



Appendix J

Bushfire Risk Assessment Report

Battery Energy Storage System - Jindera

FOR: BESS Atlantic Pty Ltd c/o Gransolar Development Australia Pty Ltd

SLR PROJECT No: 620.041088.00015

Revision: 1.0



Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
R01-v1.0	22 May 2025	Dr Peter Georgiou	Dr Craig Simpson	Dr Craig Simpson

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with BESS Atlantic Pty Ltd c/o Gransolar Development Australia Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been engaged by BESS Atlantic Pty Ltd c/o BESS Atlantic Pty Ltd c/o Gransolar Development Australia Pty Ltd (the Client) to undertake a Bushfire Risk Assessment (BRA) for a proposed 250 Megawatts (MW) / 500 Megawatt-Hours (MWh) Battery Energy Storage System (BESS) and associated infrastructure, herein the "Project", to be located adjacent to the existing Jindera 330/132 kilovolt (kV) Transmission Substation:

- The BESS component of the Project would be located within a portion of Lot 204, DP753342 204 Ortlipp Road, Glenellen, NSW.
- The BESS will connect to the adjacent Jindera Substation via a transmission line, whose proposed easement forms part of the Project.
- The Project therefore also includes the substation land located on Lot 1 DP588720, 140 Ortlipp Road, Jindera, NSW as well as a section of unformed Crown Road Reserve (for the proposed transmission line easement) between the two main Ortlipp Road lots.
- A 4 m high acoustic barrier will be constructed along the north and west perimeters of the BESS portion of the Project.
- Associated ancillary infrastructure will include security fencing, landscaping, access and internal roads, water tanks and temporary parking.
- Finally, the Project will involve extension of the Council water main along a portion of Ortlipp Road and upgrade of the existing water main along Lindner Road.
- The Project lies within the Greater Hume Shire Council Local Government Area (LGA).

The Project is deemed to be a State Significant Development (SSD) and therefore requires assessment and approval in accordance with Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (NSW). The Environmental Impact Statement (EIS) being prepared for the Project will address the requirements of the Secretary of the NSW Department of Planning, Housing and Infrastructure, known as the Secretary's Environmental Assessment Requirements (SEARs), as per SSD-68815961 (issued 18 April 2024).

This Bushfire Risk Assessment Report responds to the SEARs for the Project and forms part of the EIS submission for the Project.

Bushfire Risk

The development site is identified as being within bushfire prone land – refer Section 3.1.

Accordingly, a comprehensive Bushfire Risk Assessment (BRA) has been undertaken for the Project.

Vegetation Characteristics at the Site Relevant to Bushfire Risk

A Biodiversity Development Assessment Report (BDAR) has been prepared to accompany the development application of the Project – refer Section 3.3.

The outcome of the BDAR assessment was used to determine the vegetation types immediately surrounding the Project for the determination of the BAL (Bushfire Attack Level) of the Site.



BAL (Bushfire Attack Level)

In Section 4.0 of this report, BAL calculations were made for the Site.

Compliance with PBP-2019 (NSW RFS, *Planning for Bushfire Protection*, November 2019) for residential development would be achieved with a target BAL-29 level – related to the ability of buildings to withstand a bushfire until firefighting resources arrive on site in an emergency.

For the Jindera BESS site, subject to PBP-2019 Section 8, the more stringent BAL-12.5 level has been recommended as this would ensure that the maximum exposure at any point of a facility will be below 10 kW/m².

This will ensure the safety of firefighters and other emergency workers to safely defend the facility, evacuate personnel if needed and allow access to and from all areas within the Site, appropriate for critical infrastructure required to survive an emergency scenario such as a major bushfire.

APZ (Asset Protection Zone) at the Site

The resulting APZ distances for the proposed development are shown in Figure 13.

Bushfire Risk Mitigation

Section 5 of this report details the management and mitigation measures that address bushfire risk at the site – including the following:

- Asset Protection Zones (APZs) to minimise the impact of radiant heat and flame contact – refer Section 5.1.
- Construction Standards and Design to minimise building vulnerability to bushfire flames, radiation and embers – refer Section 5.2.
- Access and egress for the public and for firefighters and their equipment – refer Section 5.3.
- Adequate water supply for fire suppression – refer Section 5.4.
- Vegetation management – refer Section 5.7.

Bushfire Management Plan (BMP)

Section 6 details the requirements of the BMP that will be developed during detailed design stage and the need to align the BMP with other key emergency response plans that would be developed during the detailed design phase of the project.

Summary

Taking into account the above, SLR has concluded that:

- Bushfire risk issues at the site can be adequately mitigated.
- The Project will be adequately protected from the threat of a bushfire event.

In terms of the usual “Risk Matrix” approach adopted for Hazard Studies, SLR considers the residual risk associated with Bushfire hazard to the proposed development to be **LOW/MINOR**, and hence adequately mitigated and managed.



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Appendix A Vegetation Descriptions taken from AS3959:2018



Acronyms and Abbreviations

APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BRA	Bushfire Risk Assessment
BMP	Bushfire Management Plan
FDI	Fire Danger Index
FTE	Full-Time Equivalent
LGA	Local Government Area
RFS	Rural Fire Service
SEARs	Secretary's Environmental Assessment Requirements
SLR	SLR Consulting Australia Pty Ltd
SSD	State Significant Development
TL	Transmission Line
VMP	Vegetation Management Plan

Units

kL	Kilolitre (1,000 litres)
km	Kilometre (1,000 metres)
kV	Kilovolt (1,000 volts)
kVA	Kilovolt Amps
kW	Kilowatt (1,000 watts)
m	Metre
MW	Megawatt (1 x 10 ⁶ watts)
MWh	Megawatt-Hour



1.0 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by BESS Atlantic Pty Ltd c/o BESS Atlantic Pty Ltd c/o Gransolar Development Australia Pty Ltd (the Client) to undertake a Bushfire Risk Assessment (BRA) for a proposed 250 Megawatts (MW) / 500 Megawatt-Hours (MWh) Battery Energy Storage System (BESS) and associated infrastructure, herein the “Project”, to be located adjacent to the existing Jindera 330/132 kilovolt (kV) Transmission Substation.

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- A 4 m high acoustic barrier will be constructed along the north and west perimeters of the BESS portion of the Project.
- Associated ancillary infrastructure will include security fencing, landscaping, access and internal roads, water tanks and temporary parking.
- Finally, the Project will involve extension of the Council water main along a portion of Ortlipp Road and upgrade of the existing water main along Lindner Road.
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The Project is deemed to be a State Significant Development (SSD) and therefore requires assessment and approval in accordance with Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (NSW).

The Environmental Impact Statement (EIS) being prepared for the Project will address the requirements of the Secretary of the NSW Department of Planning, Housing and Infrastructure, known as the Secretary’s Environmental Assessment Requirements (SEARs), as per SSD-68815961 (issued 18 April 2024).

The specific study area addressed in this BRA falls under SEARs “Key Issues/Hazards”:

- *Bushfire* - identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a BESS would cause a bush fire and demonstrate compliance with the RFS *Planning for Bush Fire Protection 2019*; and



1.1 Structure of Report

The remainder of this BRA report is structured as follows:

- Section 2.0 Description of the Project
- Section 3.0 Site and Surrounds: Vegetation and Ground Slopes
- Section 4.0 Bushfire History, Bushfire Zoning of the Site and determination of the BAL (Bushfire Attack Level) and APZ (Asset Protection Zone) for the Project.
- Section 5.0 Bushfire Mitigation and Controls, including recommendations for the Project's Bushfire Management Plan
- Section 6.0 Summary and Conclusions

1.2 Relevant Regulatory Documents

The BRA has been undertaken in accordance with the following regulatory standards and guidelines (listed alphabetically by sub-section):

Australian Standards (AS)

- 1 AS 3959-2018, *Construction of Buildings in Bushfire-Prone Areas*, incorporating amendments 1 and 2, 2018.

Greater Hume Shire Council

- 1 Greater Hume Shire Council, *Bushfire Map*, 2011.
- 2 Greater Hume Shire Council, *Development Control Plan 2013*, amdt March 2014.
- 3 Greater Hume Shire Council, *Local Environmental Plan 2012*.

NSW Department of Planning

- 1 NSW Department of Planning, Draft Bushfire Policy for Land Use Planning (2024).
- 2 NSW Department of Planning, Draft (updated) Local Planning Direction 4.3, Planning for Bushfire Protection (2024).
- 3 NSW Department of Planning, Draft (updated) Bushfire Planning System Circular (2024).

NSW Rural Fire Service (RFS)

- 1 NSW RFS, *10/50 Vegetation Clearing Code of Practice for New South Wales*, September 2015.
- 2 NSW RFS, *Bushfire Environmental Assessment Code*, July 2021.
- 3 NSW RFS, *Bushfire Environmental Assessment Code – Supporting Document: Burning Adjacent to Powerline Guidelines*, July 2021.
- 4 NSW RFS, *Fire Trail Standards*, v2.0 November 2023.
- 5 NSW RFS, *Local Government Areas FDI*, May 2017.
- 6 NSW RFS, *Planning for Bushfire Protection*, November 2019.
- 7 NSW RFS, *Planning for Bushfire Protection Addendum*, November 2022.



2.0 Description of the Project

2.1 Site Location

The Jindera BESS, herein “the Project”, will involve the development, construction, operation, and eventual decommissioning of a BESS with a capacity of 250 MW/500 MWh connecting via transmission line directly to the existing Jindera 330/132 kV Substation, operated by Transgrid – refer Figure 1:

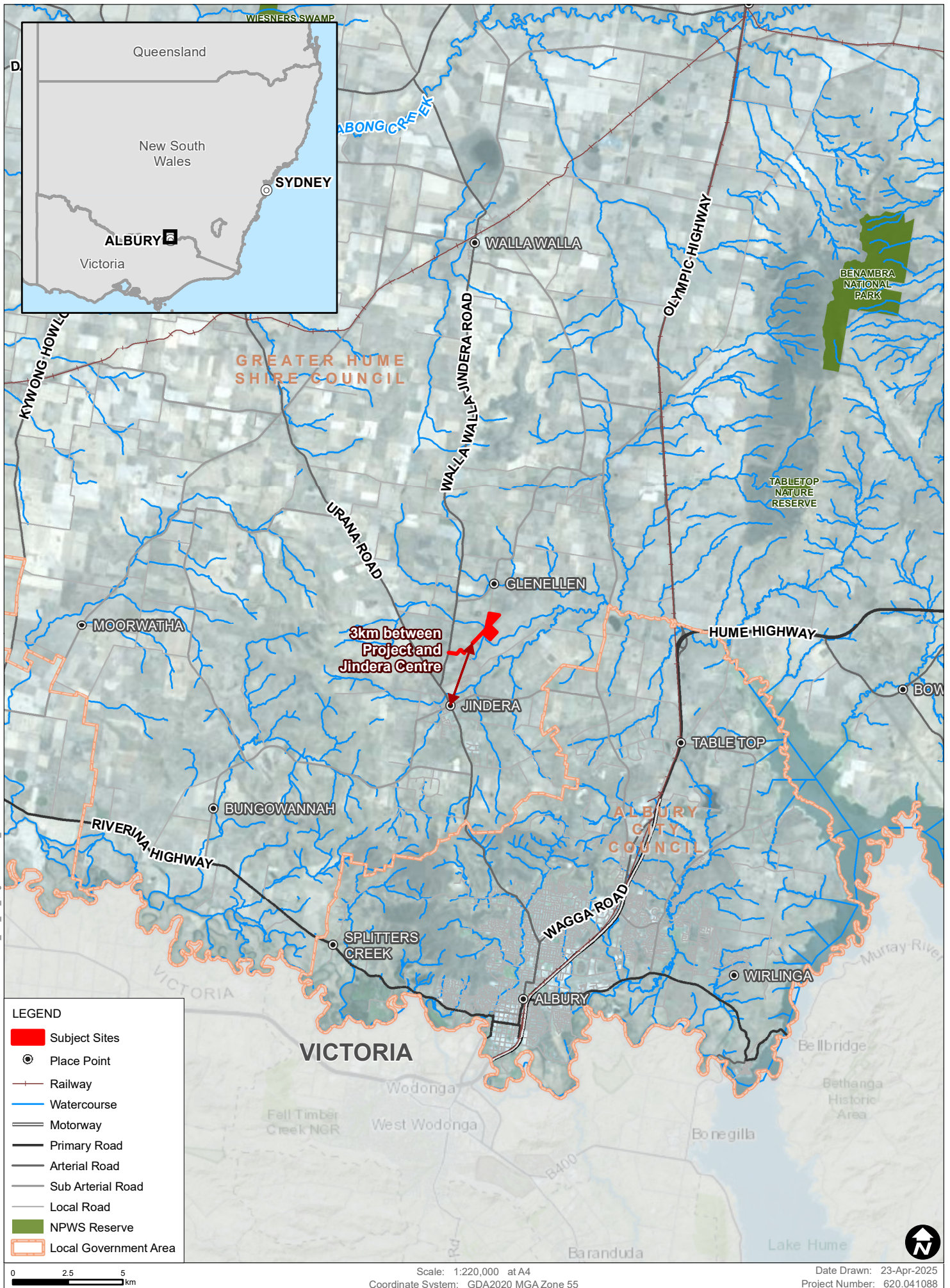


Figure 1 Jindera BESS Site Location

- The BESS is proposed on Lot 204 DP 753342 at 204 Ortlipp Road, Glenellen NSW 2642 - herein the “BESS Site”.
- The existing Jindera Substation lies within Lot 1 DP 588720, 140 Ortlipp Road, Jindera NSW 2642 - herein the “Substation Site”.
- The BESS will be connected to the nearby substation via a dedicated Transmission Line (TL) which will traverse an area of unformed Crown Road Reserve, located between the BESS Site and Substation Site.



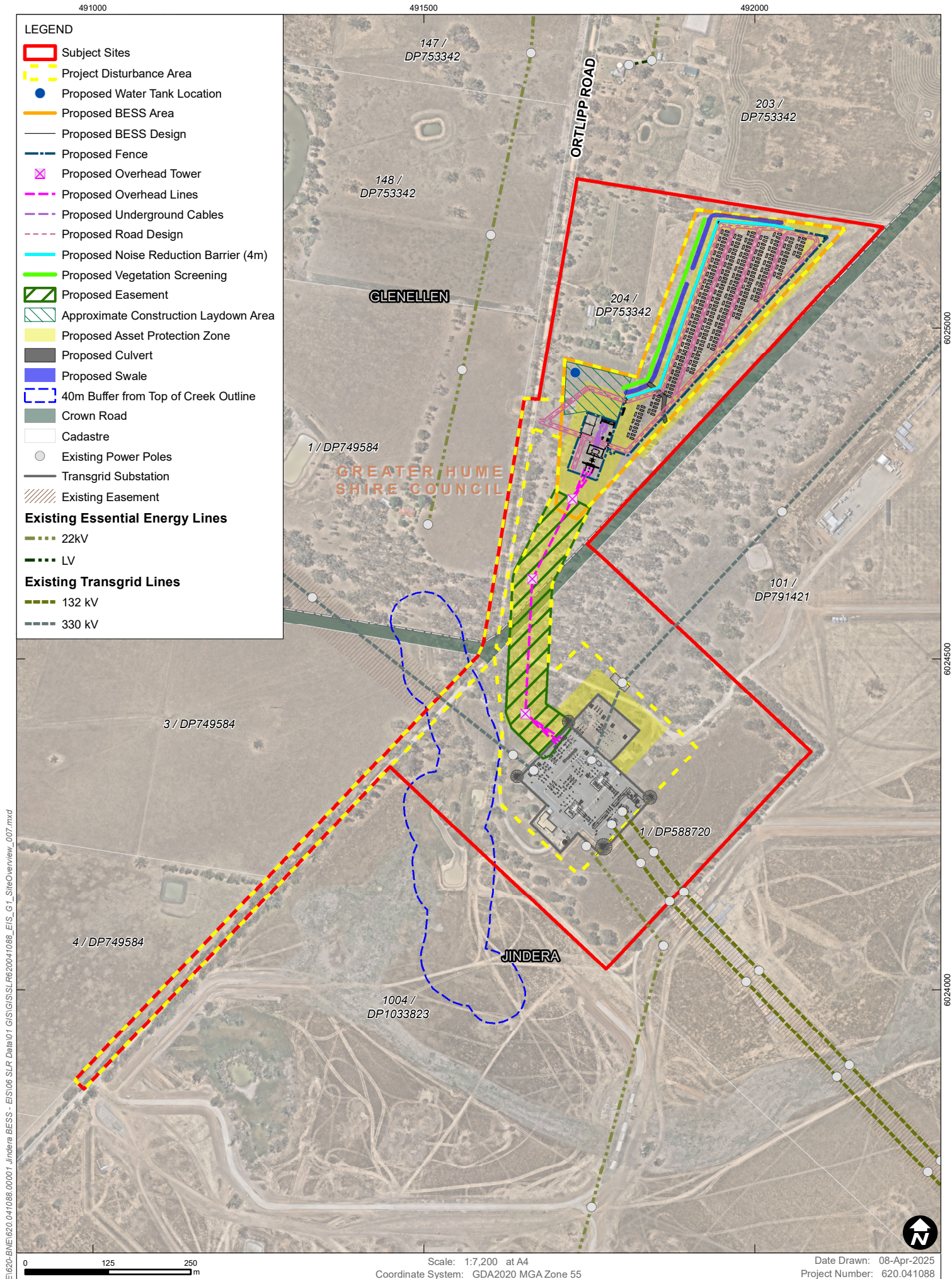
H:\Projects\SLR\620-BNE\620-BNE\620.04\1088-00001 Jindera BESS - EIS\06 SLR Data\01 GIS\GIS\SLR\620-04\1088-EIS_G4_RegionalContext_001.mxd



2.2 Project Site Layout

The layout of the Project is shown in Figure 2 and Figure 3.





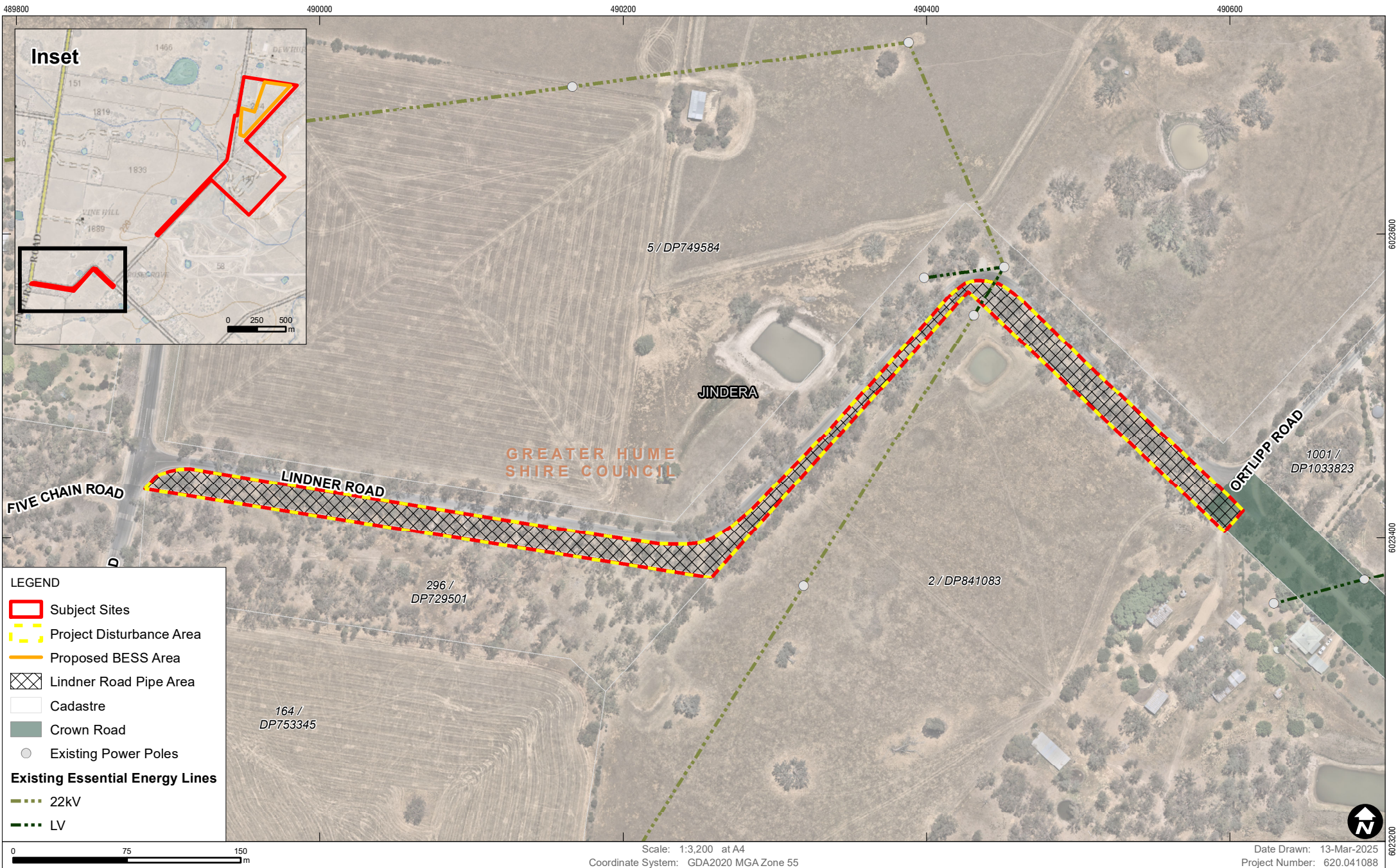
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Data Source: basedata supplied by NSW SS, June 2024
 Aerial imagery supplied by Nearmap, November 2024
 Other data sources include Gransolar Group, Look up & Live (LUAL)

Site Overview

FIGURE 2



Data Source: basedata supplied by NSW SS, June 2024
Aerial imagery supplied by Nearmap, November 2024
Other data sources include Gransolar Group, Look up & Live (LUAL)



Lindner Road Overview

FIGURE 3

2.3 Development Description

2.3.1 Construction

It is anticipated that the construction and commissioning phase will last approximately 10 months, involving up to 80 full-time equivalent (FTE) jobs required during the peak of site activity, and with the following key Project elements:

- Transport of construction personnel, associated heavy and light vehicles, and materials to and from the Subject Sites - on a day-to-day basis, dependent on the construction schedule.
- Site establishment works including vegetation clearing as approved, bulk earthworks, and a temporary construction compound.
- Roadworks to formalise internal site access roads to accommodate heavy vehicles and a new driveway crossing and temporary upgrades to Ortlipp Road.
- Construction of hardstand, all-weather internal roads, control room and switch gear, auxiliary transformer, battery enclosures, and inverter and transformer stations.
- Construction of an overhead 330 kV transmission line to facilitate connection to the existing Jindera Substation and associated high voltage steel poles.
- Construction of a 4 m high acoustic wall.
- Extension of the Council water main along a portion of Ortlipp Road and upgrade of the existing water main along Lindner Road.
- Ancillary works including parking; on-site reticulated water supply connection serving a 150 kL water tank dedicated for firefighting; one container used as a storage structure for ongoing use; stormwater management infrastructure; and security lighting and fencing.
- Removal of temporary construction facilities, and rehabilitation of disturbed areas prior to operation of the Project.

2.3.2 Operation

The Project is proposed to self-operate 24 hours a day / 7 days a week and will be monitored remotely throughout this time.

- During operation, it is anticipated that approximately two FTE job will be required for the ongoing monitoring, maintenance and management of equipment, site buildings and landscaping, as well as administration and waste removal tasks.
- The BESS will require periodic maintenance by authorised staff.
- Otherwise, the facility is restricted to the public.
- Emergency response and maintenance activities may be required to be undertaken out of hours.

Key Access Characteristics:

- Access to and from the BESS site would be provided from a new driveway crossover from Ortlipp Road, with primary access from the south (Jindera) along Ortlipp Road, as well as back-up access from the north (Glenellen) if required.



- The proposed internal roads will accommodate firefighting access during an emergency situation.

2.3.3 BESS Units

Essential specifications for the proposed BESS units are shown in Table 1, with an example of a BESS module installation shown in Figure 4.

Table 1 BESS Specifications

Specification	Detail
Number of enclosures	Up to 200 battery enclosures (6m length container frame) Each battery rack consists of 418 battery cells. Each battery enclosure contains up to 10 racks connected in parallel
Dimensions	6 m containers: 6.058 m x 2.438 mx 2.891 m
Weight	35,000 kg each
Inverters	100 Inverters (3600 kVA)

An indicative image of a BESS site is shown in Figure 4.

Figure 4 Indicative Image of BESS Modules



2.3.4 Transmission Line (TL)

A new overhead 330 kV transmission line will be constructed to connect the BESS Site (and its own substation) to the existing Jindera Substation to the south.

- The TL connection will be facilitated via above-ground transmission lines.
- A 60 m width easement is proposed for the new TL.
- The TL route will run south-southwest from the southern perimeter of the BESS Site, transecting an unformed Crown Road Reserve before entering the Substation Site.
- The TL will be supported on towers approximately 30 m in height with a minimum (ground) clearance of 7.5 m – three towers are proposed to facilitate the route of the new transmission line.

2.3.5 Removal of Vegetation

Although the majority of the Subject Sites comprise cleared pasture lands, the proposed access road, internal roads and connecting transmission line route and associated easement will require the clearing of some areas of native vegetation.

2.3.6 Ancillary Infrastructure

The following ancillary infrastructure will be undertaken in conjunction with the BESS:

- Earthworks.
- Stormwater Management works.
- Temporary Construction Facilities.
- Landscaping.

Fencing and Lighting

- The BESS site would be secured by chainmesh security fencing, up to 2.1 m in height.
- An acoustic barrier is proposed along the western perimeter and a portion of the northern perimeter of the BESS Site.
- Boundary lighting will be installed for security purposes.

Water Usage

Water will be required during the construction phase for dust suppression, general construction, and maintenance activities. This water will be brought to site in water tankers. Construction water requirements for the Project are proposed to be sourced from council's bulk water supply.

Wastewater during construction will be captured and appropriately removed from site and disposed of in accordance with the council/water authority requirements. Potable water may be transported to site in bottles for use by the construction workforce. If utilised, toilet facilities will involve waterless toilets (or equivalent) that are emptied off-site.

As previously noted, the council water main will be extended along a portion of Ortlipp Road and the existing water main along Lindner Road will be upgraded. This will enable reticulated water to service the proposed 150 kL water tank located at the entry to the Site. Water tank fittings and connections for fire appliances will comply with PBP-2019 and AS 2419.1:2021.



The 150 kL water tank dedicated for firefighting purposes will be constructed at an early stage of the Construction phase. This tank will not be used for other activities but remain available for firefighting purposes only, during construction and subsequently operation.

2.4 Decommissioning

The operational life of the Project will be determined by the evolving nature of the technology. It is anticipated that the lifespan will be approximately 20 to 25 years.

At end-of-life, the Project would be decommissioned, and the infrastructure removed, with the Subject Sites returned as close as possible to their original state and use.

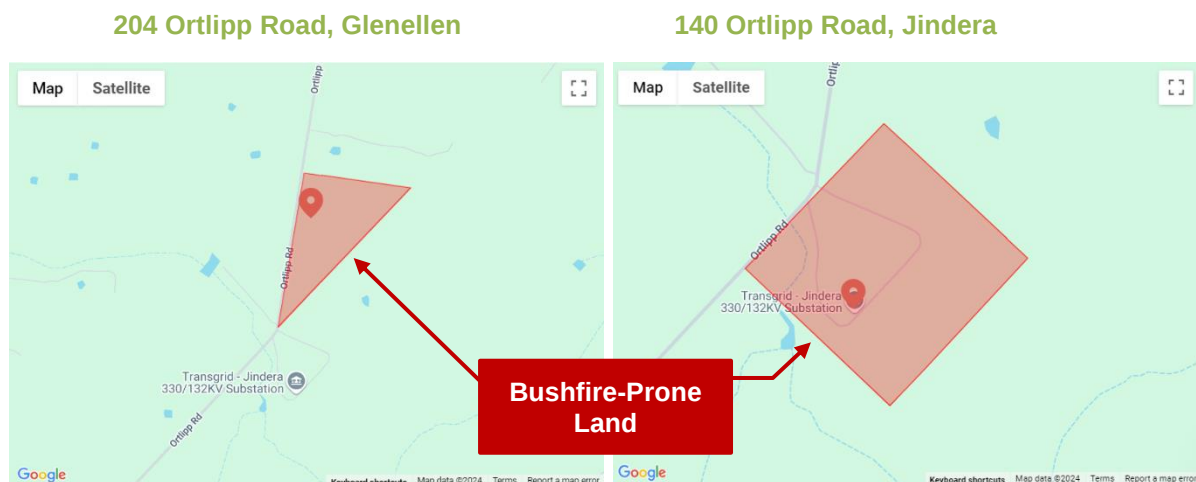


3.0 Characteristics Relevant to Bushfire Risk of the Site and Surrounds

3.1 Bushfire Prone Land

A search on the NSW Rural Fire Service (RFS) website, using the RFS mapping tool, revealed that the Subject Sites are identified as being within bushfire prone land – refer Figure 5. Accordingly, a comprehensive Bushfire Risk Assessment (BRA) has been undertaken for the Project.

Figure 5 RFS Bushfire Mapping Tool – Bushfire Prone Land

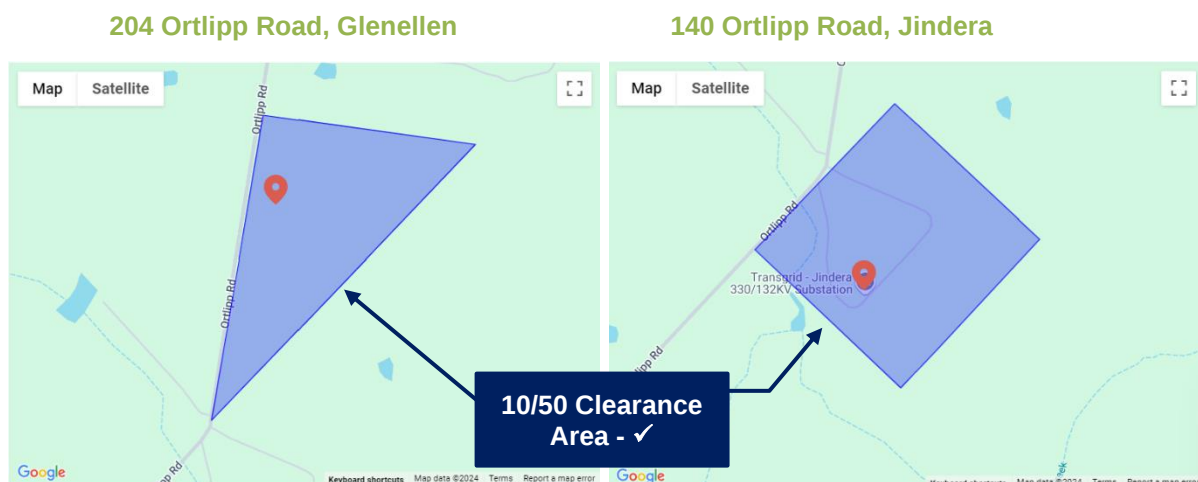


Source: bushfireprone.mapping@rfs.nsw.gov.au

3.2 Designated 10/50 Vegetation Entitlement Clearing Area

The NSW RFS mapping tool also indicates that the Subject Sites are identified as being within designated 10/50 vegetation entitlement clearing areas – refer Figure 6 – relevant to ongoing APZ management.

Figure 6 RFS Bushfire Mapping Tool – 10/50 Clearing Areas



Source: bushfireprone.mapping@rfs.nsw.gov.au



3.3 Vegetation Characteristics of Site and Surrounds

A Biodiversity Development Assessment Report (BDAR) has been prepared to accompany the development application of the Project. The following are some relevant key findings of the BDAR in relation to this Bushfire Risk Assessment.

- The Subject Sites contains PCT 277 Blakely's Red Gum - Yellow Box Grassy Tall Woodland, which also constitutes a threatened ecological community under the *Biodiversity Conservation Act 2016*.
- The Project will likely involve direct clearing of native vegetation and removal of limited areas of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, e.g. for the proposed transmission line easement – refer Figure 2.
- Measures will be required to avoid and minimise the above impacts, including a detailed Vegetation Management Plan (VMP) covering all stages of the Project through to decommissioning. Preliminary offset requirements for an approximated 1.3 hectares of clearing are included in the BDAR.

Representative photos of the above are shown in Figure 7.

Figure 7 Representative Site Photos of Surrounding Vegetation

View from Ortlipp Road Towards Jindera Substation



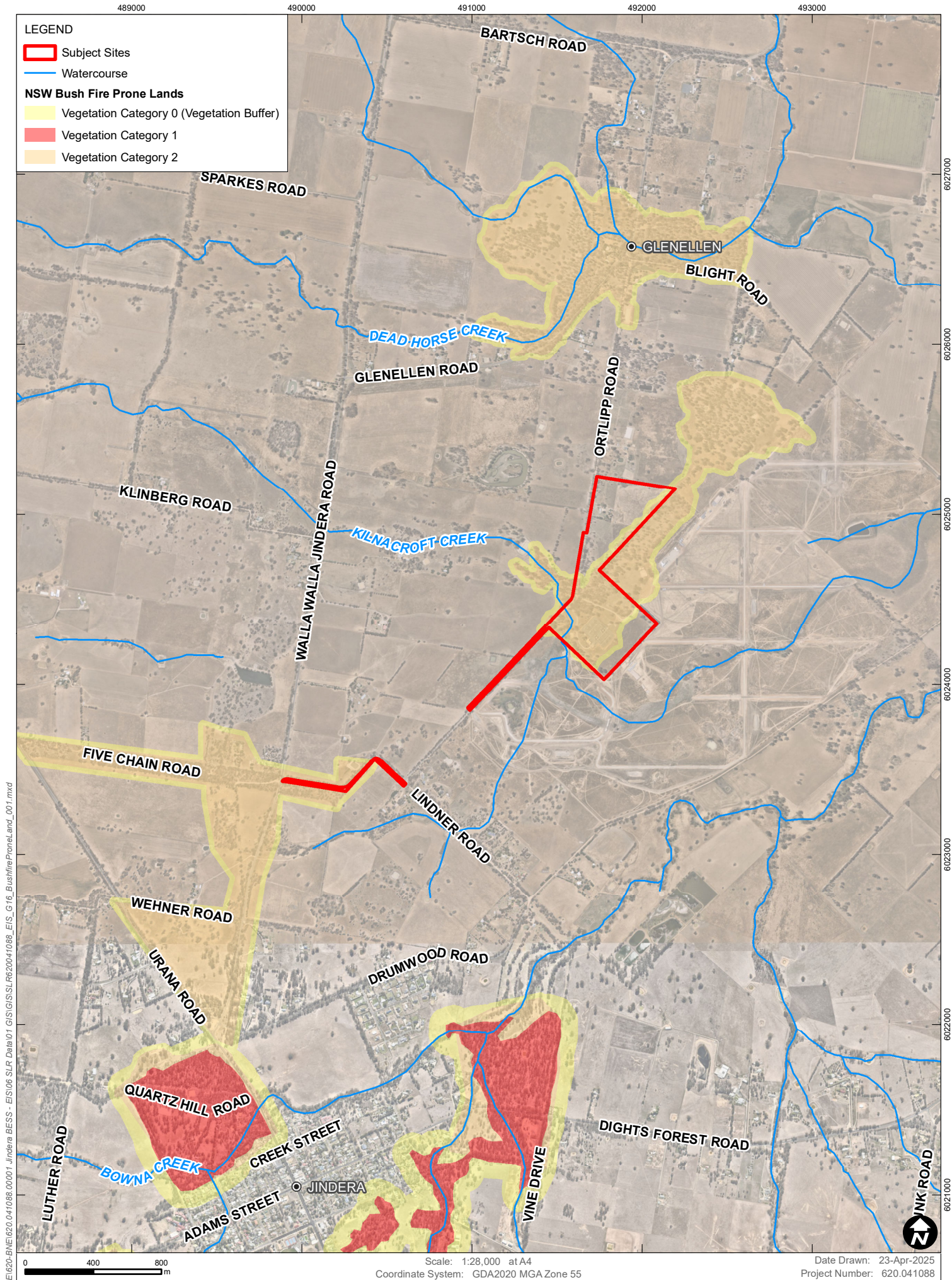
Typical Mix of Grassland and Woodland at Northern End of Site



The general description above is reflected in the Vegetation Zoning found within the mapping tool of NSW Department of Planning e-Planning (Map Service 7) – refer Figure 8.

<https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>





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Data Source: basedata supplied by NSW SS, June 2024
Aerial imagery supplied by Neamap, November 2024
NSW Bush Fire Prone Land, NSW Rural Fire Service, 2025
Other data sources include Gransolar Group

Bushfire Prone Land

FIGURE 8

The following is noted:

- Vegetation Category 2 is found to the northeast, east and south of 204 Ortlipp Road, Glenellen. This vegetation lies partly within the eastern boundary and southern corner of the lot. Vegetation Category 2 is found both within and to the northwest and northeast of 140 Ortlipp Road, Jindera.
- This aligns with the PCT 277 vegetation category identified in the BDAR report.

According to NSW RFS *Guide for Bushfire Prone Land Mapping* (Version 5b, 2015):

- Vegetation Category 2 consists of rainforests or lower risk vegetation parcels which represent a lower bushfire risk, with lower combustibility and/or limited potential fire size due to the vegetation area shape and size, land geography and management practices.
- Vegetation Category 2 is to be given a 30 m buffer – note that this impacts the southeastern boundary of the BESS portion of the facility, including its substation, as well as the TL connecting to Jindera Substation.

3.4 Bushfire History

The NSW Government SEED initiative mapping tool documents historical NPWS wildfires in NSW. The results for the broad area surrounding the Project are shown in



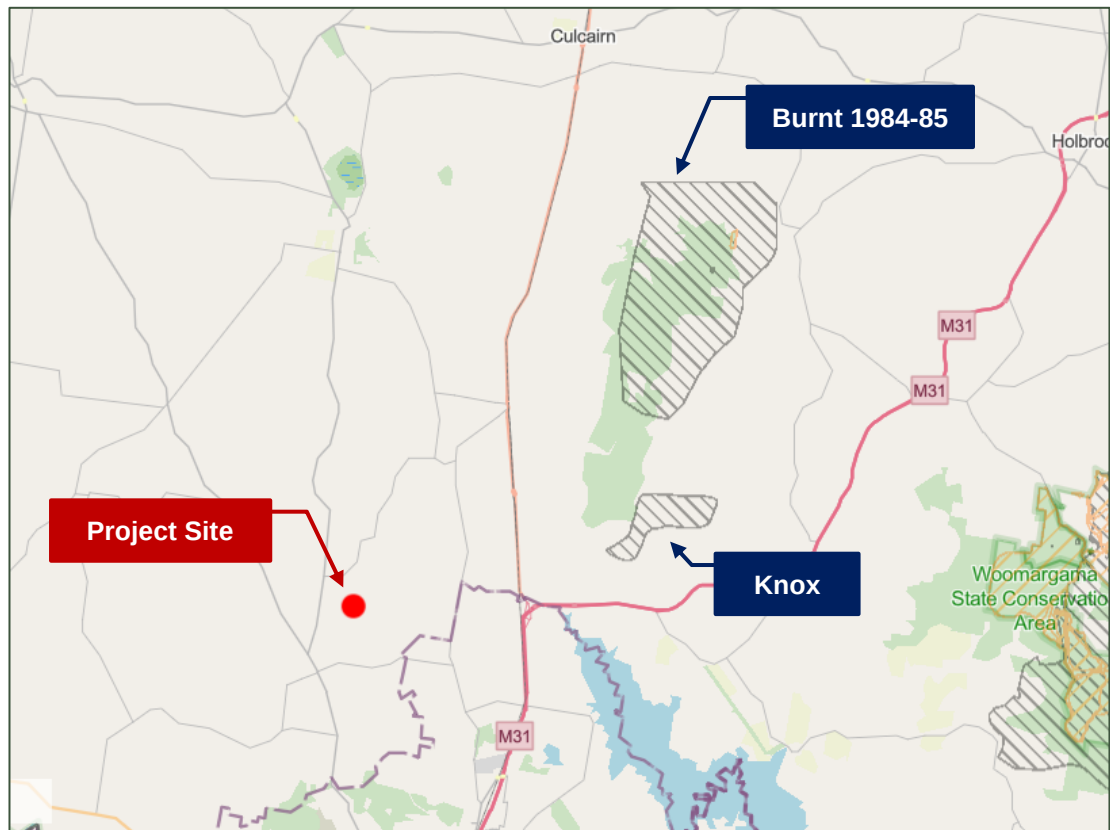
Figure 9.

The two nearest document wildfire events are:

- “Knox” Wildfire – southern tip of Benambra National Park:
 - November 2006 806.7 ha
 - Approximately 14 km east of the Project site at closest point.
- “Burnt 1984-1985” Wildfire – northern half of Benambra National Park:
 - January 1985 6,453.8 ha
 - Approximately 18 km northeast of the Project site at closest point.



Figure 9NPWS Wildfire Events – Fire Historical Database (SEED Mapping Tool)



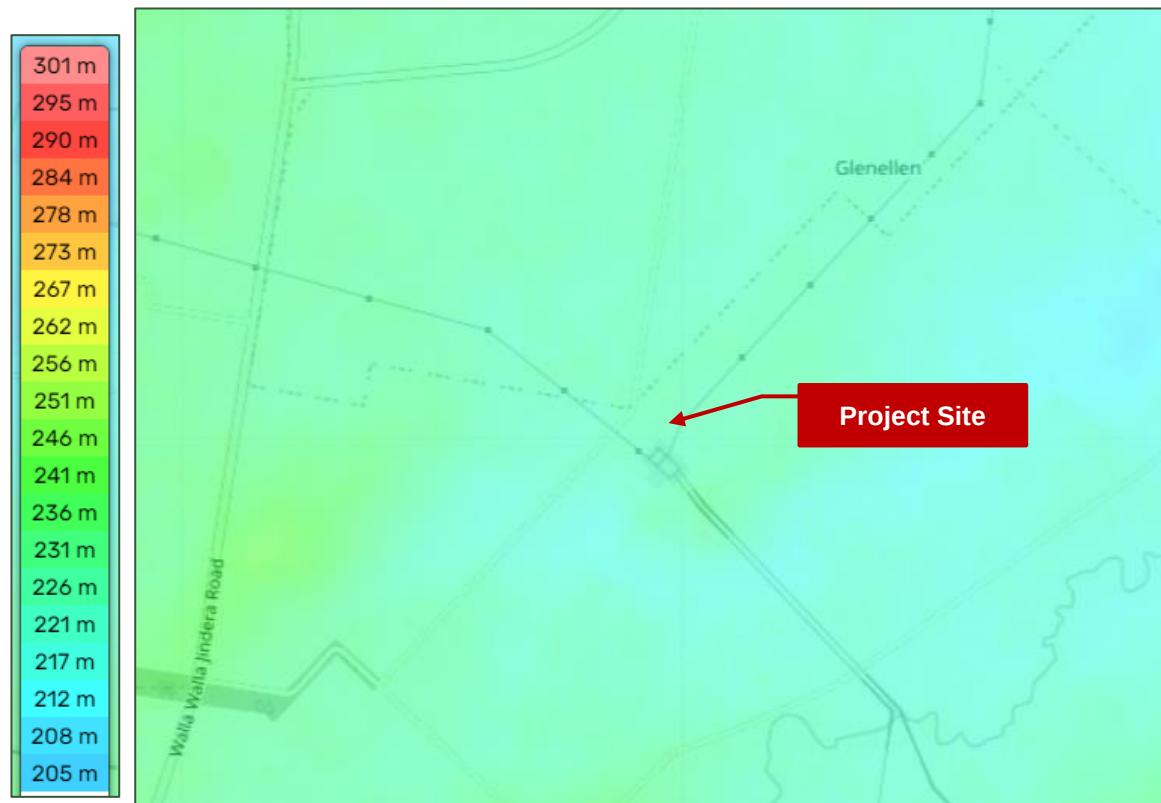
The absence of documented wildfires indicated by the SEED mapping tool is in line with the generally lower bushfire risk profile of the site and surrounds as suggested in Figure 8.



3.5 Topography of the Site and Surrounds

As shown in the site photos in Figure 7 and the relief map shown in Figure 10, the topography surrounding the Project is generally flat. The maximum variation in elevation across the site is approximately 5 m (RL.225m to RL.220m) over a distance of 1 km from north to south.

Figure 10 Topography of Site and Surrounds



In terms of bushfire risk, the immediate land surrounding the Project site boundaries can be taken as essentially flat, ie **zero slope** in all directions of adjacent land.



4.0 Bushfire Risk

4.1 Bushfire Attack Level (BAL)

A key input in the assessment of bushfire risk is to determine the BAL (Bushfire Attack Level) of the project site of interest. The Jindera BESS BAL has been assessed according to:

- Australian Standard AS 3959:2018, “*Construction of Buildings in Bushfire-Prone Areas*”.
- NSW RFS, Planning for Bushfire Protection, November 2019 – herein PBP-2019.
- NSW RFS, Planning for Bushfire Protection Addendum, November 2022.

The modelling procedure for the assessment of the BAL in PBP-2019 uses the input values and the Detailed Method for Determining the BAL - Method 2 in AS 3959. The BAL tables in PBP-2019 Appendix 1 replace the equivalent tables in AS 3959 in NSW.

The BAL is defined as:

- A means of measuring the severity of a building’s potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kW/m², and the basis for establishing the requirements of construction to improve protection of building elements from attack from bushfire.

Table 2 lists the six BALS defined in AS3959:2018.

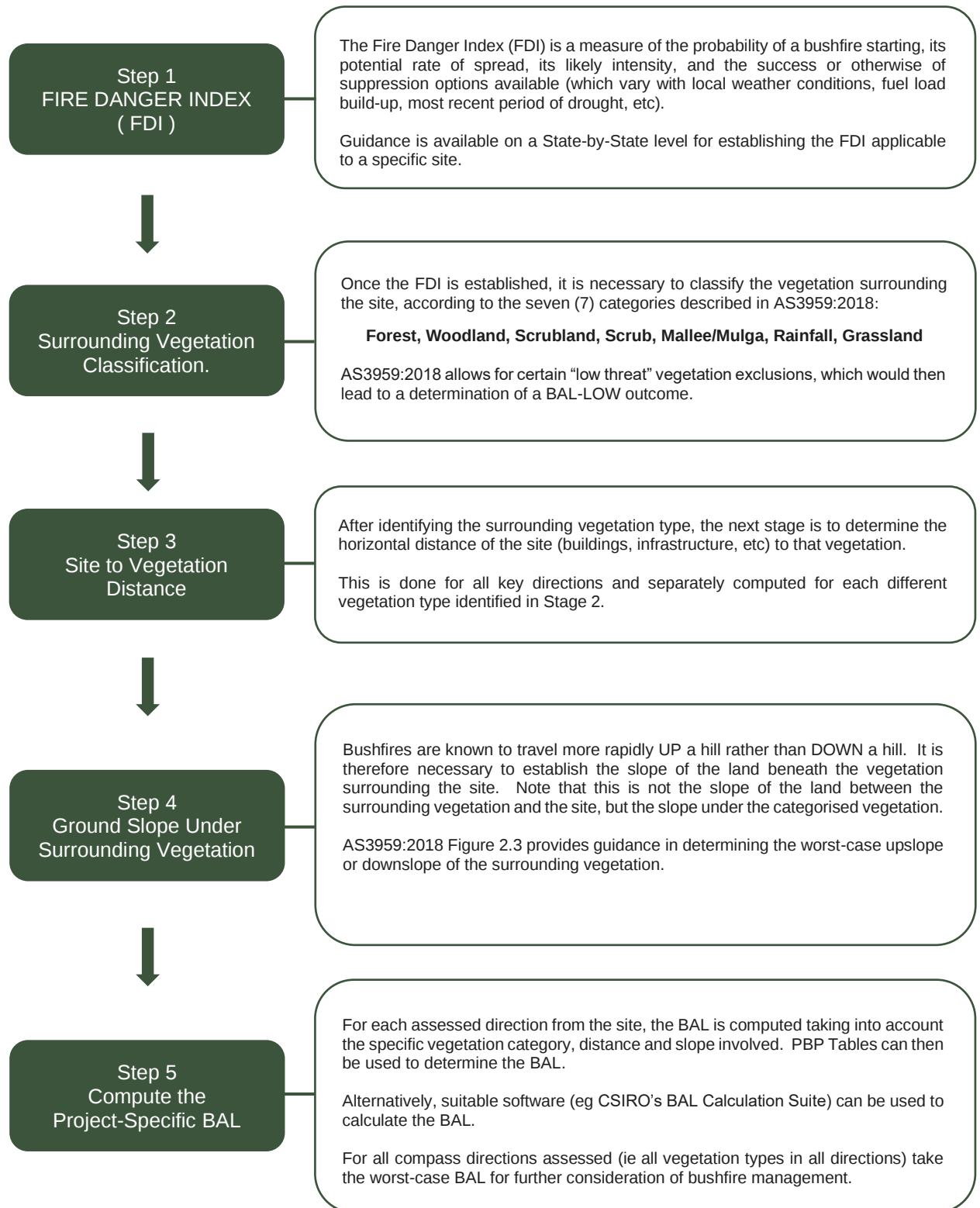
Table 2 AS3959:2018 Bushfire Attack Levels (BALs)

Bushfire Attack Level (BAL)	Classified Vegetation within 100m of the site and heat flux exposure threshold	Description of Predicted Bushfire Attack and Levels of Exposure
BAL - LOW		There is insufficient risk to warrant specific construction requirements
BAL - 12.5	≤ 12.5 kW/m ²	Ember Attack
BAL - 19	> 12.5 kW/m ² and ≤ 19 kW/m ²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux
BAL - 29	> 19 kW/m ² and ≤ 29 kW/m ²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux
BAL - 40	> 29 kW/m ² and ≤ 40 kW/m ²	Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames
BAL - FZ	> 40 kW/m ²	Direct exposure to flames from fire front in addition to heat flux and ember attack



The steps involved in assessing a site-specific BAL are shown in Figure 11.

Figure 11 BAL Analysis Methodology



4.2 BAL Inputs

4.2.1 BAL Assessment Step 1: FDI

The FDI for the Jindera BESS site has been determined to be 80.

This was based on:

<https://research.csiro.au/bushfire/assessing-bushfire-hazards/hazard-identification/fire-danger-index/>
NSW RFS, May 2017, *NSW Local Government Areas FDI*: development.policy@rfs.nsw.gov.au

4.2.2 BAL Assessment Step 2: Vegetation Classification

The vegetation types surrounding the Project were discussed in Section 3.3.

The vegetation categories defined in AS3959:2018 are listed in Appendix A along with descriptive summaries.

Of specific interest in relation to the BAL calculation are:

- Open/Sparse Woodland and Grassland.

4.2.3 BAL Assessment Steps 3 and 4: Distance to Vegetation and Slope Under Vegetation

As shown in Section 3.5, the topography surrounding the Project site is generally flat, with a slope designation as per AS3959:2018 of: "Flat – 0°".

Table 3 lists the distance to vegetation distance and slope parameters used in the BAL calculations. The distance is taken from the Site boundary for the BESS Site and the transmission line axis for the remaining areas of interest.

Table 3 Vegetation Distance and Slope Parameters used for the BAL Calculations

Direction	Regional Ecosystem Classification	Distance to Vegetation	Upwind Slope Under Vegetation
BESS Site North Perimeter	Grassland	0 m	Flat - 0°
BESS Site Southeast Perimeter	Woodland	30 m	Flat - 0°
BESS Site West Perimeter	Grassland	0 m	Flat - 0°
Transmission Line Easement	Woodland	0 m	Flat - 0°

AS3959:2018 allows for "Exclusions" to BAL calculations for "low threat" vegetation and non-vegetated areas.

Specifically, AS3959:2018 Clause 2.2.3.2(a) states that the following shall be excluded from a BAL assessment:

- Vegetation of ANY type that is more than 100 m from the site.

On the basis of the vegetation distances shown in Table 3, the vegetation required for the BAL assessment of the site is the Grassland and Woodland categories immediately



surrounding the BESS site to the east and south and within the proposed transmission line easement.

4.3 BAL Calculations

The BAL Calculation for the site has been carried out using:

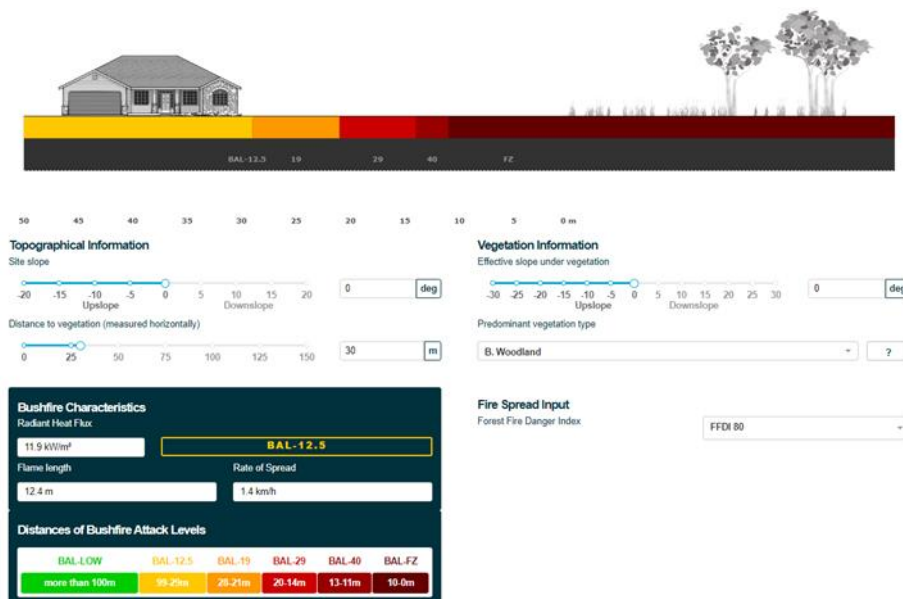
- CSIRO's BALA (Bushfire Attack Level Assessment) Tool

<https://best-practices-assessment-tool.herokuapp.com/calculator?slope=0&vegslope=0&FFDI=60&vegtype=Tussock>

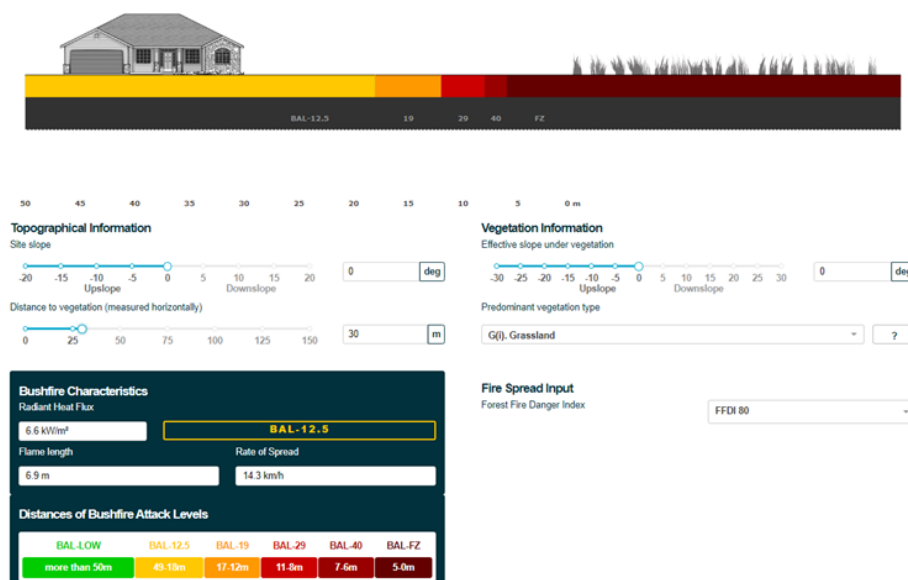
Vegetation categories, and distances and slopes to the nearest vegetation have been based on Table 3. The results are shown in Figure 12.

Figure 12 BAL Calculation using the CSIRO BALA Tool

BESS Site Southeast Perimeter



BESS Site North and West Perimeters



4.4 BAL Summary

BESS Site Southeast Perimeter

- The resulting BAL for this perimeter is BAL-12.5, achieved at a distance of 29 m.

BESS Site North and West Perimeters

- The resulting BAL for this perimeter is BAL-12.5, achieved at a distance of 18 m.

Transmission Line Easement

- The resulting BAL for this perimeter is BAL-12.5, achieved at a distance of 29 m.

Comment on BAL recommendation

Compliance with PBP-2019 (NSW RFS, *Planning for Bushfire Protection*, November 2019) for residential development is achieved with a target BAL-29 level – related to the ability of buildings to withstand a bushfire until firefighting resources arrive on site in an emergency.

The Jindera BESS site is subject to PBP-2019 Section 8 and therefore, a risk assessment based on the nature of the site.

The more stringent BAL-12.5 level has been recommended as this would ensure that the maximum exposure at any point of a facility will be below 10 kW/m².

This will ensure the safety of firefighters and other emergency workers to safely defend the facility, evacuate personnel if needed and allow access to and from all areas within the Site.



5.0 Bushfire Risk Mitigation and Management

The site requirements needed to address a potential bushfire attack fall into the following categories:

- APZs to minimise the impact of radiant heat and flame contact.
- Construction Standards and Design to minimise building vulnerability to bushfire flames, radiation and embers.
- Access and Egress for the public and for firefighters and their equipment.
- Adequate Water Supply for fire suppression.
- Landscape Management.
- Emergency Response and Management – Preparedness and Planning.

5.1 Asset Protection Zone

The recommended APZ was developed in accordance with guidance contained in:

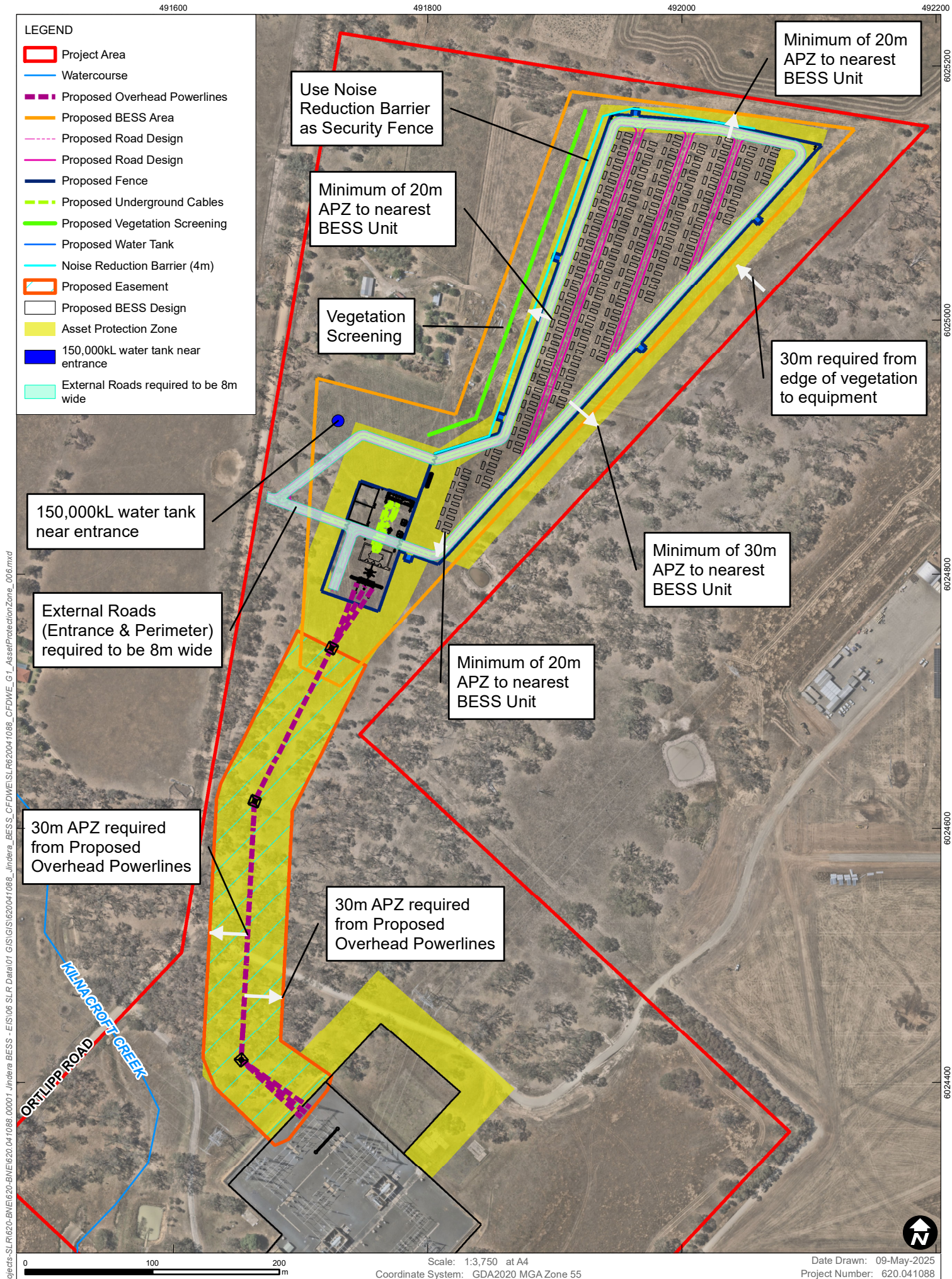
- NSW Govt, NSW Rural Fire Service, *“Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers”*, November 2019.
- NSW Govt, NSW Rural Fire Service, *“Planning for Bush Fire Protection Addendum”*, November 2022.
- NSW Govt, NSW Rural Fire Service, *“Standards for Asset Protection Zones”*.

The recommended APZ for the Project facility is shown in Figure 13.

The recommended APZ satisfies the following:

- The APZ is located wholly within the Subject Sites’ boundaries.
- The APZ is situated on cleared ground with minimal gradients.
- The APZ creates a total separation from the nearest piece of equipment on the site to the nearest vegetation of the following:
 - 30 m from nearest BESS Site equipment to the southeast (woodland).
 - 20 m from nearest BESS Site equipment to the other boundaries (grassland).
 - 30 m for the transmission line easement and substation extension.
- As the APZ has been based on a BAL-12.5 level, it will provide total site access for firefighting personnel and equipment – refer Section 5.3:
 - Access will be provided both internally (i.e. within the BESS Site security fence) and externally, via the cleared, flat laned located between the BESS Site boundary and security fence.
- The APZ will be maintained as either completely cleared land or a mown area with a grass height of less than 100 mm.





Additional recommendations covering the following are covered in subsequent sections:

- Areas of vegetation clearing.
- Design of the west and partial north side Acoustic barrier.

Note:

- Figure 13 shows that the proposed acoustic barrier for the BESS Site doubles as the security fence for the BESS Site along the relevant western and northern perimeters.

Benefits of the APZ and Potential Radiant Heat Impact

The recommended APZ achieves the following:

- The BESS site will experience a radiant heat flux level LESS THAN 10 kW/m² at all footprint plan equipment boundaries.
- A radiant heat flux of 10 kW/m² is the threshold for piloted ignition of dry timber and failure of plain glass, and more generally is a target maximum exposure at any point of a site building wall or façade.
- A radiant heat flux of 10 kW/m² is also the threshold where firefighters and other emergency services can operate, for both firefighting and evacuating occupants from threatened buildings.
- Limiting radiant heat flux level to 10 kW/m² at the BESS site boundary forms a critical element of the risk management for what are termed “vulnerable” uses, which includes community infrastructure for essential services.
- Accordingly, the facility’s proposed APZ achieves a performance-based outcome relevant to NSW Rural Fire Service guidelines.

Additional Project Commitment

- The Proponent commits to establishing a management regime to ensure the ongoing integrity of the proposed APZ, including responsibility for ongoing vegetation management, etc.

5.2 Construction Standards and Design

Building work on bushfire-prone land must also comply with the requirements of the National Construction Code (NCC). The NCC contains the technical provisions for the design and construction of buildings. Under the Deemed to Satisfy provisions of the NCC, building work on bushfire-prone land must comply with *Australian Standard 3959:2018* or the *National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas* (NASH Standard).

This does not apply however for a BAL-FZ, not relevant to the present Project.

The National Construction Code (NCC) is a performance-based code which comprises the Building Code of Australia (BCA) as Volumes 1 and 2 and the Plumbing Code of Australia as Volume 3.

- As noted above, the NCC contains Performance Requirements and Deemed-to-Satisfy provisions relating to the construction of buildings in bush fire prone areas.



The construction requirements of AS3959:2018 and the NASH Standard contain Deemed-to-Satisfy solutions in the NCC (which can be varied State-to-State), for buildings in designated bushfire prone areas.

The general requirements for the construction of buildings specified in AS3959:2018 are separated according to the relevant BAL at the site of interest.

For the Jindera BESS facility, and hence for BAL-12.5, the relevant code sections are Sections 3.0 and 5.0.

Relevant Areas of AS3959:2018 Section 3

The guidance in AS3959:2018 pertains mainly to standard building construction, with a focus on external features prone to ember attack, covering items such as attached structures, garages, carports, external mouldings, bushfire shutters, glazing, etc. None of these is relevant to the BESS design.

Relevant Areas of AS3959:2018 Section 5

Again, the guidance in AS3959:2018 Section 5 pertains mainly to standard building construction, with a focus on external features prone to ember attack, covering items such as attached exposed floor supports, floor slabs, walls, external glazing, doors, roofs, verandas, etc.

Of relevance:

- Clause 5.8 states that any above-ground, water supply pipes shall be metal.
- Clause 5.8 also covers gas pipes and fittings – not relevant to the BESS design.

5.3 Access

Access requirements are crucial to the enabling of adequate firefighting capability and for emergency planning purposes (e.g. emergency evacuation). Reference is made to:

- NSW Govt, NSW Rural Fire Service, *“Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers”*, November 2019.
- NSW Govt, NSW Rural Fire Service, *“Planning for Bush Fire Protection Addendum”*, November 2022.

The following general principles and RFS-compliant design apply to ensure that firefighting vehicles are provided with safe, all-weather access to the proposed BESS facility.

- BESS site firefighting access roads should be two-wheel drive, all-weather roads and appropriately sign-posted.
- Road widths accessing the site and within the site must be sufficient to accommodate firefighting vehicles:
 - Perimeter access is to be provided with a minimum clear width of 6 m, with turning access up to 8 m.
 - Non-perimeter access is to be provided with a minimum clear width of 5.5 m.
- An unobstructed clearance height of 4 m should be maintained above all access roads including clearance from building construction, archways, gateways, overhanging structures and vegetation overhanging roads.



- In relation to vehicle turning circle requirements, any curved carriageways should be constructed using the minimum swept path dimensions shown in Table A3.2 of the above RFS 2019 Planning Guideline.
- Dead ends that are longer than 200 m must be provided with a turning head area that avoids multipoint turns. “No parking” signs are to be erected within the turning head. Example turning heads and minimum dimensions are provided in Figure A.3 of the above RFS 2019 Planning Guideline.
- Passing bays should be provided every 200 m. Where required, passing bays shall be 20 m in length with a minimum trafficable width at the passing point of 6 m.
- Maximum grades for sealed roads should not exceed 15° with an average grade of not more than 10°.

RFS Vehicle Specifications

In recent years, the NSW RFS has taken possession of a large number of new firefighting equipment. For specific details on RFS vehicles, refer <https://www.fire.nsw.gov.au/page.php?id=161>

Project Commitment

Given the current design development stage, the Proponent has committed to the following:

- The road carrying capacity, turning circles, etc, will be designed for fully loaded firefighting vehicles of up to 23 tonnes.

External Project Access

Where practical and feasible, a “back-up” secondary access road to a facility is recommended for consideration.

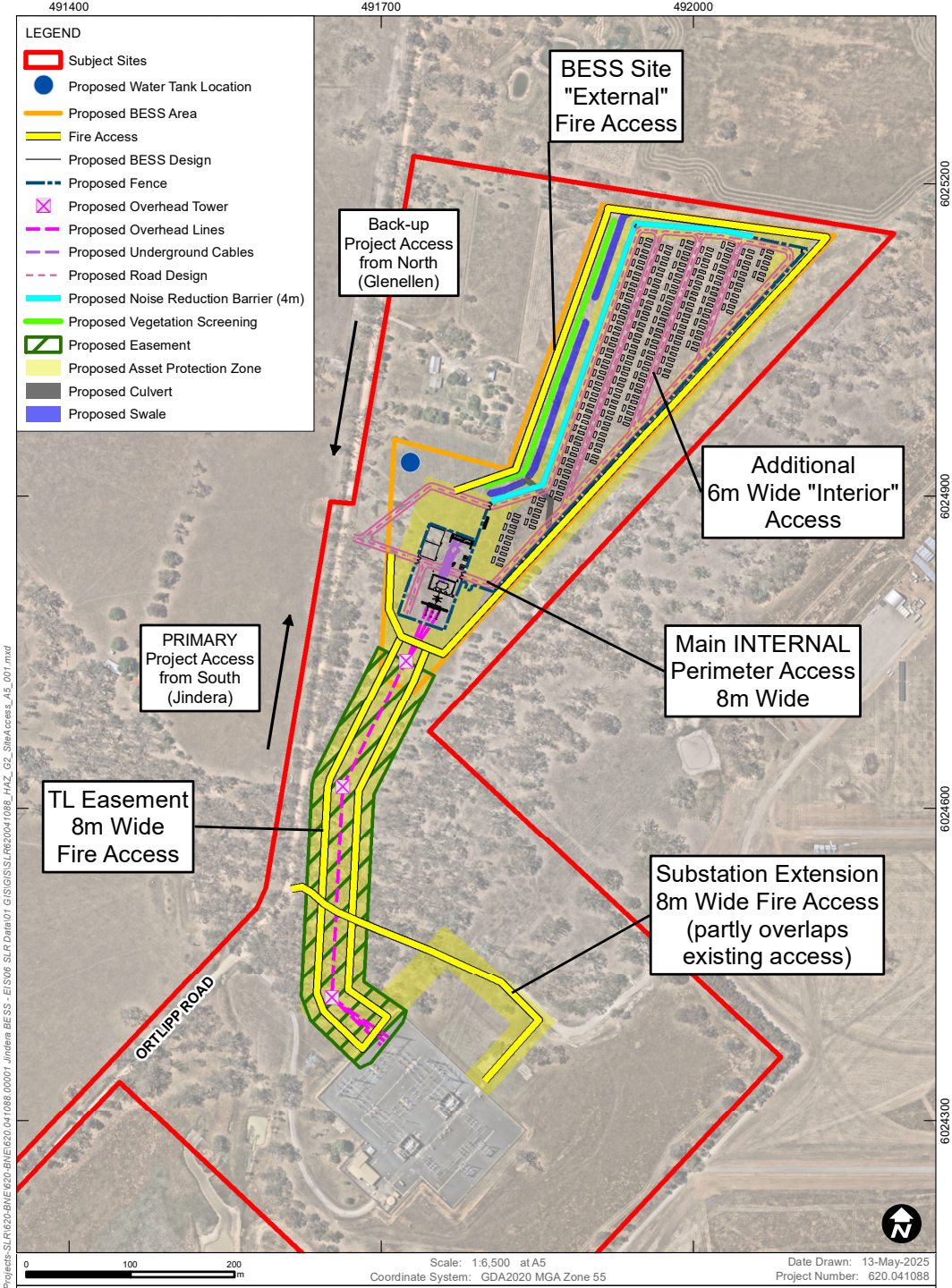
Off-site approach paths and access to the Project are shown in Figure 14.

- Primary access is enabled from the south – south west along Ortlipp Road from Jindera.
- If needed, back-up access would be enabled from the north along Ortlipp Road from Glenellen.

Accordingly, firefighting resources have two approach paths to access the site in the advent of an emergency situation.

Key firefighting-related access characteristics of the Project site are shown in Figure 14.





Data Source: basedata supplied by NSW SS, June 2024
Aerial imagery supplied by Nearmap, November 2024

BESS Access Arrangements

FIGURE 14

5.4 Water Supply

Proposed Option

It is currently proposed to upgrade the surrounding water main network on Ortlipp Road and Linder Road so as to be able to supply reticulated water to the Site.

This will require a reticulated water supply connection within the Site close to the entry point, suitable for firefighting purposes (hose fittings, etc). Reticulated water will therefore be available to service the 150 kL water tank that has been proposed near the site entry.

Alternative Option

In the absence of a reticulated water supply, an appropriate static water supply must be provided to support effective emergency services response. This will include a water tank that satisfies the following.

The water tank:

- Is clearly identified by directional signage at all access points to the facility.
- Must be readily accessible by firefighting appliances.
- Should be located as close as possible to the BESS facility security perimeter.
- Shall have a volume in accordance with AS 2304:2011.
- Shall be constructed of concrete or metal (as per PBP-2018 Table 5.3c); all connecting above-ground water service pipes and taps being metal.
- Will be located in an area such that medium rigid vehicles (eg a 15-tonne fire appliance) have clear access within 4 m of the tank and with sufficient parking adjacent for other emergency service vehicles.
- If serviced by a rural fire brigade, is provided with IPA-rated rural fire brigade tank fittings including a 65 mm Storz outlet valve and relevant coupling:
 - Ball valves and pipes should be adequately sized for water flow and shall be constructed of metal. The supply pipes from the tank to the ball valve should have the same bore size to ensure flow volume.
- Underground tanks should have an access hole of 200 mm to allow tankers to refill direct from the tank.
- Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see *Appendix F* AS 3959).

Project Commitments:

Given the size of the development footprint, the Proponent has committed to the following:

- Continue to develop the reticulated water supply option coupled with the 150 kL tank
- And
- Should the above not proceed, ensure that the above firefighting static water tank requirements are met by providing a minimum 150 kL dedicated water supply for firefighting purposes – refer Figure 14.



5.5 Landscape Management

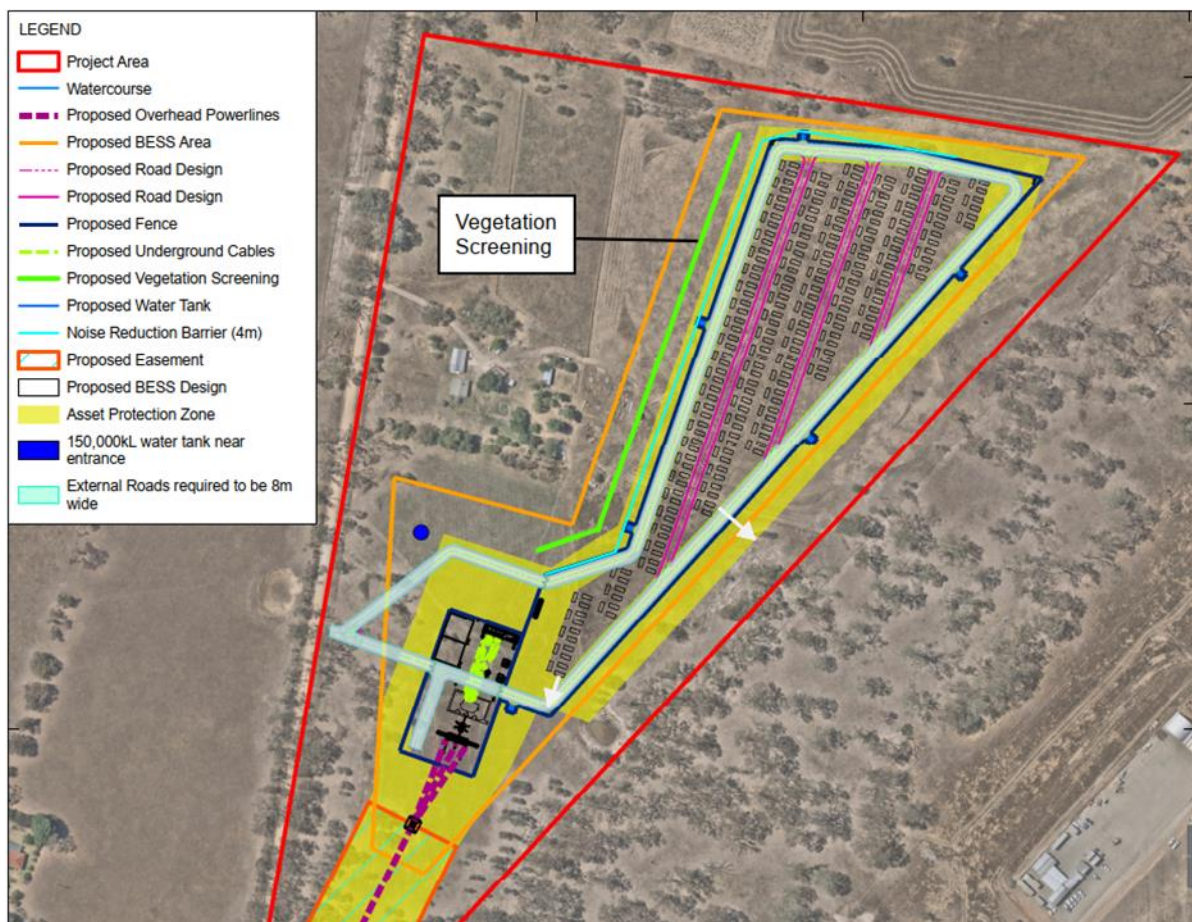
Landscape screening has been proposed for the BESS Site – refer Figure 15.

- The Bushfire Management Plan for the facility (refer Section 6.12) shall contain a provision preventing any other vegetation from taking hold within the proposed APZ zone around the site, thereby reducing the bushfire hazard risk and maintaining adequate access to firefighting personnel and equipment.

The following is recommended, as per NSW RFS *“Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers”* (2019):

- The landscaping should NOT be continuous, achieving a “coverage ratio” of no greater than 50%.
- The landscaping should comprise fire-wise plant species with fire resilience characteristics. Low flammability plant species are characterised by high moisture content, low oil/resin content, and having smooth bark that sheds bark and leaves infrequently.

Figure 15 Landscape Screening Location



5.6 Proposed Acoustic Barrier

A 4 m high Acoustic barrier is being proposed for the BESS Site

As shown in Figure 2, the Acoustic barrier would double as the security fence for the BESS Site along the relevant western and northern perimeters.

- The Acoustic barrier shall be made of non-combustible (i.e. fire-resistant) materials.
- Timber is not a suitable material for the Acoustic barrier in a bushfire prone zone.
- Acoustic barriers incorporating plastics must contain a fire-retardant and UV inhibitor.
- Lightweight (aerated) concrete can be cost-effective and is suitable in a bushfire prone area.
- The “fire-resistance period” of the Acoustic barrier should be based on the nature of the BESS Site and surrounding bushfire risk. In the absence of a calculation based on site specific, SLR recommends a minimum fire-resistance period of 60 minutes. An example of a barrier material providing 60 minutes of fire protection is:
 - 10-15mm of Vermiculite Spray.
 - Minimum 15 mm of Fire-Retardant Board.
 - 1-2 mm of intumescent paint with a 50 mm clearance to expand.

5.7 Vegetation Management

The APZ-related areas requiring vegetation management are shown in Figure 13. They cover:

- The 60 m wide transmission line easement and 20m/30 m APZ around the Substation extension.

It is understood that landowner permission has been granted for the proposed vegetation management.

5.8 Management of Bushfire Risk Initiators

Potential “internal” bushfire risk initiators are summarised in Table 4, according to the stage of the Project. The Project’s Bushfire Management Plan (BMP) will include mitigation measures designed to address the risks detailed in Table 4.

Table 4 Potential Bushfire Initiators

Project Phase	Impact
Construction	Clearing activities (e.g. slashing, mowing and diesel-powered tool use), lightning strikes, storage of fuels/chemicals, hot welding activities, cigarette butts thrown from cars travelling within the site, traffic accidents, etc.
Operational	Ground cover/vegetation within site, ignition of electrical equipment, especially during repairs and maintenance activities, traffic accidents.
De-Commissioning	Decommissioning activities would have similar impacts to that for construction.



5.9 Bushfire Management Plan (BMP)

During the post-approval design phase of the Project, and prior to construction commencing, a detailed Bushfire Management Plan (BMP) will be prepared for the Project.

Key elements within the BMP will be:

- APZ locations and management details.
- Access provisions such as locations, passing bays and alternate emergency access.
- Water supplies and bush fire suppression systems.
- Landscaping management requirements.
- A Bushfire Emergency Management and Evacuation Sub-Plan within the overall BMP.

5.9.1 Detailed Requirements of the BMP

The following is a more detailed listing of the BMP:

- The BMP will identify specific responsibilities for actions required within the BMP for the Proponent and Ultimate Operator.
- The BMP will contain a detailed site layout plan identifying the locations of all site infrastructure, APZs, access routes and water supply details.
- The BMP will identify key bushfire risks associated with the BESS facility and the strategies developed to mitigate them, including minimum APZ calculations, access requirements, firefighting water supply quantity and other design details aimed at facilitating an effective response to bushfire.
- The BMP will include site-specific factors relevant to the site's protection from bushfire: the likely direction of bushfire attack if historic evidence indicates a bias in prevailing wind conditions during the fire season, location of evacuation routes and safety zones and identification of secondary risks, e.g. from nearby sites (if relevant).
- The BMP will include: a description of the activities to be conducted on the site and in particular personnel movements covering both regular staff, maintenance staff and irregular visitors.
- The BMP will list the storage or handling of any hazardous chemicals in quantities that would be equivalent to or exceed the threshold quantities set out in the relevant standards.
- The BMP will show all transportation routes into and out of the site covering personnel, delivery of materials, access routes for emergency services or disaster response, etc. Details will be provided covering road layout, accessways, passing bays, evacuation routes, easements on site, designated routes for fire-fighting appliances, etc. These will be detailed in an Emergency and Evacuation Sub-Plan.
- The BMP will clearly indicate the total extent of clearing, revegetation and landscaping proposed for the site, which is to be indicated on a site plan, including the APZ for the site. The means by which the APZ will be maintained, including who responsible, will be clearly enunciated.
- The BMP will include information covering fire maintenance access areas, if relevant.



- The BMP will provide warning and evacuation procedures, plans and routes including capacity of public roads especially perimeter roads and traffic management treatments, and responsibility for their maintenance.
- The BMP will detail all fire-fighting requirements including infrastructure and water supply, design standards for tanks, fittings and connection details, etc.

5.9.2 RFS Engagement

- The BMP should be developed in consultation with the NSW RFS with final approved copies stored locally within an appropriate “emergency cabinet” securely located within the Project site.

5.9.3 Community Engagement

- The BMP will include recommendations to be passed on the ultimate BESS Operator (if not the Proponent) covering surrounding resident education and awareness.

5.9.4 Local Firefighting Resources

The BMP will provide a listing of the nearest local firefighting resources, phone/email contacts, etc. The nearest Fire and Rescue NSW stations are currently:

- Jindera Bushfire Brigade:
 - 83 Urana Road, Jindera NSW 2642 (0427) 263 414 | (0429) 230 027

5.9.5 Bushfire Initiator Risk Management – Refer Table 4

Project Stage - Construction

- Bushfire risks during construction will be managed through the implementation of a comprehensive Construction Bushfire Management Sub-Plan (CBMP), to be prepared by the successful Project Contractor and signed off by all appropriate authorities.
- The CBMP will ensure adequate site access for RFS along with water supply resources needed to suppress any fire within the Project site.

Project Stage – Operational

- Bushfire risks once the facility is fully operational will be managed through the implementation of the BMP as described above, to be prepared by the successful Project Operator and signed off by all appropriate authorities.

Project Stage – De-Commissioning

- The BMP will detail De-Commissioning phase management strategies similar to those deployed for the Construction phase to address the similar risks expected during this last phase of the Project.

5.9.6 Other Management and Mitigation Aspects

In addition to the above measures, the BMP will:

- Recommend a system for the continuous monitoring of the RFS website for bushfire alerts (especially during the bushfire season).



- Ensure that smoking is prohibited throughout the site and that all employees receive training and instruction on the relevant fire procedures as part of their induction training.

5.9.7 Alignment of the Overall BMP with Other “Plans”

Finally, it is important that the Project’s BMP is aligned with other related (post-approval) management plans, including:

- Emergency Management Plan (EMP) – so there is no conflict between activities such as the risk control measures adopted for minimising electrical hazards for firefighters attending emergency situations on-site.
- A Fire Safety Study (FSS) for the Project which aligns the relevant firefighting elements (eg access routes, water supply etc) for both an (external) bushfire response and (internal) fire response.



6.0 Conclusions

Section 2.0 of this report described essential elements of the Project.

Section 3.0 of this report described key characteristics of the Project site and surrounds in relation to bushfire risk.

Section 4.0 of this report assessed the bushfire risk, in terms of the Bushfire Attack Level of the site.

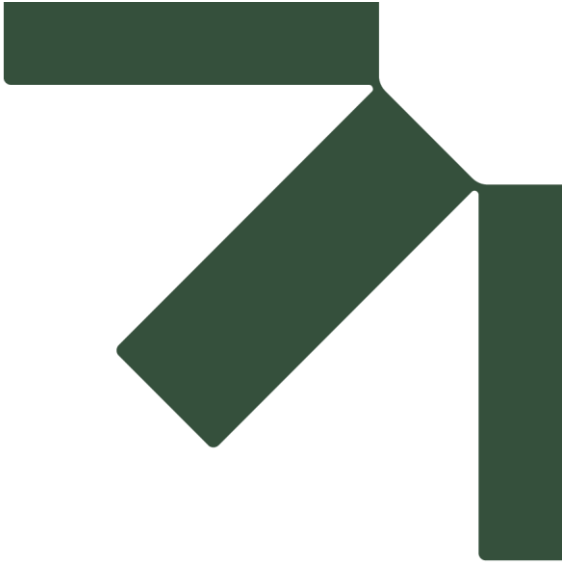
Section 5.0 of this report described risk mitigation and management measures associated with the bushfire hazard.

On the basis of the above, SLR has concluded that:

- Bushfire risk issues can be adequately mitigated.
- Accordingly, the Project will be adequately protected from the threat of a bushfire event.

Using the Risk Matrix approach adopted in the Hazard and Risk Study for the Project, SLR considers the residual risk associated with Bushfire fire hazard to be **LOW**, and hence adequately mitigated and managed.





Appendix A Vegetation Descriptions taken from AS3959:2018

Bushfire Risk Assessment Report

SSD-68815961 Proposed BESS Facility: 140 Ortlipp Road, Jindera NSW & 204 Ortlipp Road, Glenellen, NSW

BESS Atlantic Pty Ltd c/o Gransolar Development Australia Pty Ltd

SLR Project No.: 620.041088.00015

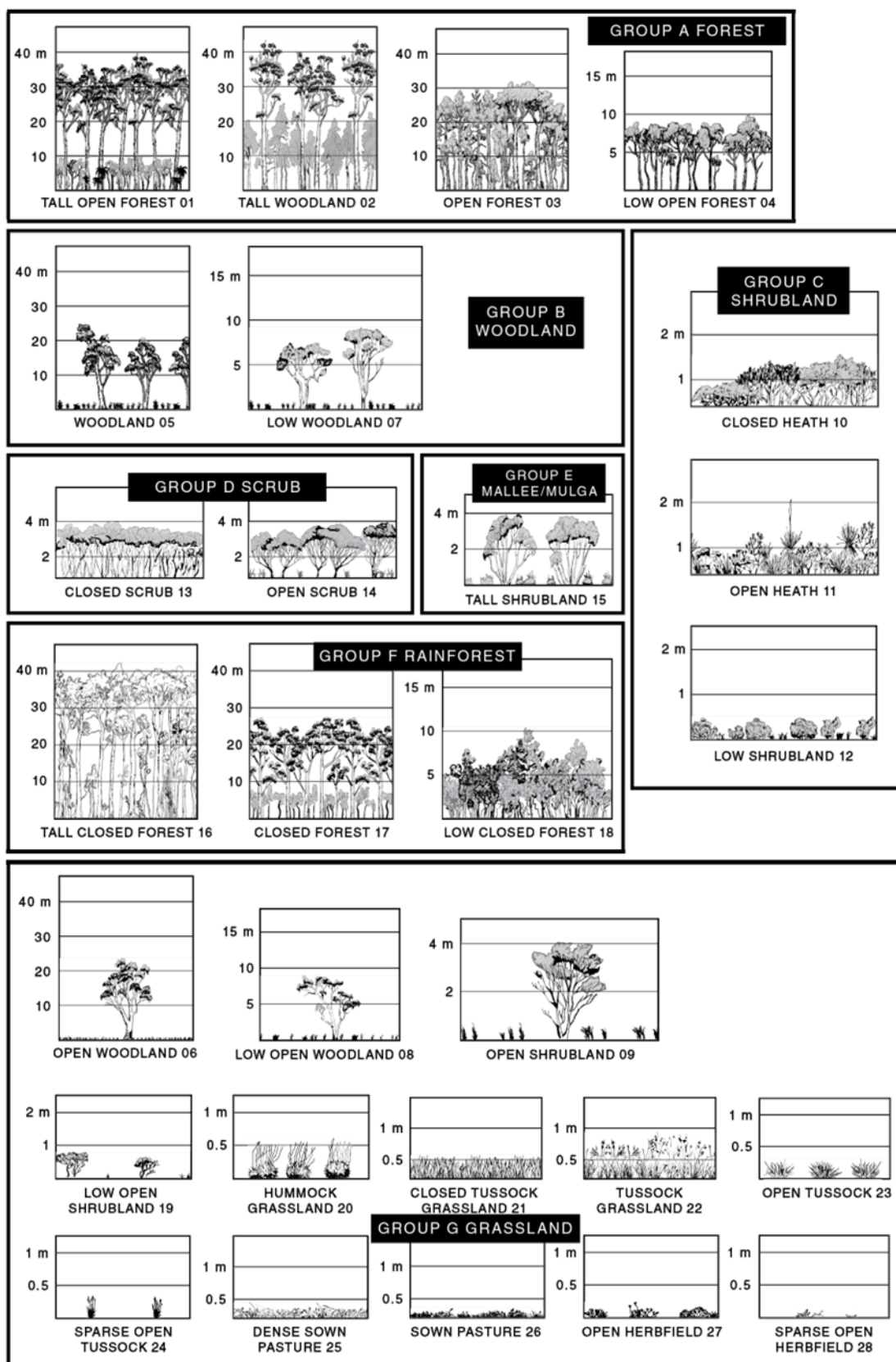
22 May 2025

AS3959:2018 - Table 2.3 CLASSIFICATION OF VEGETATION

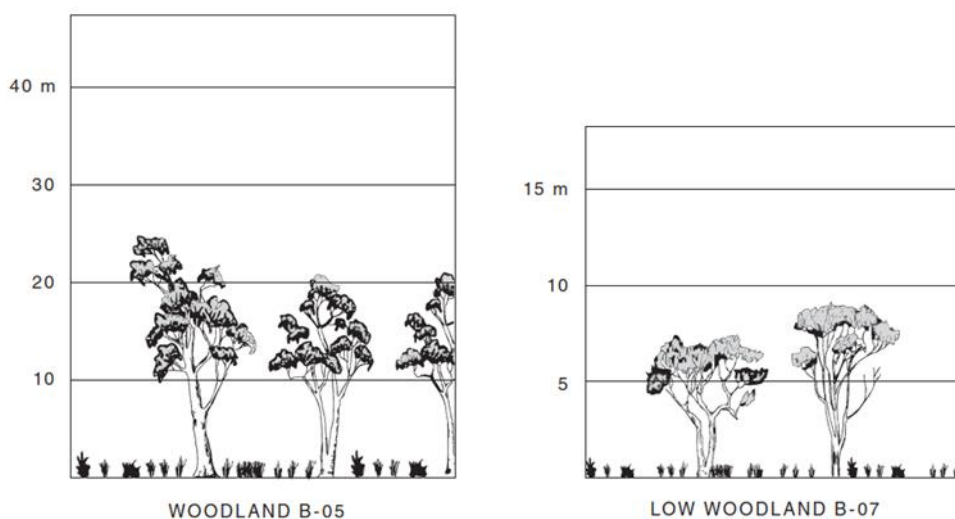
Vegetation classification	Vegetation type	Figure No. in Figures 2.4(A) to 2.4(H)	Typical characteristics
A Forest	Tall open forest Tall woodland	01 02	Trees over 30 m high; 30%–70% foliage cover (may include understorey ranging from rainforest species and tree ferns to low trees and tall shrubs). Found in areas of high reliable rainfall. Typically dominated by eucalypts with a sub-dominant tree layer.
	Open forest Low open forest	03 04	Trees up to 30 m high; 30%–70% foliage cover (may include understorey of sclerophyllous low trees or shrubs). Typically dominated by eucalypts, melaleuca or callistemon (may include riverine and wetland environments) and callitris. Includes eucalypt plantations.
	Pine plantation	Not shown	Trees 30 m in height at maturity, generally comprising Pinus species or other softwood species, planted as a single species for the production of timber.
B Woodland	Woodland Low woodland	05 07	Trees up to 30 m high; 10%–30% foliage cover dominated by eucalypts and/or callitris with a prominent grassy understorey. May contain isolated shrubs.
C Shrubland	Closed (low) heath Open heath	10 11	Found in wet areas and/or areas affected by poor soil fertility or shallow soils. Shrubs 1 m–2 m high. Wet heaths occur in sands adjoining dunes of the littoral (shore) zone. Montane heaths occur on shallow or water-logged soils.
	Low shrubland	12	Shrubs <2 m high; greater than 30% foliage cover. Understoreys may contain grasses. Acacia and Casuarina often dominant in the arid and semi-arid zones.
D Scrub	Closed scrub (Tall heaths)	13	Found in wet areas and/or areas affected by poor soil fertility or shallow soils; >30% foliage cover. Dry heaths occur in rocky or sandy areas. Shrubs >2 m high. Typical of coastal areas and tall heaths up to 6 metres in height. May be dominated by Banksia, Melaleuca or Leptospermum with heights of up to 6 metres.
	Open scrub	14	Shrubs greater than 2 m high; 10%–30% foliage cover with a mixed species composition.
E Mallee/Mulga	Tall shrubland	15	Vegetation dominated by low trees or tall shrubs (especially eucalypts and acacias) some with a multi-stemmed habit (mallee); usually greater than 2 m in height; <30% foliage cover. Understorey of widespread dense low shrubs or sparse grasses and generally found in the arid and semi-arid zones, but not within the rangelands.
F Rainforest	Tall closed forest Closed forest Low closed forest	16 17 18	Trees >90% foliage cover; understorey may contain a large number of species with a variety of heights. Not dominated by eucalypt species.
G Grassland	Open woodland	06	All forms (except tussock moorlands), including situations with shrubs and trees, if the overstorey foliage cover is less than 10%. Includes pasture and cropland. NOTE: Grassland managed in a minimal fuel condition and non-curing cropland is regarded as low threat vegetation for the purposes of Clause 2.2.3.2.
	Low open woodland	08	
	Open shrubland	09	
	Low open shrubland	19	
	Hummock grassland	20	
	Closed tussock grassland	21	
	Tussock grassland	22	
	Open tussock	23	
	Sparse open tussock	24	
	Dense sown pasture	25	
H Tussock Moorland	Sown pasture	26	All forms of vegetation where the overstorey is dominated by the species Buttongrass (<i>Gymnoschoenus sphaerocephalus</i>). Only occurs as a significant vegetation type in Tasmania.
	Open herbfield	27	
	Sparse open herbfield	28	



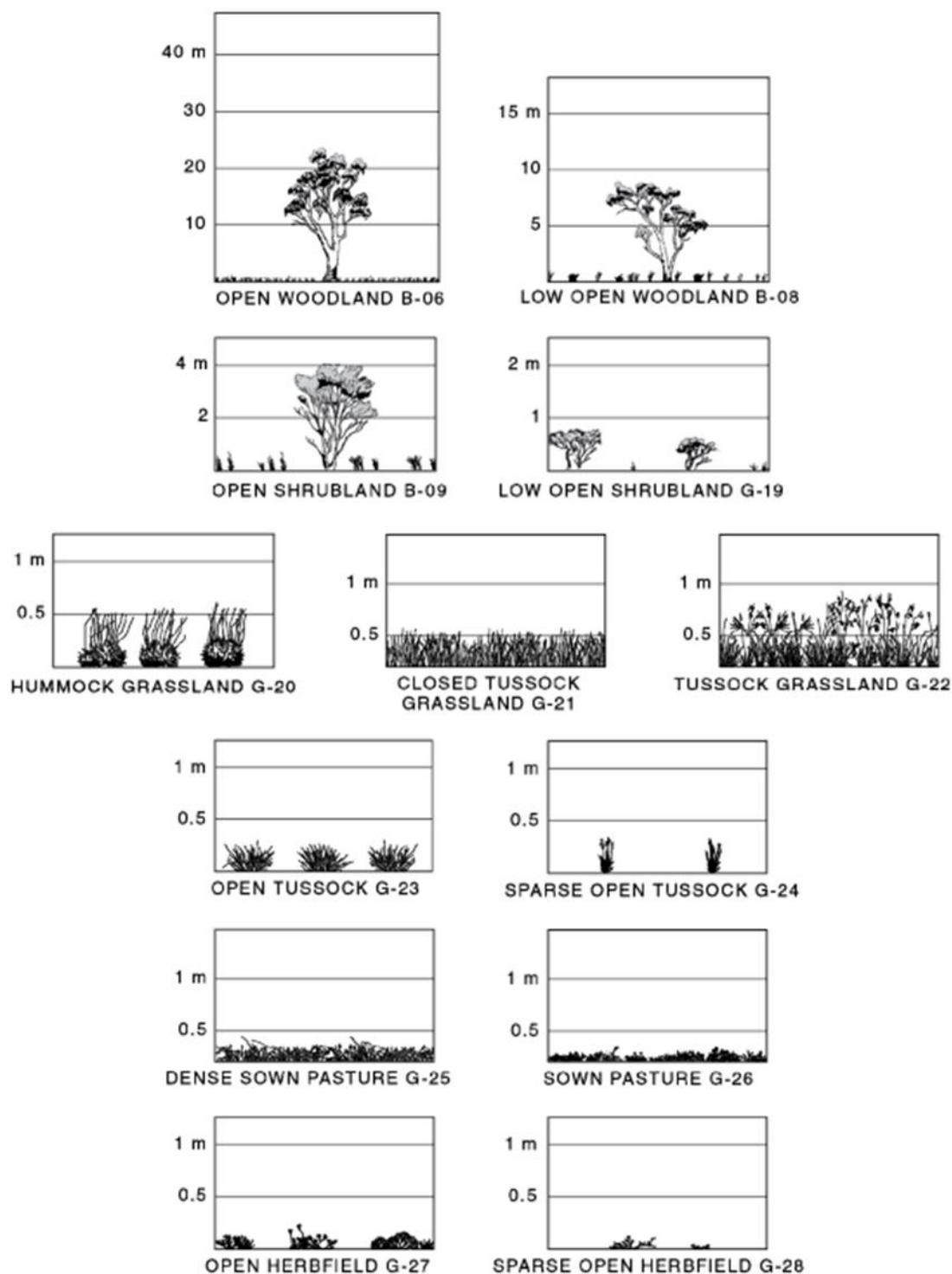
AS3959:2018 – Figure 2.4(A) Classification of Vegetation - SUMMARY

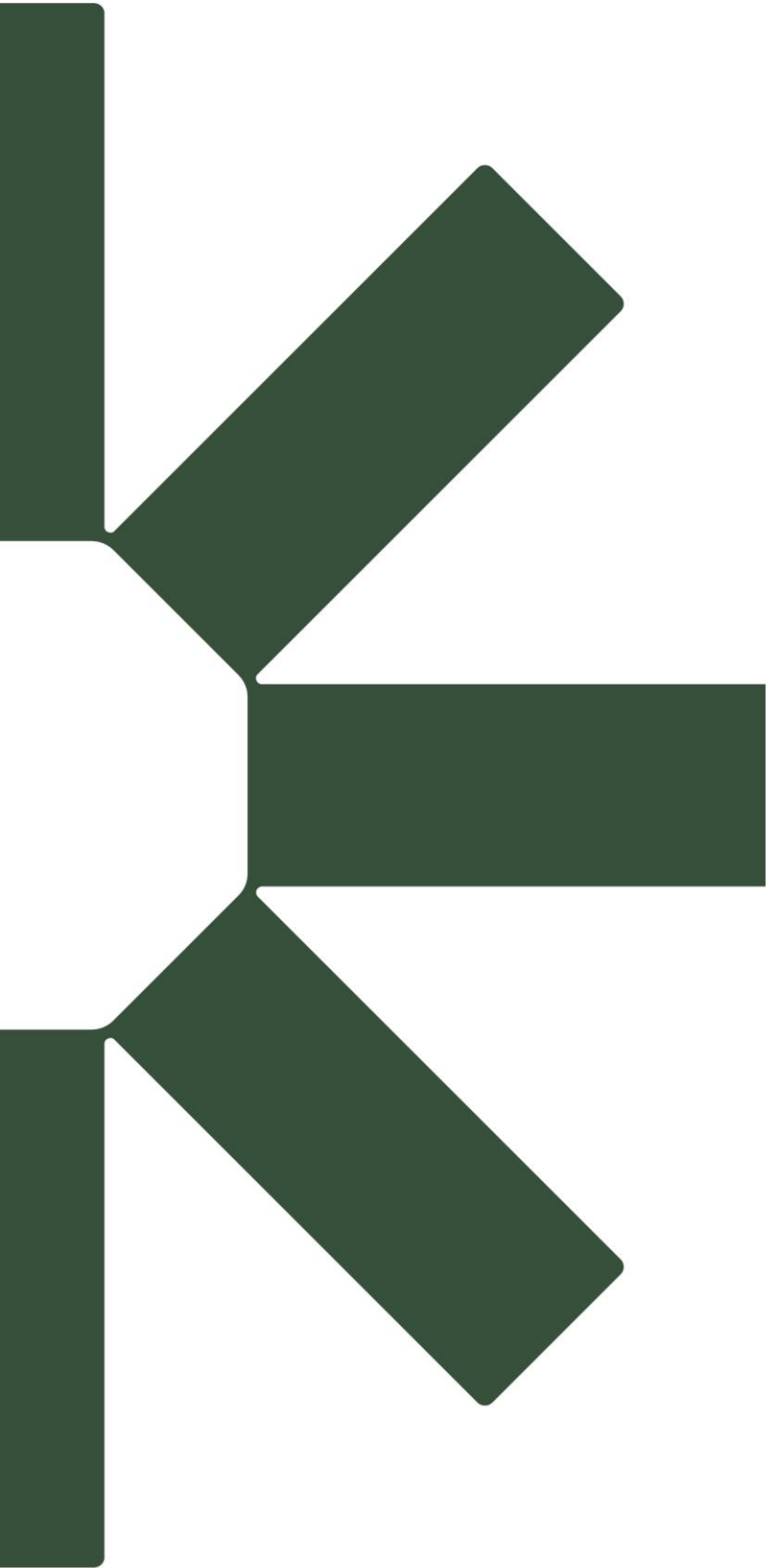


AS3959:2018 – Figure 2.4(C) Classification of Vegetation – WOODLAND (Group B)



AS3959:2018 – Figure 2.4(H) Classification of Vegetation – GRASSLANDS (Unmanaged)





Making Sustainability Happen