance.
  - Air quality impacts: Impacts associated with construction works, primarily earthworks.
  - Increased employment opportunities: Impact on the community's access to local and regional employment opportunities.
- During operation:
  - Network resilience: The ability to reduce the chance of blackouts during high demand periods, overall reducing health and wellbeing risks associated with moderate blackout events.
  - Operational noise: Decline in way of life and associate health and wellbeing for local residents due to operational noise annoyance
  - Visual impact and landscape changes: Permanent changes to the aesthetic value of the area

Issues that were carried forward for assessment in the SIA are summarised in the following sections, including recommended mitigation measures.

6.12.3 ASSESSMENT IMPACTS

Key social impacts and benefits identified as having a potential notable impact / benefit because of the project are summarised below in **Table 19**.

Table 19 – Summary of assessed social impacts and benefits

Social impact	Nature	Social impact category	Proposal phase	Social impact rating	
				Unmitigated	Mitigated
Temporary changes due to construction traffic	Negative	Access, Way of Life	Construction	Medium (C2)	Low (C1)
Temporary changes due to construction noise	Negative	Way of Life, Health and Wellbeing	Construction	Medium (B2)	Low (C1)

Social impact	Nature	Social impact category	Proposal phase	Social impact rating	
				Unmitigated	Mitigated
Air quality impacts during construction	Medium	Way of Life, Health and Wellbeing	Construction	Medium (A2)	Low (A1)
Direct employment from construction workforce (local)	Positive	Livelihoods	Construction	Low (C2)	Medium (B2)
Direct employment from construction workforce (regional)	Positive	Livelihoods	Construction	Low (C1)	Low (B1)
Increased network resilience	Positive	Livelihoods	Operation	Medium (C3)	(Medium (C3)
Decline in way of life and associated health and wellbeing for local residents due to noise annoyance	Negative	Way of Life, Health and Wellbeing	Operation	Medium (B2)	Low (C1)
Permanent changes to the aesthetic value of the area	Negative	Surroundings	Operational	Medium(C2)	Low (D1)

With respect to benefit sharing, direct discussions have taken place between the Applicant and NCC. A draft offer associated with benefit sharing has been submitted to NCC, to be managed as a voluntary planning agreement (VPA). The terms of the offer have been discussed with NCC and the Applicant will continue to work towards an acceptable agreed outcome prior to determination.

6.12.4 MITIGATION MEASURES

The SIA recommends that the following actions be adopted in order to enhance potential benefits and mitigate potential social impacts:

- Develop and implement a local procurement policy that aims to engage the local construction workforce and relevant suppliers.
- Develop and implement a complaint handling process prior to construction.
- Develop a website as a central source of information
- Adopt the technical mitigation measures identified in other technical reports.

6.13 Economic

6.13.1 INTRODUCTION

A Social and Economic Impact Assessment (SEIA, bd Infrastructure Pty Ltd 2023) is provided at **Appendix M**.

The economic impact assessment section of the SEIA contains the following elements:

- Assessment methodology.
- Economic profile
- Economic assessment

- Conclusion

A summary of the economic impact component of the SEIA is provided in the following sections, including mitigation measures.

6.13.2 EXISTING ENVIRONMENT

bd Infrastructure Pty Ltd provide a summary of the economic profile to better understand the economic context of the

- Unemployment rates (historic and current)
- Regional employment profile
- Economic opportunity
- Regional exports
- Regional value added.

The above areas are discussed in the following subsections.

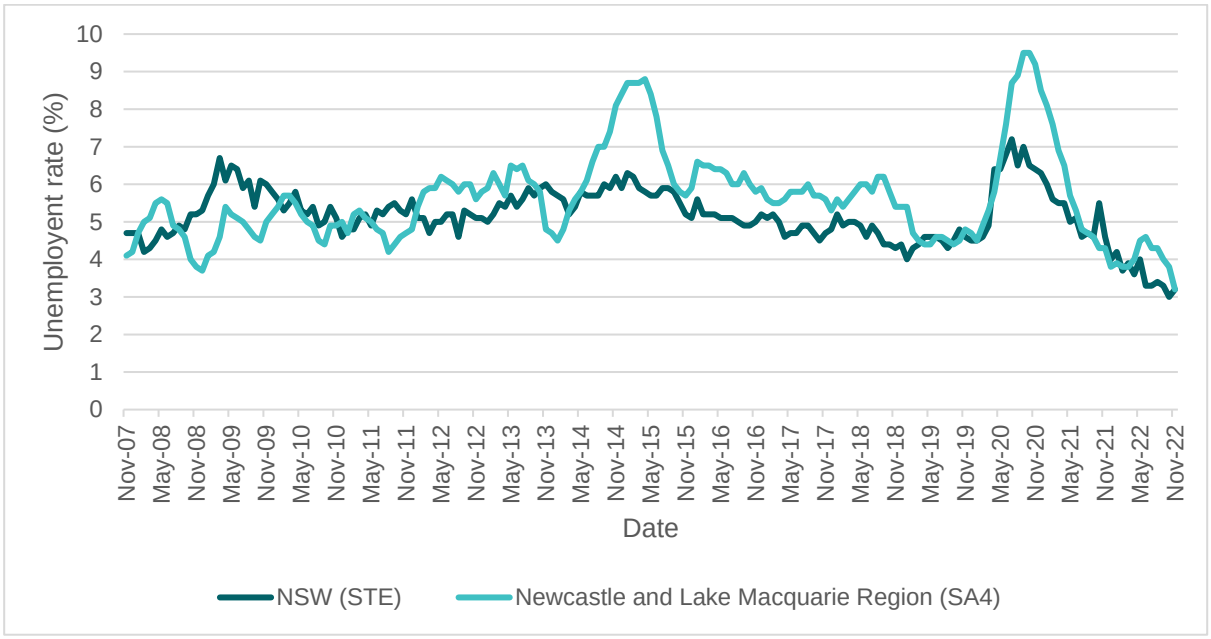
6.13.2.1 Unemployment

bd Infrastructure report that in November 2022, both NSW and the Newcastle and Lake Macquarie Region experienced low unemployment rates, at 3.2 per cent (refer to **Figure 17**).

The impact of COVID-19 on both the NSW and Newcastle and Lake Macquarie Region employment rates are evident in in Figure 7-1 of the SEIA (**Appendix M**), reproduced in **Figure 17**, with unemployment spiking between 2020 and 2021. Despite NSW and the Newcastle and Lake Macquarie Region having similar unemployment rates pre-COVID-19 (4.3 per cent and 4.4 per cent respectively), the Newcastle and Lake Macquarie Region experienced a notably higher increase in unemployment rates compared to NSW during this time.

Noting the impact of COVID-19 on unemployment rates in NSW and the Newcastle and Lake Macquarie Region, both the Region and the State have recovered to record low unemployment rates.

Figure 17 – Unemployment rates for Newcastle and Lake Macquarie Region and NSW (bd Infrastructure, 2023)



6.13.2.2 Regional employment profile

bd Infrastructure identify that the top industries of employment within the Newcastle and Lake Macquarie region are:

- Health care and social assistance (21.1%).
- Education and training services (9.5%).
- Construction (8.5%).

The top industries of employment within the region in terms of resident employment are:

- Health care and social assistance (19.8%).
- Education and training (9.7%).
- Construction (9.6%).

The top three industries of employment highlight the importance of Newcastle City as an economic and service hub for the region. Key services in Newcastle, including Newcastle University, regional and rural health services, and various construction projects, have played an important role in defining the employment profile of the Newcastle and Lake Macquarie Region.

6.13.2.3 Construction opportunities

bd Infrastructure reports that workforce migration data for the construction industry reflects a narrative of both inwards and outwards migration for the Newcastle and Lake Macquarie Region (ABS, 2016). Key facts include:

- 15,319 people work in construction in the Newcastle and Lake Macquarie Region
- 8,937 people live and work in construction in the Newcastle and Lake Macquarie Region
- 2,768 people travel to the Newcastle and Lake Macquarie Region to work in construction
- 2,446 residents of the Newcastle and Lake Macquarie Region travel outside the region for construction work
- 2,965 residents of the Newcastle and Lake Macquarie Region do not have a fixed place of work in construction.

Considering both place of work and usual residency of construction workers in the Newcastle and Lake Macquarie Region, workforce migration data indicates there is an approximate worker to job ration of 0.8 (ABS, 2016). This means that for every construction worker who lives in the Region there is 0.8 (less than one) construction jobs in the Region.

6.13.2.4 Regional exports

bd Infrastructure states that the Newcastle and Lake Macquarie Region's exports were estimated to be $17.89 billion. Manufacturing was the Region's largest export, representing 23.4 per cent of the Region's total export value ($4.1 billion).

6.13.2.5 Regional and state value added

The bd SEIA identifies that in 2021, the Newcastle and Lake Macquarie Region generated an estimated $28.7 billion in value added. The largest contributor was the Rental, Hiring and Real Estate Services industry, representing 14.3 per cent of the total value added.

The Newcastle and Lake Macquarie Region reflects similar economic diversity to the State. Economic diversity reflected at both the State and regional level include:

- other industries representing approximately 50 per cent of total value-added
- the top value-added industry represents a relatively low proportion of all total value added.

Based on the distribution of value added across key industries, the Newcastle and Lake Macquarie Region has a relatively diverse and robust economy.

6.13.3 ASSESSMENT IMPACTS

The proposal has the potential to generate a range of economic benefits within the Newcastle and Lake Macquarie Region and NSW economies. These include:

- 77-155 direct and 21-42 indirect construction services jobs (FTE) and $9.835 - 19.686 million direct and $2.782 - 5.5 million indirect value added to the Newcastle and Lake Macquarie regional economy over the construction phase
- 155 direct and 42 indirect construction services jobs (FTE) and $19.686 million direct and $5.645 million indirect value added to the NSW economy over the construction phase
- 2-3 direct and indirect electricity distribution jobs (FTE) and $0.845-$1.267 million direct and $1.303-$1.449 million indirect value added per annum to the Newcastle and Lake Macquarie regional economy during operation phase
- 2-3 direct and indirect electricity distribution jobs (FTE) and $0.850-1.199 million direct and $1.463-$1.626 million indirect value added per annum to the NSW economy during operation phase.

In addition to employment benefits and increased value-added, the proposal is expected to:

- directly strengthen and support the construction industry within the Newcastle and Lake Macquarie Region, an important industry of employment for residents
- indirectly support future capital investment in renewable energy projects in the Region and across NSW, further stimulating regional and State economies
- indirectly support the viability of cheaper electricity generation cost sources, such as wind and solar, by contributing to network firming with the potential to provide cheaper household electricity costs to households in the Region, and to a lesser extent NSW.

6.13.4 MITIGATION MEASURES

No negative economic impacts were identified in the SEIA. Therefore, no recommended mitigation measures are provided.

6.14 Air Quality

6.14.1 INTRODUCTION

An assessment of the potential impacts to air quality during construction and operation of the project is provided by Premise.

6.14.2 EXISTING ENVIRONMENT

The site is located in a predominantly industrial area in Beresfield, separated from non-industrial uses by the New England Highway to the north and east, John Renshaw Drive to the south and densely vegetated land to the west.

Potential existing sources of air pollution include emissions from industrial uses in the area, light and heavy vehicles travelling within the industrial area and surrounding major roads, dust emissions from mining and extractive industries in the locality and, potentially, emissions from wood heaters used in residential properties.

Meteorological conditions that influence air quality include gradient wind flow regimes and local conditions typically driven by topographical features, namely drainage flows. Wind speed, wind direction and topography influence dispersion and transport of plumes.

The nearest major industries with the potential to generate air quality impacts in the locality include:

- Industrial activities throughout the industrial area in which the site is located.
- Donaldson Coal located approximately 800 metres to the west of the site. The title for Donaldson Coal is held by Donaldson Coal Pty Ltd since December 1999 until December 2020 when it was last renewed. It is understood that the Donaldson coal mine was an open cut operation which operated from 2001 to 2013 when rehabilitation works commenced. Rehabilitation works are understood have been completed in March 2014.
- Bloomfield Collieries located approximately four kilometres to the west of the site. Bloomfield began operations in the 1860s and has been subject to a range of approvals and modifications since the introduction of the EP&A Act in 1979. The title is held by Bloomfield Collieries Pty Ltd since June 2016 until June 2037.

DPE provide data services which record air quality information around NSW. The nearest recording stations to the site is at Francis Greenway High School in Beresfield, approximately two kilometres to the east of the site.

The Beresfield station measures the following air pollutant and meteorological variables:

- Ozone (O3)
- Oxides of nitrogen (NO and NO2)
- Visibility using nephelometry (NEPH)
- Sulfur dioxide (SO2)
- Fine particles as PM10
- Fine particles as PM2.5
- Wind speed, wind direction and sigma theta
- Ambient temperature
- Relative humidity
- Solar radiation

DPE categorises air pollutants by air quality categories, as set out in **Table 20**.

Table 20 – DPE Air Quality Categories

Air pollutant	Averaging period	Units	Good	Fair	Poor	Very poor	Extremely poor
O3	1-hour	pphm	<6.7	6.7–10.0	10.0–15.0	15.0–20.0	20.0 and above
O3	4-hour rolling	Pphm	<5.4	5.4–8.0	8.0–12.0	12.0–16.0	16.0 and above
NO2	1-hour	Pphm	<8	8–12	12–18	18–24	24 and above
NEPH	1-hour	Bsp	<1.5	1.5–3.0	3.0–6.0	6.0–18.0	18.0 and above
SO2	1-hour	Pphm	<13.3	13.3–20.0	20.0–30.0	30.0–40.0	40.0 and above
PM10	1-hour	µg/m^3	<50	50–100	100–200	200–600	600 and above
PM2.5	1-hour	µg/m^3	<25	25–50	50–100	100–300	300 and above

Pollutant measurements at the Beresfield station for February 2022 to January 2023 are outlined in **Table 21**.

Table 21 – Beresfield Pollutant Measurements

Date	SO2 1hr average	NO 1hr average	NO2 1hr average	O3 1hr average	O3 4hr average	PM10	PM2.5	NEPH 1hr average
	pphm	pphm	pphm	pphm	pphm	µg/m^3	µg/m^3	bsp
28/02/2022	0.1	0.5	0.5	1.4	1.4	16.9	5.4	0.19
31/03/2022	0.1	0.6	0.5	1.3	1.3	13.9	4	0.16
30/04/2022	0.1	0.8	0.6	1.2	1.2	12.9	4.5	0.14
31/05/2022	0.1	1.3	0.9	0.9	0.9	13.8	5.4	0.18
30/06/2022	0.2	1.4	1.1	1.1	1.1	15.5	6.1	0.16
31/07/2022	0.2	0.8	0.9	1.4	1.4	11.9	5.9	0.19
31/08/2022	0.1	1	0.9	1.4	1.4	13.5	6	0.17
30/09/2022	0.1	0.6	0.7	1.8	1.8	13.5	4.7	0.14
31/10/2022	0.1	0.4	0.6	1.9	1.9	12.3	3.7	0.11
30/11/2022	0.1	0.5	0.5	1.8	1.8	15.5	4.5	0.12
31/12/2022	0.1	0.5	0.4	1.7	1.7	15.9	5.2	0.15
31/01/2023	0.2	0.4	0.4	1.5	1.4	14.8	5	0.18

All of the above readings fall within the 'good' classification by reference to the DPE air pollutant classification ratings (the highest category) at **Table 20**, reflecting that the current environment is a good quality air environment.

6.14.2.1 Climate

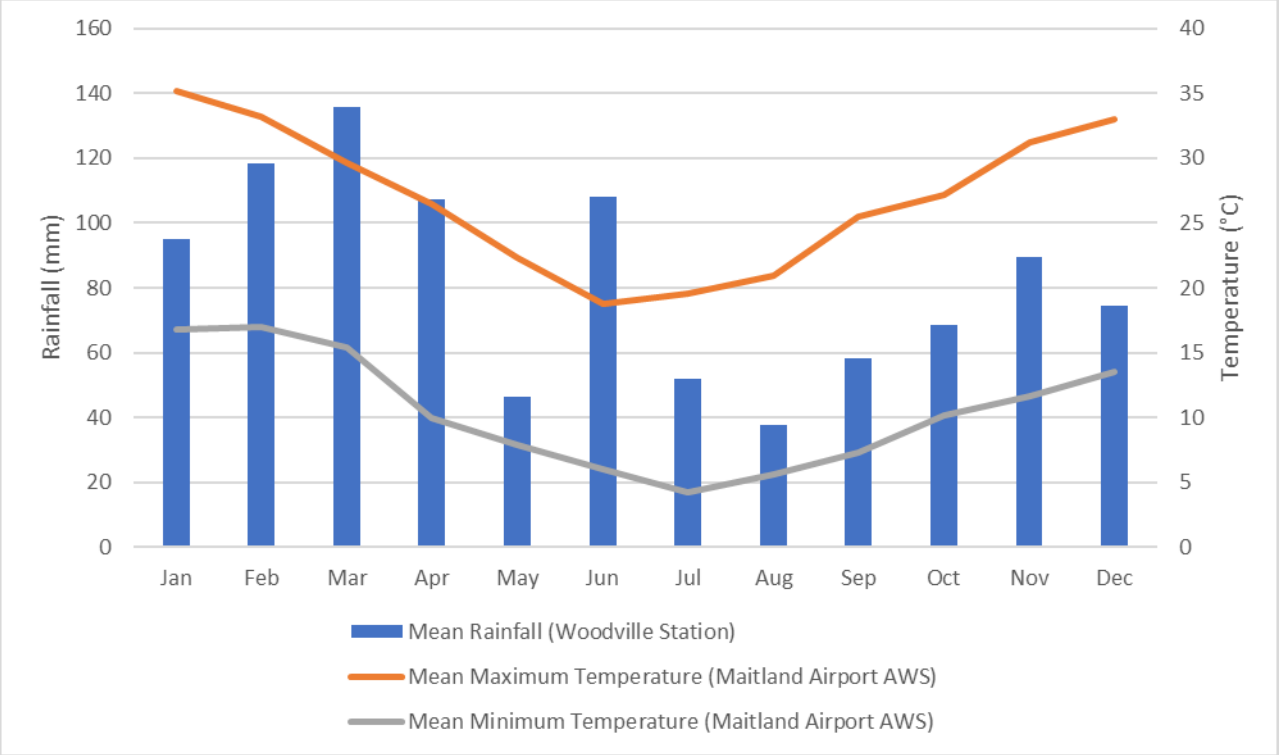
The closest Australian Bureau of Meteorology (BoM) weather station with daily rainfall observations and complete records for 2022 is Woodville (Station 061405), located approximately 13 kilometres north of the site.

The closest BOM weather station with daily mean minimum temperature observations and complete records for 2022 in Maitland Airport AWS (State 061428), located approximately 17 kilometres to the east of the site.

Summary climate statistics are provided below and depicted in **Figure 18**:

- The mean annual maximum temperature is 23.9°C and the mean annual minimum temperature is 11.5°C (BoM, 2022).
- Mean annual rainfall is 1079.3 mm and records indicate monthly mean rainfall received at the site is highest in the months of November through to March (BoM, 2022).

Figure 18 – Climate statistics for the locality



6.14.2.2 Climate change

It is now generally accepted by the scientific community that certain emissions have a contributory impact to climate change. Emissions associated with construction and maintenance activities, such as those associated with the construction and operation of the Beresfield BESS, contribute to climate change.

6.14.3 POTENTIAL IMPACTS

Sensitive receivers near the site are likely to be the most impacted by potential changes in air quality as a result of the project. These impacts are expected to be largely localised (within approximately 500 metres of the site).

As show in **Figure 5**, there are no associated residential receivers and nine non-associated residential receivers within 500 metres of the project boundary. The closest of these is R01 (179 New England Highway, Beresfield), directly adjoining the site's northern boundary.

Primary air quality impacts associated with the development relate to the construction and decommissioning phases of the BESS, and would include dust generation resulting from excavation, earthworks and vehicle movements. Air quality impacts associated with construction and decommissioning of the development are considered manageable via the application of the mitigation measures provided in **Section 6.14.4**.

The development is not anticipated to result in any negative air quality impacts during the operational phase. Minor impacts associated with movement of maintenance vehicles would be negligible.

On the completion of construction, cumulative air quality impacts associated with the project is considered to be negligible.

6.14.4 MITIGATION MEASURES

The CEMP would incorporate measures and protocols to minimise dust generation during the construction period. Specific measures would include but not be limited to:

6.14.4.1 Prior to construction

Development of a dust management plan as a sub-plan to the site-specific CEMP, including (but not limited to) measures as set out in the following sections.

6.14.4.2 During Construction and Decommissioning

- A water cart (truck) would be utilised routinely, wetting all access roads/tracks and exposed dusty surfaces as appropriate to the conditions of the site.
- Stockpiled topsoil and other materials that exhibit significant dust lift off would be wet down routinely and as appropriate.
- Stabilising techniques and/or environmentally acceptable dust palliatives will be utilised if the wetting down of surfaces prove to be ineffective.

6.14.4.3 During Operation

- Any area that was temporarily used during construction would be restored back to original condition or re-vegetated with native plants.
- Areas that may not have been hard packed but have been disturbed in some form would be vegetated with seeds native to the area.

6.15 Waste

6.15.1 INTRODUCTION

Premise has conducted a review of likely waste impacts associated with the construction and operation of the project. The legislative framework and assessment of impacts is provided in the following sections.

6.15.2 EXISTING ENVIRONMENT

The management of waste in NSW, including recycling, is via the POEO Act and the *Waste Avoidance and Resource Recovery Act 2001* (the WARR Act). The WARR Act sets out a hierarchy of management, including avoidance, recovery and then disposal.

6.15.3 ASSESSED IMPACTS

6.15.3.1 Construction

From a waste perspective, the construction program will generate a range of solid waste, including:

- Packaging materials;
- Building materials;
- Scrap metal;
- Excess soil;
- Plastic and masonry products; and
- Vegetation from clearing.

Waste generated through the construction phase would be managed in accordance with an adopted waste management plan, with consumption avoidance being the first management tier, following by on site reuse/recycling where possible (i.e., mulch from vegetation clearing). As a last resort, waste would be removed from the site and either recycled or disposed of at an appropriate waste disposal facility.

Effluent disposal would be limited to provision of short-term services to service the construction workforce. Transportable services would be provided and emptied by suitable contractors. These would be removed at the completion of the construction period.

6.15.3.2 Operation

Operational waste associated with the facility is of a limited nature, being likely limited to small amounts of packaging associated with plant maintenance/replacement and general waste from site staff.

Noting the intended life of the project is 20 years, it is likely that batteries will require replacement one to two times during the life of the project.

Batteries are classed as hazardous waste and their transport for disposal or recycling is regulated under the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (National Transport Commission 2020, Ed. 7.7). The operator will be required to ensure that all transport requirements are met for the off-site transport of batteries at their end of life. This would be managed by the operator at the time in line with the applicable hazardous materials requirements in effect at that time.

As the development of solar farms and large-scale batteries and uptake of electric vehicles increases in Australia in response to the shifting methods of energy generation and management, there is the likely potential for increase in batteries requiring recycling or disposal. This will increase opportunities for onshore recycling operations and avoid the need for export of these materials, a shift that is now increasingly evident in the domestic market.

6.15.3.3 Decommissioning

Waste generating during the decommissioning phase would be managed in a manner consistent with the construction phase, including waste avoidance, reuse and finally disposal.

Waste expected to be generated includes electrical infrastructure including batteries, inverters, transformers and other components and cabling.

Most materials would be reused or recycled where possible. Disposal of batteries would occur in accordance with the hazardous waste policies in effect at the time of decommissioning.

Any items that cannot be reused or recycled, would be disposed of as waste at appropriate facilities in line with applicable regulations. Those on-site materials that remain of use to the landowner (such as roads) or the electricity authority (such as the switching station or sub-station) would remain on site, subject to agreements with the landowner.

Most materials are able to reused or repurposed, and this would be the core aim of the decommissioning phase.

6.15.4 MITIGATION MEASURES

A Waste Management Plan for all phases of the project would be prepared and implemented prior to the commencement of any works on the site.

6.16 Cumulative Impacts

6.16.1 INTRODUCTION

A review of the potential for cumulative impacts has been prepared by Premise.

Cumulative impacts have been identified and assessed in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE, 2021).

6.16.2 EXISTING ENVIRONMENT

A review of the major project website for solar farms within the region were completed. Five renewable energy projects at various stages were identified and are detailed in **Table 22**.

Table 22 – SSD Renewable projects

Location:	Stage:	Distance (Direction) from Site:
Brandy Hill Battery Energy Storage System	SEARs	Approximately 25 kilometres (north)
Awaba Battery Energy Storage System	Response to Submissions	Approximately 30 kilometres (south)
Eraring Battery Energy Storage System	Determined	Approximately 33 kilometres (south)
Bridgman Solar Farm	Prepare EIS	Approximately 80 kilometres (north-west)
Liddell Battery and Bayswater Ancillary Works	Determined	Approximately 100 kilometres (north-west)

Several other state significant major projects were identified within the locality. These are detailed within **Table 23**.

Table 23 – Other Major Projects within the Locality

Project Name	Development Stage	Distance from Site (km)
Bloomfield Coal Mine	Determined	Approximately 4 kilometres (west)
Enviroking Liquid Waste Facility	Determined	Approximately 8 kilometres (west)
Newcastle Gas Storage Facility	Determined	Approximately 8 kilometres (south-east)
Tomago Asphalt Facility	Determined	Approximately 11 kilometres (south-east)
Remondis Resource Recovery Facility Tomago	Determined	Approximately 13 kilometres (south-east)
Gillieston Heights Learning Community facility	Prepare EIS	Approximately 13 kilometres (north-west)
Tomago Industrial Estate	Determined	Approximately 15 kilometres (east)

6.16.3 ASSESSED IMPACTS

As noted, whilst there are a range of projects in development or in operation within the locality of the project, there is limited capacity for the opportunity for cumulative impacts. This is on the basis that most of these projects are well removed from the project site.

The closest operating land uses to the site with the potential to result in cumulative impacts from an air quality perspective are industrial activities throughout the industrial area in which the site is located. Other contributors to potential air quality impacts include road users on the Sydney-Newcastle M1 Freeway, New England Highway and connecting John Renshaw Drive, as well as the Bloomfield Collieries.

Noting the range of land uses in the region, consideration of air quality information has been provided in **Section 6.14** to summarise the current environment. This reflects, despite the number of major projects operating in the region, that air quality levels are good.

Cumulative air quality impacts associated with the proposal is limited to emissions during constructions. Subject to the implementation of mitigation measures outlined in **Section 6.14**, the likelihood of significant cumulative impacts is considered low. It is notable that the proposal would generate limited air emissions during operation.

The construction of the project is considered unlikely to lead to cumulative impacts with other projects in the locality on the basis that:

- The proposed site access is not shared with any other nearby external major projects; and
- The construction period is a discrete, limited period, that would be managed with appropriate management plans and controls to limit the opportunity for cumulative impacts.

Operational cumulative impacts are considered unlikely on the basis that:

- The site is well separated from other state significant renewable and major projects and thus is unlikely to lead to any cumulative visual impacts;
- The operational noise levels are low and generally contained within or very close to the site, without contributing to noise levels generated by adjacent and nearby major operations;
- Construction impacts of the BESS and these projects, whilst having the potential to coincide, can be managed through the application of appropriate management plans and mitigations to ensure that impacts are minimised;
- Operational impacts to the BESS are predominantly limited to the potential for noise and visual impacts. Detailed analysis at **Appendix G** and **Appendix F** reflects that these impacts are manageable and unlikely to result in cumulative impacts.

6.16.4 MITIGATION MEASURES

The following mitigation measures are recommended to limit the potential for cumulative impacts associated with the project:

- Construction noise impacts would be addressed in a Noise Management Plan. Consultation with key proponents of nearby projects, would be completed to determine if construction activities may take place near adjoining projects. Where possible, noise generating activities would be scheduled for different areas of the proposal site to avoid cumulative construction noise impacts.
- If there is potential for construction of multiple projects to occur in and around Beresfield/Thornton/Black Hill at the same time, and large workforce numbers are required, consideration would be given to alternative accommodation options such as neighbouring towns.

7. JUSTIFICATION OF THE PROJECT

This section provides a justification and evaluation of the project, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development.

7.1 Design of the Project

The project area has been carefully selected to identify a site that is immediately adjacent to the existing substation and wholly within IN2 zoned land. The site has been selected to make the best and most efficient use of existing developed and zoned land to provide a permissible use. The number and location of receivers, and the nature of the majority of these as industrial receivers, ensures that off-site impacts are minor in nature. The nearest confirmed non associated receiver is R1, which is a residential receiver located in the industrial zone, located 53 metres to the north of the site. For the purposes of the noise assessment, R1 has therefore been treated as a residential receiver in an industrial zone by reference to the provisions of the Noise Policy for Industry (2017).

The noise and visual impacts on all receivers have been considered as part of the acoustic and visual assessments undertaken, as discussed in **Section 6.4** and **Section 6.3** of this EIS. A range of traffic management measures will be implemented during the construction phase to ensure that impacts with the shared access driveway with the landowner are appropriately managed and mitigated.

7.2 Consistency of the Project with the Strategic Context

The NSW Government has recognised that the NSW electricity system needs to change, acknowledging that traditional generators are ageing, and the State's transmission system is congested. Further, electricity prices are putting pressure on households and businesses. This realisation has informed the preparation of Government policies and documents, the provisions of which have filtered to the local scale and informed local plan making.

The project will contribute to the provision of renewable energy in NSW and facilitate private investment in the state's electricity system over the next decade and beyond, a key consideration of the NSW Electricity Strategy. The BESS has an anticipated lifespan in the order of 20 years and will contribute to the NSW Government's three objectives for the electricity system: reliability, affordability and sustainability.

Refer to the detailed discussion at **Section 2** of this EIS.

7.3 Compliance with Relevant Statutory Requirements

The proposed development is characterised as SSD as the proposal is for the purpose of electricity generating works with a capital investment value ('CIV') more than $30 million, pursuant to Clause 20 of Schedule 1 of the Planning Systems SEPP.

Pursuant to the LEP, the project area is zoned IN2 – Light Industrial.

Electricity generating works are permitted with consent in the IN2 land use zone via the LEP and the Infrastructure SEPP. The project is wholly located within the IN2 zoned land, including the proposed sub-transmission line connecting to the substation and the existing access driveway.

Refer to **Section 4** of this EIS for a detailed discussion.

7.4 Community Views About the Project

Consultation with the community about the project identified general interest in the project and the manner in which it aligns with community values. Other areas of interest where around construction impacts (particularly changes to traffic, noise, dust and visual and impacts on employment) and operational impacts (particularly with respect to network resilience, a just transition of energy supplies sources, operational noise, changes to the visual environment, and the safety of BESS systems).

Refer to **Section 5** of this EIS for a detailed discussion.

7.5 Economic, Social, Environmental and Cumulative Impacts of the Project

The project is contributing to the enhancement of the existing Ausgrid Substation infrastructure, through the provision and operation of the BESS, which will serve to balance the grid and support the performance and future uptake of renewable energy. The project seeks to invest in and contribute to the local economy through the creation of jobs and provision of affordable electricity.

The project has been sited and designed to minimise environmental impacts, where impacts cannot be avoided, mitigation measures have been proposed.

A review of public record information for large scale projects confirms that, whilst there are a range of projects in development or in operation within the locality of the project, there is limited capacity for the opportunity for cumulative impacts. This is on the basis that most of these projects are well removed from the project site.

Refer to **Section 6.16** of this EIS for a detailed discussion.

7.6 Compliance Monitoring and Communication

Throughout construction, management measures will be implemented through the adoption of a construction environmental management plan, which will consist of a range of supporting studies, including but not limited to the following:

- Traffic Management Plan
- Bushfire Management Plan
- Construction Noise and Vibration Management Plan
- Landscape Implementation Plan
- Soil and Water Management Plan
- Emergency Response Plan
- Community Engagement Plan
- Waste Management Plan
- Incident Management Procedures

Operation and monitoring of the facility would be governed by an adopted operational environmental management and monitoring plan that would clearly identify any residual matters requiring ongoing attention during operation, with particular emphasis on bushfire management, risk management, landscape implementation and monitoring and ongoing noise monitoring to ensure ongoing compliance with adopted criteria.

The site is expected to operate for a period of approximately 20 years, after which it would be decommissioned, in accordance with the measures outlined in a decommissioning management plan.

7.7 Key Uncertainties

Due to the extent of technical studies undertaken to inform the project and the mitigation measures proposed to address impacts of the development, there are no uncertainties with the project. All impacts can be adequately mitigated through the location and design of the BESS and on-going management practices and monitoring.

7.8 Public interest

The public interest may be determined by consideration of relevant national, state and local government goals, as well as community priorities, which are expressed through a range of documentation. Relevant strategic documents are considered in **Section 2**.

It also requires the consideration of the principles of ecologically sustainable development, discussed in **Section 7.9**. It has been consistent held through a range of determinations in the NSW Land and Environment Court that the ESD precautionary intergenerational equity principles include considerations associated with climate change (impact of the development on climate change and impacts of climate change on development).

Mostly recently, the LEC held that the downstream impacts of mining projects, including the burning of fossil fuels for energy production, is a public interest consideration. Namely, in Gloucester Resources Limited v Minister for Planning [2019] NSWLEC 7, Preston J stated at 499:

> *Many courts have held that indirect, downstream GHG (greenhouse gas) emissions are a relevant consideration to take into account in determining applications for activities involving fossil fuel extraction or combustion or electricity generated by fossil fuel combustion.*

In summing up, Preston noted that the impacts associated with climate change, among others, were sufficient to justify refusal of the project.

It follows that a project that seeks to provide for improved grid stability and support and encourage the uptake of renewable forms of energy is in the public interest as it reduces the reliance on forms of electricity generation that rely on the consumption and burning of fossil fuels and that negatively contribute to the impacts of climate change as a result. Adoption of forms of development that counter the need for these high impact uses is therefore positive in the context of the ESD principles and is in the public interest.

The proposed development is in the public interest on the basis that it:

- Offers an opportunity for productive and sustainable economic activity within the area;
- Presents an excellent opportunity to the local region to provide local employment opportunities;
- Has been designed with appropriate to the consideration to social, environmental and sustainability interests of the community;
- Aims to minimises impacts to natural resources through minimising the land required to support energy supply; and
- Assists to reduce reliance on traditional, fossil fuel burning forms of electricity generation, thereby assisting in curbing the long-term impacts of climate change.

7.9 Ecologically sustainable development

The *National Strategy for Ecological Sustainable Development* (NSESD) (Department of Environment and Heritage 1992) defines Ecologically Sustainable Development (ESD) as:

> *using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (refer website)*

The concept of ESD gives formal recognition to environmental and social considerations in decision-making to ensure the current and future generations can enjoy an environment that functions as well as or better than the environment they inherit.

The core objectives of the NSESD are:

- To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- To provide for equity within and between generations; and
- To protect biological diversity and maintain essential ecological processes and life-support systems.

As outlined in Clause 193 of the *Environmental Planning and Assessment Regulation 2021,* the four principles of ESC are listed below. These are discussed in the following sections.

- Precautionary principle;
- Intergenerational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation and pricing of environmental resources.

7.9.1 PRECAUTIONARY PRINCIPLE

The precautionary principle states where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a justification for not implementing mitigation measures or strategies to avoid potential impact. This has been held in various decisions in the NSW Land and Environment Court to include considerations associated with climate change (impact of the development on climate change and impacts of climate change on development).

The potential impact from the proposal has been identified in the environmental assessment section of this EIS and all mitigation measures are summarised in **Appendix C**.

The proposal supports improvements to grid efficiency, including the uptake of renewable forms of renewable energy. This assists in reducing the long-term impacts of climate change and is therefore in the public interest. The potential outcome of climate change, being higher temperatures and greater periods of sunlight, also suggests that increasing reliance of renewable forms of energy generation is sustainable. This is discussed in further detail in **Section 2**.

7.9.2 INTERGENERATIONAL EQUITY

The second principle of ESD is intergenerational equity, such that the present generation should ensure the health, diversity and productivity of the environment are equal to or better for future generations.

All work would be carried out in accordance with the environmental safeguards summarised in **Appendix C** to mitigate potential impact associated with noise and vibration, socio-economic considerations, traffic and transport, drainage and water quality, air quality, greenhouse gas emissions, climate change, Aboriginal and non-Aboriginal heritage, topography, soils, waste and hazardous materials.

The proposal supports the development of sustainable forms of renewable energy, and in doing so reduces reliance on traditional forms of electricity generation, including the burning of fossil fuels. This assists in reducing the impacts of climate change and therefore assists in ensuring the health of future generations is protected; the development is therefore in the public interest. This is discussed in further detail in **Section 7.8**.

7.9.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

The third principle of ESD is conservation of biological diversity and ecological integrity such that ecosystems, species and genetic diversity within species are maintained.

The proposed development has been the subject of a comprehensive assessment in accordance with the provisions of the *Biodiversity Conservation Act 2016* by reference to **Appendix D**.

The mitigating measures for protecting biodiversity at the site are provided in **Section 6.1.6**.

7.9.4 IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

The final principle of ESD is improved valuation and pricing of environmental resources which establishes the need to determine economic values for services provided by the natural environment such as the atmosphere's ability to receive gaseous emissions, cultural values and visual amenity. The principle is designed to improve methods of carrying out valuation of environmental costs and benefits and use this information when making decisions.

The development of policy to guide pricing and incentive mechanisms in delivering ecologically sustainable development is the responsibility of governments and regulatory stakeholders.

7.10 Site suitability

As outlined throughout this EIS, the site is suitable for the proposed purpose on the basis that:

- The site is within an established industrial zone with limited residential receivers;
- The site is well shielded from established residential areas by virtue of existing infrastructure and vegetation;
- The site is not unduly constrained such that the development would result in significant impacts to the receiving environment;
- The site is proximal to existing electrical infrastructure (substation and transmission lines) to meet the objectives of the project and substantial upgrades are not required;
- The site is located within the Hunter REZ and will support the delivery of the REZ;
- Access to the site is established and capable of accommodating light and heavy vehicles, and would therefore not require upgrade to facilitate the development;
- The co-location with the existing substation ensures that the project would not result in a radical transformation of the locality; and
- The project has been refined (as discussed in **Section 3.2**) to ensure the design and delivery of the project would not lead to unreasonable impacts.

7.11 Conclusion

This EIS has been prepared pursuant to Part 5, Division 5.1, Subdivision 3 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act), Part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2000* (the EP&A Regulation), *State Significant Development Guidelines – Preparing an Environmental Impact Statement* (DPIE 2022) and SEARs issued by DPIE on 20 December 2021 in response to the Scoping Report (refer to **Appendix A**).

An assessment of potential environmental impacts has identified limited minor adverse residual impacts to the environment that would require the implementation of appropriate controls to ensure compliance in accordance with relevant legislation, standards and guidelines. Measures are proposed during both construction and operation to ensure impacts are appropriately managed. These measures would ensure compliance with relevant legislation and any conditions of approval.

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APPENDIX A

SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Table 24 – Response to SEARs

	Details:	**Section of EIS where issue addressed:**
General Requirements	In particular, the EIS must include:	
	• a stand-alone executive summary;	Refer to **Executive Summary.**
	• a full description of the development, including: – details of construction, operation and decommissioning; – a high-quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process); – a high-quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development;	Refer to **Section 3**
	• 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, residential development, Crown lands adjacent to the site and neighbouring industrial and infrastructure developments);	Refer to **Section 2**
	• an assessment of the likely impacts of the development on the environment, 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;	Refer to **Section 2.2**
	– 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 or proposed developments in the region in accordance with the *Cumulative Impact Assessment Guideline* (DPIE, July 2021);	Refer to **Sections 3 & 6**
	– 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	Throughout **Section 6** and summarised in **Appendix C**.
	– a description of the measures that would be implemented to monitor and report on the environmental performance of the development;	Refer to **Section 7.6**.

	• a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS; and	Refer to **Appendix C**.
	• a detailed evaluation of the merits of project as a whole having regard to:	
	– the requirements in Section 4.15 of the *Environmental Planning and Assessment Act 1979*, and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;	Refer to **Section 7.9**
	– the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; and	Refer to **Section 6.11**
	– feasible alternatives to the development (and its key components), including the consequences of not carrying out the development.	Refer to **Section 2.4**
	• 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; and	Refer to **Section 2.1**
	• a signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.	Refer to Certification (Page ii)
	The EIS must also be accompanied by a report from a suitably qualified person providing: • a report from a suitably qualified person providing a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; • an estimate of the jobs that will be created during the construction and operational phases of the proposed infrastructure; and • certification that the information provided is accurate at the date of preparation.	Provided as a separate attachment
	The development application must be accompanied by the of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).	This is provided.
Key Issues	The EIS must address the following specific matters:	
	• **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), the Biodiversity Assessment Method (BAM) and	Refer to **Section 6.1** and **Appendix D**

	documented in a Biodiversity Development Assessment Report (BDAR), unless BCS and DPIE determine the proposed development is not likely to have any significant impacts on biodiversity values; – 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 BAM; and – if an offset is required, details of the measures proposed to address the offset obligation.	
	• **Heritage** – including:	
	– an assessment of the impact to Aboriginal cultural heritage items (cultural and archaeological) 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 *ArchaeologicalInvestigation of Aboriginal Objects in NSW* (DECCW, 2010);	Refer to **Section 6.5** and **Appendix H**.
	– provide evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selectingoptions and mitigation measures (including the final proposed measures), having regard to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010); and	Refer to **Section 6.5** and **Appendix H**
	– assess the impact to historic heritage having regard to the *NSW Heritage Manual*.;	Refer to **Section 6.6**.
	• **Land** – including:	
	– a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints; and	Refer to **Sections 2.4 and 6.11**.
	– a site contamination assessment and a description of any mitigation and monitoring measures in accordance with *State Environmental Planning Policy No. 55-Remediation of Land*; and	Refer to **Section 6.10 and Appendix L.**
	– 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;	Refer to **Sections 2.4 and 6.11**.
	• **Visual** – including an assessment of the likely visual impacts (including night lighting) of all components of the project (including transmissionlines and any other ancillary	Refer to **Section 6.3 and Appendix F.**

	infrastructure) on surrounding residences, scenic or significant vistas and road corridors in the public domain	
	• **Noise** – including an assessment of the construction noise impacts 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)*, cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria;	Refer to **Section 6.4 and Appendix G.**
	• **Transport** – including: – an assessment of the peak and average traffic generation, including over-dimensional vehicles, construction worker transportation and transport of materials by rail; – an assessment of the likely transport impacts to the site access route, site access point(s), particularly in relation to the capacity and condition of the roads; – a cumulative impact assessment of traffic from nearby developments; and – provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority;	Refer to **Section 6.2**.
	• **Water** – including: – an assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts; – details of water requirements and supply arrangements for construction and operation; and – 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);	Refer to **Section 6.9.**
	• **Hazards** – including:	
	– a preliminary risk screening completed in accordance with StateEnvironmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011);	Refer to **Appendix I**
	– a Preliminary Hazard Analysis prepared in accordance with Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – Guideline for Hazard Analysis (DoP, 2011) and	Refer to **Appendix I**

	Multi-Level Risk Assessment (DoP, 2011). 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 (DoP, 2011);* and	
	– an assessment of potential hazards and risks including but not limitedto bushfires, 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*.	Refer to **Sections 6.7, 6.8, Appendix J** and **Appendix I**
	• **Social impact** – including an assessment of the social impacts in accordance with *Social Impact Assessment Guideline* (DPIE, July 2021);	Refer to **Section 6.12 and Appendix M**.
	• **Economic** - including an assessment of the economic impacts or benefits of the project for the region and the State as a whole; and	Refer to **Section 6.13 and Appendix M**.
	• **Waste** – identify, quantify and classify the likely waste stream to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	Refer to **Section 6.15**.
Plans and Documents	The EIS must include all relevant plans, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these as part of the EIS rather than as separate documents. In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.	Figures throughout.
Legislation, Policies& Guidelines	The assessment of the key issues listed above must take into account relevantguidelines, policies, and plans as identified. A list of some of the legislation, policies and guidelines that may be relevant tothe assessment of the project can be found at: • https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning- reforms/Rapid-Assessment-Framework/Improving-assessment-guidance • https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines; and • http://www.environment.gov.au/epbc/publications#assessments	Throughout
Consultation	During the preparation of the EIS, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected	Refer to **Section 5**.

	landowners and any exploration licence and/or mineral title holders. In particular, you must undertake detailed consultation with affected landowners surrounding the development, Council, Crown Lands, NSW Aboriginal Land Council and Transport for NSW. The EIS must: • detail how engagement undertaken was consistent with the Undertaking Engagement Guide: Guidance for State Significant Projects (DPIE, July 2021); and • describe the consultation process and the issues raised and identify wherethe design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, anexplanation should be provided.	
Expiry Date	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.	Noted

APPENDIX B

STATUTORY COMPLIANCE TABLES

Table 25 – Commonwealth Legislation

Statutory Reference	Pre-condition	Relevance	Section in EIS
Environment Protection and Biodiversity Conservation Act 1999	Direct or indirect impacts to a Matter of National Environmental Significance (MNES)	The project is unlikely to have a significant impact on a biodiversity MNES and therefore is unlikely to be deemed a controlled action based on impacts to biodiversity.	**Section 6.1**
Native Title Act 1993	Objective of the Act is to recognise and protect Native Title.	No sites listed on the Native Title register are impacted by the project	**N/A**

Table 26 – NSW Legislation

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
Aboriginal Land Rights Act 1983	Section 36	The NSW Aboriginal Land Council may make a claim for land on its own behalf or on behalf of one or more Local Aboriginal Land Council.	No impacts to land the subject of an Aboriginal land claim as a result of the project	**N/A**
Biodiversity Conservation Act 2016	Section 7.9	Any SSD or SSI application is required to be accompanied by a BDAR unless the Planning and Environment Agency Heads determine that the proposed development is not likely to have any significant impact on biodiversity values.	The proposed development is SSD and has not been assessed by the Planning and Environment Agency Heads. A BDAR is required.	**Section 6.1**
Contaminated Land Management Act 1997	Section 11	The EPA may declare any land it believes to significantly contaminated as significantly contaminated land.	An assessment of the contamination status of the land has been completed and the conclusion is that the land is suitable in its current state for the proposed purpose	**Section 6.10**

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
Electricity Infrastructure Investment Act 2020	Section 19	The Minister may declare a renewable energy zone (REZ) by reference to a specified geographical area of the State and a specified generation, storage or network infrastructure (including planned or existing infrastructure).	The site is located in the Hunter REZ.	**Section 2.1**
Environmental Planning and Assessment Act 1979	Section 1.3	Objects of the Act	The proposed development is consistent with each of the Objects of the Act, with the exception of Object (d) which relates to the delivery and maintenance of affordable housing which is not relevant to this proposal.	**N/A**
	Section 4.15(1)	Consideration of the relevant provisions of any environmental planning instruments	• *State Environmental Planning Policy (Resilience and Hazards) 2021*; • *State Environmental Planning Policy (Transport and Infrastructure) 2021*; • *State Environmental Planning Policy (Planning Systems) 2021*; • *State Environmental Planning Policy (Biodiversity and Conservation) 2021*; and • *Newcastle Local Environmental Plan 2012*.	**Section 4**
		Consideration of the relevant provisions of any proposed environmental planning instruments	No draft environmental planning instruments apply.	**N/A**
		Consideration of the relevant provisions of any development control plans	Development control plans do not apply to SSD by way of clause 2.10 of the Planning Systems SEPP.	**N/A**

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
		Consideration of the relevant provisions of any planning agreements or draft planning agreements	No planning agreements or draft planning agreements apply.	**N/A**
		Consideration of the relevant provisions of the regulations	Refer next section of this table	**This table**
		Consideration of the likely impacts of the development		**Section 6**
		Consideration of the suitability of the site for the development		**Section 7.10**
		Consideration of any submissions made in accordance with this Act or the regulations	The proponent will be required to prepare a Submissions Report in accordance with Appendix C to the SSD Guidelines following the completion of the mandatory public exhibition period.	**N/A**
		Consideration of the public interest		**Section 7.8**
Environmental Planning and Assessment Regulation 2021	Section 23	Requires the consent of all landowners to be obtained for the making of a Development Application.		**Attached to the EIS submission**
	Clause 192	(1) An environmental impact statement must contain the following—		
		(a) a summary of the environmental impact statement,		**Executive Summary**

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
		(b) a statement of the objectives of the development, activity or infrastructure,		**Section 1.2**
		(c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure,		**Section 2.4**
		(d) an analysis of the development, activity or infrastructure, including—		
		(i) a full description of the development, activity or infrastructure, and		**Section 3**
		(ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and		**Section 2.2**
		(iii) the likely impact on the environment of the development, activity or infrastructure, and		**Section 6**

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
		(iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and		Throughout **Section 6** and summarised in **Appendix C**
		(v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out,		**This table**
		(e) a compilation, in a single section of the environmental impact statement, of the measures referred to in paragraph (d)(iv),		**Appendix C**
		(f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development set out in section 193.		**Section 7**
Heritage Act 1977	Section 58	Approval in respect of the doing or carrying out of an act, matter or thing referred to in s 57(1)	No interim heritage order/s or listing/s apply to the site under the State Heritage Register. The proponent will develop an Aboriginal Cultural Heritage Management Plan (ACHMP) following receipt of development consent in consultation with the Registered Aboriginal Parties (RAPs) and	**Section 6.6**

Statutory Reference	Section/Clause	Pre-condition	Relevance	Section in EIS
			the Department of Planning and Environment (DPE) (with input from Heritage NSW)	
Local Land Services Act 2013			No land zoned for rural purposes is affected by the project.	N/A
National Parks and Wildlife Act 1974	Section 90	Grant of Aboriginal heritage impact permit	The results of the ACHHHA indicate that significant Aboriginal cultural heritage values will not be harmed within the study area.	**Section 6.5**
Protection of the Environment Operations Act 1997	Sections 43(a), 43(b), 43(d), 47, 55 and 122	Various environmental protection licences	The NSW EPA were consulted as part of the SEARs process and advised that the project does not require an environment protection licence under this Act.	**Section 5**
Roads Act 1993	Section 138	Various activities within road reserves	The project will utilise the existing connection to Whites Road and no further approval is required under the Roads Act.	**N/A**
Water Management Act 2000	Sections 89, 90 and 91	Water use approval, water management work approval or activity approval under Part 3 of Chapter 3	Whilst works are proposed within 40 metres of a mapped waterway, a Controlled Activity Approval is not required pursuant to Section 91 of the *Water Management Act 2000* (WM Act) by reference to Section 4.41 of the EP&A Act (approvals that do not apply). It is also noted that the mapped waterway does not feature a defined channel, bank or bed and is therefore not considered to represent a waterway by reference to the DPI/NRAR *Guidelines for controlled activities on waterfront land*.	**Section 6.9**

APPENDIX C

MITIGATION MEASURES TABLE

Table 27 – Mitigation Measures Summary

Impacts:	Phase:	Mitigation Measures:
Transport, Traffic and Access	Construction	A Construction Traffic Management Plan (CTMP) will be prepared prior to construction of the site, including: • Road transport volumes, distribution and vehicle types broken down into: – Hours and days of construction. – Schedule for phasing/staging of the project. • The origin, destination and routes for: – Employee and contractor light traffic. – Heavy vehicle traffic. – Oversize and over mass traffic. The following measures will form part of the CTMP to minimise the impact of construction traffic: • Consultation is to be undertaken with developers of other nearby major projects, particularly relating to renewable energy, in order to limit the potential for cumulative traffic impacts during any construction overlap. • Neighbours of the BESS be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access. • Loading and unloading is proposed to occur within the work area. No street or roads will be used for material storage at any time. • All vehicles will enter and exit the site in a forward direction. • Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the labour force. The following code is to be implemented as a measure to maintain safety within the site: – Utilisation of only the designated transport routes. – Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities. • Implementation of a proactive erosion and sediment control plan for on-site roads, hardstands and laydown areas. • All permits for working within the road reserve must be received from the relevant authority prior to works commencing. • A map of the primary haulage routes highlighting critical locations. • An induction process for vehicle operators and regular toolbox meetings. • A complaint resolution and disciplinary procedure. • Local climatic conditions that may impact road safety of employees throughout all project phases (e.g., fog, wet and significant dry, dusty weather).

Impacts:	Phase:	Mitigation Measures:
Transport, Traffic and Access	Decommissioning	A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained during decommissioning.
Biodiversity	Throughout	To compensate for impacts on native vegetation, two ecosystem credits of PCT 1592 (Spotted Gum – Red Ironbark – Grey Gum shrub-grass open forest of the Lower Hunter) are required. The following mitigation measures are also recommended to manage residual impacts: • Design phase: – Detailed design should include adequate design measures for drainage to capture and direct surface flows appropriately. • Prior to and during construction and vegetation clearing: – Clearing limits will be clearly marked to prevent clearing beyond the extent of the disturbance footprint. Tree clearing and disturbance will be limited to the disturbance footprint. – A clearing procedure will be implemented during vegetation clearing in the disturbance footprint as follows: ▪ felling of hollow-bearing trees within the disturbance footprint (Figure 5.1) will follow a two-stage clearing protocol, whereby surrounding non-hollow vegetation is cleared 24 hours prior to the removal of hollow trees to allow fauna time to move; ▪ preclearance surveys will be completed by a suitable quailed person to determine if any nesting birds are present; and ▪ a suitably qualified fauna handler will be present during hollow-bearing tree/log/rock clearing to rescue and relocate displaced fauna if found in the subject land. • Clearing to be undertaken outside of the Powerful Owl breeding period (April-September). Alternatively, a survey is to be undertaken to determine if Powerful Owl is present during breeding period (April-September): – if it is determined the species is not present, clearing can proceed during breeding period, following the above clearing procedure, OR – if Powerful Owl is determined to be breeding in a hollow within or adjacent to the subject land, clearing must not proceed until young birds have fledged • All equipment used during the vegetation clearing and construction of the project, is to arrive clean and weed free. • The interface between the retained vegetation to the east of the disturbance footprint shall be fenced off (as per above requirements) to prevent machinery entering the area. • Once operational, there will be limited vehicle movement, and it will all be contained within the BESS footprint, therefore

Impacts:	Phase:	Mitigation Measures:
		introduction of weeds to adjacent vegetation and habitat is not of concern.
Visual	Throughout	• During construction: – Lighting at the construction compound would be designed and operated in accordance with *AS4282-2019 Control of the obtrusive effects of outdoor lighting*. • During operation: – Lighting at the BESS would be designed and operated in accordance with AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting. – Noise barriers should be painted a dark neutral shade (such as Colourbond Woodland grey) to reduce their prominence in any views to the development.
Noise and Vibration	Pre-construction	Preparation of a Construction Noise and Vibration Management Plan (CNVMP), to be incorporated into the project CEMP.
	Construction	• Implement and maintain the CNVMP throughout the construction of the period. • Limiting the type and scale of concurrent activities undertaken close to sensitive receptors where possible. • Using broad band reversing alarms on all mobile plant and equipment. • Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine. • Operating plant in a quiet and efficient manner. • Reduce throttle setting and turn off equipment when not being used. • Regularly inspect and maintain equipment to ensure it is in good working order including checking the condition of mufflers. The following specific recommendations also apply: • The highest predicted noise level at receptor R1 exceeds the highly affected noise criteria of 75dB(A). It is recommended that a temporary noise barrier be installed during construction to minimise noise impacts experienced at Receptor 1. • A temporary 2m high noise barrier be installed along the northern boundary of the site. The noise barrier could be constructed of individual acoustic panels such as Echo Barriers which attach to fencing or similar. • During work generating high noise levels that have impulsive, intermittent, low frequency, or tonal characteristics, consult with sensitive receptors regularly.

Impacts:	Phase:	Mitigation Measures:
		• During working, following best practice mitigation and staff training regarding excessive noise from machinery use is recommended.
	Operational	• Installation of noise barriers to the north and west of the BESS. The noise barriers are to have a minimum height of 3m with a density of 12/kgm^2 and be free of any gaps. The final height, length and location of the noise barriers will be determined during detailed design to ensure that noise criteria are achieved. • The OEMP will contain a noise sub plan that will set out a complaint handling procedure. In the event, of a complaint being received attended compliance monitoring will be completed at the relevant receiver to assess noise impacts from the development. Outcomes from this monitoring will determine appropriate noise mitigation measures where applicable.
Aboriginal Cultural Heritage	Throughout	Noting that no Aboriginal sites or specific cultural values were identified within the site, recommended mitigation measures are as follows: • Following development consent of the proposal, the proposed work may proceed with caution. In the unlikely event that unexpected Aboriginal heritage items are encountered during works, the unanticipated finds protocol must be enacted, including appropriate procedures to be undertaken in the unlikely event that human remains are encountered. • All land-disturbing activities must be confined to within the study area. Should the parameters of the proposed work extend beyond this, then further archaeological assessment will be required. • All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal heritage items.
Historic Heritage	Throughout	• If items of historic heritage significance are uncovered during the proposal, then the unanticipated finds protocol must be implemented. • All land and ground disturbing activities must be confined to within the study area. Should the parameters of the proposal extend beyond the assessed areas, then further assessment may be required. • All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all historic items.
Hazards and Risks	Throughout	The Riskcon PHA provides the following recommendations: • The minimum separation distance between BESS units shall be 3.1m in compliance with the NFPA 855 guidelines;

Impacts:	Phase:	Mitigation Measures:
		• Prior to construction, the total area required for the BESS Units shall be verified against the available space to demonstrate that there is adequate area to achieve the required spacing; • The BESS containerised units shall be provided with the fire protection system specified by the BESS manufacturer and UL9540A report.
Bushfire	Throughout	• The following mitigation measures would be implemented as per Section 5 of **Appendix J:** • A 10m defendable space (APZ) will be provided between the vegetation hazard and the infrastructure. The entire site will be managed as an Inner Protection Area (IPA) for the life of development. Ongoing management of APZ to IPA standards e.g., fuel free (gravel concrete) or low-cut grass (<10cm). • A Fire Management Plan (FMP) will be developed for the project in consultation with the local NSW RFS District Office. • All buildings will be constructed to the NCC general fire safety provisions. • Either hydrants will be installed to satisfy the provisions of AS50 AS 2419.1:2005, or alternatively, a minimum 10kL static water supply and hard stand will be supplied. • Any electrical sub-transmission lines will either be underground and/or to Ausgrid power line design specifications. • If gas is installed, its services are to be maintained in accordance to AS/NZS 1496:2014. • It is noted that the existing access to the site meets the relevant standards and no further actions required. • Any new internal roads will provide for safe, reliable, and unobstructed passage by a Category 1 firefighting vehicle within acceptable operational limits as per Section 4.7 of the bushfire assessment (**Appendix J**) and will be maintained for the life of the development. • A Fire Management Plan (FMP) will be developed for the project in consultation with the local NSW RFS District Office at Section 4.8 of **Appendix J**.
Water and soils	Prior to construction	• Detailed design is to limit excavation to less than 1m. If this level is exceeded, an ASSMP is to be prepared and implemented throughout the construction phase of the project, • Ensure the detailed design incorporates all necessary measures from a Construction Erosion and Sediment Control Plan (ESCP) and Soil and Water Management Plan (SWMP) and (if required) an Acid Sulfate Soils Management Plan (ASSMP). The ESCP/SWMP would include measures to address the following principles: – Limiting the area and time of disturbed areas.

Impacts:	Phase:	Mitigation Measures:
		– Gentle grades, and a combination of progressive revegetation and surface cover across the site once disturbed. – Sediment sumps (including appropriate drainage). – Clean water diversions and sediment fencing. – Prepare a project CEMP to address the above matters together with the following: ▪ Ensure adequate provision of accident documentation. ▪ Achieve water quality compliance with SEARs. ▪ A Spill Management Plan, including emergency response and EPA notification procedures. ▪ Speed limit of 40km/hr on site. ▪ Application of binders to road surfaces as required.
	Construction	• Implement all measures from ESCP and SWMP. • Minimise all ground disturbance where possible. • Minimise construction activities during wet weather conditions. • Retain, stockpile, treat for weeds and ameliorate all disturbed or excavated soil, with all topsoil and subsoils stockpiled separately and returned in order. • Return stockpiled soil and cleared vegetation or organic matter to its original location (where possible) as soon as reasonably practicable. • Undertake rehabilitation and revegetation in accordance with an appropriate landscape, revegetation or rehabilitation plan prepared by a suitably qualified professional. • Ensure rehabilitation is undertaken progressively to minimise the total disturbance area at any one time. – Wastewater during construction will be captured and appropriately removed from site/disposed. – Toilet facilities will involve waterless toilets that are emptied off-site.
	Operation	• Implement and maintain a project OEMP, including: – Implement and maintain all operational requirements of the SWMP. – Implement and maintain a Spill Management Plan, including emergency response and EPA notification procedures. – With respect to the potential for leakage from batteries: ▪ All batteries will be enclosed from weather and any fluids will be fully bunded. ▪ Regular inspection of batteries which will identify any issues with leakages. – With respect to the potential for spillage of hydrocarbons, chemical and fuels

Impacts:	Phase:	Mitigation Measures:
		▪ Storage of chemicals in accordance with Australian Standards. ▪ Storage of hydrocarbon fuels within bunded storage areas. ▪ Bunding of substations, transformers or other infrastructure that utilise oil. ▪ Minimise usage of herbicides and avoid spraying when rain is predicted. ▪ OEMP to identify requirements for water quality monitoring and reporting. ▪ Progressive rehabilitation of surfaces as installation and removal of batteries proceeds across the site.
	Decommissioning	• Prepare an appropriate decommissioning management plan that incorporates appropriate soil management to return the site to existing or improved land and soil capability. • Specific soil management practices should be determined at the time of decommissioning but would include preparation of an ESCP/SWMP • Temporary ground cover and revegetation after removal of BESS.
Other Land Resources and Land Uses	Throughout	Mitigation measures are reflective of those recommended throughout the range of specialist reporting prepared to support the proposal and are summarised in **Appendix C**. • Grouting of underlying historic mine workings as recommended by the Douglas Partners grout estimate memo and through detailed design; • Consultation with TfNSW with respect to any nearby large projects in the event of construction timing overlaps; • Ongoing engagement with receivers in the industrial area to the south (R2, R6, R7, R9, R14, R15, R21, R39, and R43) to ensure that access during construction is always maintained; • Construction of noise barrier/embankment in the north of the site to ensure compliance with the relevant noise criteria under the NPfI during operations; and • Implementation of all reasonable and feasible noise management measures during construction of the project in accordance with the ICNG.
Social	Throughout	The SIA recommends that the following actions be adopted in order to enhance potential benefits and mitigate potential social impacts: • Develop and implement a local procurement policy that aims to engage the local construction workforce and relevant suppliers. • Develop and implement a complaint handling process prior to construction. • Develop a website as a central source of information

Impacts:	Phase:	Mitigation Measures:
		• Adopt the technical mitigation measures identified in other technical reports.
Air Quality	Pre-construction	Development of a dust management plan as a sub-plan to the site-specific CEMP, including (but not limited to) measures as set out in the following sections.
	During Construction and Decommissioning	• A water cart (truck) would be utilised routinely, wetting all access roads/tracks and exposed dusty surfaces as appropriate to the conditions of the site. • Stockpiled topsoil and other materials that exhibit significant dust lift off would be wet down routinely and as appropriate. • Stabilising techniques and/or environmentally acceptable dust palliatives will be utilised if the wetting down of surfaces prove to be ineffective.
	During Operation	• Any area that was temporarily used during construction would be restored back to original condition or re-vegetated with native plants. • Areas that may not have been hard packed but have been disturbed in some form would be vegetated with seeds native to the area.
Waste	Throughout	A Waste Management Plan for all phases of the project would be prepared and implemented prior to the commencement of any works on the site.
Cumulative Impacts	Throughout	The following mitigation measures are recommended to limit the potential for cumulative impacts associated with the project: • Construction noise impacts would be addressed in a Noise Management Plan. Consultation with key proponents of nearby projects, would be completed to determine if construction activities may take place near adjoining projects. Where possible, noise generating activities would be scheduled for different areas of the proposal site to avoid cumulative construction noise impacts. • If there is potential for construction of multiple projects to occur in and around Beresfield/Thornton/Black Hill at the same time, and large workforce numbers are required, consideration would be given to alternative accommodation options such as neighbouring towns.

APPENDIX D

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

APPENDIX E

TRAFFIC IMPACT ASSESSMENT

APPENDIX F

VISUAL IMPACT ASSESSMENT

APPENDIX G

NOISE IMPACT ASSESSMENT

APPENDIX H

ABORIGINAL CULTURAL HERITAGE AND HISTORIC HERITAGE ASSESSMENT

APPENDIX I

PRELIMINARY HAZARD ASSESSMENT

APPENDIX J

BUSHFIRE ASSESSMENT

APPENDIX K

WATER ASSESSMENT

APPENDIX L

SOIL CONTAMINATION ASSESSMENT

APPENDIX M

SOCIAL AND ECONOMIC IMPACT ASSESSMENT

APPENDIX N

MINE SUBSIDENCE ASSESSMENT

APPENDIX O

TITLE SEARCHES

Premise