Bushfire Assessment Report

MUSWELLBROOK BATTERY ENERGY STORAGE SYSTEM

State Significant Development SSD-29704663

Lot 11 & 12 DP839233 Sandy Creek Rd, Muswellbrook, NSW

Applicant: Firm Power Pty Ltd

Aug 2022

Cool Burn Pty Ltd
Warners Bay NSW
dan@coolburn.com.au

COOL BURN FIRE + ECOLOGY

Prepared for:

Firm Power Pty Ltd
to support EMM preparation for the Environmental Impact Statement (EIS)

Prepared by:

Dan Pedersen | Director
B Sc./ BPAD 16293 / EngTech
Cool Burn Fire & Ecology
Address: 14 Mills Street, Warners Bay NSW 2282
Email: dan@coolburn.com.au
Phone: **0427 337 783**
ABN: **61 645 633 236**

Ref J089: Muswellbrook Battery Energy Storage System

Project Name:	J089: Muswellbrook Battery Energy Storage System
Client Details:	Firm Power Pty Ltd
Project Address	20-24 Sandy Creek Road, Muswellbrook NSW 2233
Lot/DP:	Lot 11 & 12 in DP 8392333
Local Government Area	Muswellbrook Shire Council – Hunter Region (FDI 100)
Zoning (MCC LEP)	SP2 Infrastructure & C3 Environmental Management
Bushfire Prone Land	YES: Category 1 & 3 bushfire prone vegetation
Proposed Development	PBP 'Other Development' Battery Energy Storage System (BESS)
Approval Path	Major Projects - State Significant Development SSD-29704663

Document Control:

Version	Description	Date	Author	Reviewer
1.0	Bushfire Assessment Report Draft	14 April 2022	D Pedersen	D Smith
1.1	Bushfire Assessment Report Draft for Firm Power Review	29 June 2022	D Pedersen	-
1.2	Bushfire Assessment Report	14 July 2022	D Pedersen	D Pedersen
1.3	Bushfire Assessment Report	25 Aug 2022	D Pedersen	D Pedersen

Contents

1. INTRODUCTION

EMM on behalf of the proponent (Firm Power Pty Ltd Australia) have engaged Cool Burn Fire and Ecology to prepare a Bushfire Assessment Report to support the Environmental Impact Statement (EIS) for The Muswellbrook Battery Energy Storage System (BESS) project, a State Significant Development project SSD-29704663. The BESS is to be located adjacent and connected to the Ausgrid Muswellbrook substation located at 20-24 Sandy Creek Road, Muswellbrook (Lots 11 and 12 DP839233 and Lot 15 DP 905479 as the access driveway, hereafter referred to as 'the site').

The site is identified as 'bushfire prone land' as per the Muswellbrook Shire Council bushfire prone land map and is required to comply with the requirements of the Rural Fire Services document *Planning for Bush Fire Protection 2019* (PBP).

Development for the purpose of a BESS is defined as 'other non-residential development' (BCA Class 8) by section 8.3.1 of PBP. The aims and objectives of PBP must be satisfied by the development. This bushfire assessment report has been prepared in accordance with Appendix 2 of PBP.

The bushfire assessment report aims to address the requirement of the Planning Secretary's Environmental Assessment Requirements (SEARs) (SSD-29704663), being an assessment of potential hazards and risks including a bushfire assessment. The report provides recommendations to demonstrate compliance with the aims and objectives of PBP. Other matters relating to hazards, as specified in the SEARs, have been considered elsewhere in the Environmental Impact Statement (EIS), including a Preliminary Hazard Analysis (PHA).

Cool Burn Pty Ltd is a recognised and suitably qualified bushfire consultant (BPAD Level 3), experienced in the preparation of bush assessments.

1.1 PROJECT OVERVIEW

The BESS and associated infrastructure will occupy an area of the site of up to 4.94 hectares and will have a delivery capacity of up to 150 MW and a useable energy storage of 300MWh. The BESS will connect to the adjacent Muswellbrook substation via a new approximately 300m long 132 kV underground or overhead sub-transmission line and will store energy from the grid. The key project infrastructure includes:

The Muswellbrook BESS 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 main power transformer, 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 Muswellbrook 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;
- Vegetation screening and noise walls; and
- Utilisation of existing site access arrangements.

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.

At the end of its practical life (approx. 20 years), the BESS and infrastructure would be decommissioned, and the site returned to its pre-existing land status. It is conceivable that the infrastructure may be upgraded rather than decommissioned and the lifespan of the BESS extended.

2. SITE DETAILS

2.1 PROJECT ENVIRONMENT

The BESS project site is located within the Muswellbrook Shire Council (MSC) Local Government Area (LGA), within the Hunter region of NSW, approximately 2.5km north-east of the Muswellbrook township **(Figure 1)**. The BESS is to be located on land adjacent to the Ausgrid Muswellbrook substation, on Lots 11 and 12 DP839233 and using Lot 15 DP 905479 as access driveway.

The planned BESS development site footprint is approximately 4.94ha. The BESS, associated infrastructure and development footprint will align with, and be contained within, the development area shown in **Figure 2**. A preliminary layout of the BESS and associated infrastructure will be detailed in the EIS for the project.

The land adjacent to site is currently used for the purpose of distribution of electricity, with the key piece of infrastructure being the Ausgrid Muswellbrook substation located centrally within Lot 12. Existing improvements within Lots 11 and 12 DP839233 (adjacent to the site) include the substation occupying a total area of approximately 0.72 hectares, plus 132 kV and 33 kV powerlines which extend from the eastern and western sides of the substation and follow an east-west and north-south alignments.

Vehicular access to the site is provided by an existing access track located within Crown reserve (Lot 15 DP 905479), being Travelling Stock Reserve (TSR) 70196, which connects to the public road network via Sandy Creek Road, a local, undivided, and unmarked road. Sandy Creek Road crosses the Main Northern Rail Line to connect to the New England Highway, approximately 620 metres from the site. The planned BESS development would utilise this existing access track via Sandy Creek Road.

An ephemeral drainage line intersects the central portion of the study area in a general east to west direction and flows into Sandy Creek. While the site, and areas immediately surrounding the site, is largely cleared, patches of native and non-native vegetation are scattered throughout the site, primarily located in the south of the site and along the watercourses and adjacent to the existing access driveway. The cleared areas of the site have a history of grazing activities.

The site is zoned under the Muswellbrook Local Environment Plan (LEP) 2009 as:

- SP2 – Infrastructure
- C3 – Environmental Management and
- R5 – Large Lot Residential.

The project is located on land zoned SP2, except for the proposed transmission line from the BESS to the Muswellbrook substation, which is located on the C3 zoned land (**Figure 3**).

3. BUSHFIRE ASSESSMENT

3.1 BUSH FIRE PRONE LAND MAPPING

The site is identified as bushfire prone land (**Figure 4**) on the Muswellbrook Shire Council's bushfire prone land map. The site is located on land identified as having Vegetation Category 1 and 3, Vegetation immediately surrounding the site is also Vegetation Category 3, with vegetation further to the north, east and south identified as Vegetation Category 1.

3.2 FIRE WEATHER

Muswellbrook Local Council being within the 'Greater Hunter Region' fire weather district (District 3) has a corresponding FFDI rating of 100 and GFDI rating of 130.

3.3 VEGETATION ASSESSMENT

In accordance with PBP, an on-site assessment and classification of bushfire prone vegetation on and surrounding the area of the BESS, (out to 140 metres in all directions) has been undertaken (**Figure 5**). The following vegetation types occur on or within 140m of the BESS site:

- **Grassland (up to 6t/ha):** Native and derived grassland vegetation predominantly in the central portion of the site, extending into the north-west corner.
- **Grassy Woodlands:** New England Grassy Woodlands (10.5t/ha surface/elevated – 20.2t/ha overall). *Grassland areas within the power line easements, which surround the planned BESS and associated infrastructure area, is managed by Ausgrid on a frequent basis and to specified standards for bushfire mitigation. These power line easements would be managed in perpetuity for the life of the BESS operations*.

3.4 EFFECTIVE SLOPE

In accordance with PBP, an assessment of the effective slope was undertaken for 100m in the direction of the identified bushfire vegetation using aerial photographs with 1m contours and ground truthing with an inclinometer. The effective slopes surrounding the BESS out to

100 metres are generally flat (0 degrees) to the east and west, down-slope to the north (0-5 degrees) and upslope to the south.

4. BUSHFIRE PROTECTION MEASURES

The following proposed Bushfire Protection Measures (BPM's) have been developed for the BESS project to achieve compliance with the aims and objectives of PBP. The owner/operator is responsible for the actions associated with bush fire management associated with BESS construction, ongoing operations, and decommissioning.

4.1 ASSET PROTECTION ZONES

An Asset Protection Zone is an area of cleared/managed land around an asset that provides a buffer between bushfire prone vegetation and the asset. It allows for suppression of a fire and aims to avoid flame contact and/or excessive radiant heat at the asset. The APZ allows emergency services access and provides a relative safe area for firefighters to defend assets.

An APZ also provides a zone that would act to minimise the risk of any fire occurring within asset (e.g. a battery fire) to spread and ignite surrounding vegetation and causing a bushfire.

Recommended APZ setbacks for the BESS project have been developed using Table A1.12.5 of PBP.

It is recommended that a minimum **10 metre wide APZ** be established around the BESS and any associated buildings/ infrastructure (**Figure 5**). The recommended APZ aims to ensure that radiant heat levels at the building surface remain below 29kW/m^2.

The APZ is to be established and maintained for the life of the development to the standard of an Inner Protection Areas (IPA) as outline within section 4.1.3 and Appendix 5 of PBP and the NSW RFS document *Standard for Asset Protection Zones* e.g.

A Fuel Free Area

- Having a fuel free area (e.g., sand, gravel, concrete etc)

Grass

- Grass to be kept short and mown/ maintained to a heigh <10cm.

Note: 'Infrastructure' for the purposes of requiring APZ excludes road access to the site and power or other services to the site and associated fencing.

4.2 APZ LANDSCAPE MAINTENANCE

The bushfire assessment assumes grasslands surrounding the infrastructure will continue to be maintained as grasslands. This would involve the management of regrowth woodland and should include some form of grassland management such as continued slashing of the grassland vegetation surrounding the development area and within power line easements. In discussions with Firm Power, Ausgrid have confirmed they service the land surrounding the development at least twice a year and intend to continue using it for current and future electrical infrastructure. This confirms the previously described assumption is appropriate to use in the bushfire assessment.

This bushfire assessment assumes that the recommended 10m APZ would be managed to the prescribed APZ (IPA) standards e.g., fuel free (sand, gravel, concrete) or short mown grass <10cm high.

A vegetation screen is proposed as a visual buffer at the outer extent of the 10m APZ and separated from the BESS and associated infrastructure by the perimeter access roads. This vegetation screen will be managed in accordance with low-fuel standards, and as a windbreak/nature strip, whereby dry and fine fuels and overhanging canopy would need to be removed. This would be actioned under a Plan of Management.

There are no known environmental constraints to the ongoing management of the APZ to this standard, and based on the proposed BESS layout, management does not appear to impact on mapped drainage lines.

More information on APZ management can be found in the document: Standards for APZ (NSW RFS). https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf

4.3 BUILDING CONSTRUCTION

PBP recognises the general fire safety provisions of the National Construction Code (NCC) as acceptable solutions in relation to bushfire protection for buildings of Class 5 to 8 of the NCC. The construction of the BESS and ancillary infrastructure is inherently constructed of fire resilient materials however, the following measures are recommended to control the risk of accidental fire ignitions during construction and ongoing operations:

- APZ (10m IPA) and water supply (tank) for bushfire fighting purposes to be constructed as the first stage of development.
- Construction of the BESS and associated infrastructure to the general fire safety provisions of the National Construction Code (NCC).
- Essential equipment should be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies. It should also be designed and maintained so that it will not serve as a bush fire risk to surrounding bush. In this regard it is recommended that substations and other new building be constructed to comply with Australian Standard AS 3959-2018 Construction of buildings in bushfire-prone areas, commensurate with the modelled bushfire attack levels.

4.4 WATER SUPPLY

To ensure an adequate water supply for the protection of assets, a 20kL volume steel tank supply would provide suitable emergency water supplies. The tank should be provided in a strategic location with respect to essential equipment and accessibility (e.g., adjacent to the existing vehicle access road and adjacent to the planned BESS). The tank should incorporate fast fill options and easily accessible fill points such as 65mm Storz fittings for hydrant stands or direct link to tanks. Hardstand access capable of supporting weight and turning capacity for a fully loaded fire truck (23 tonne) should be provided at the tank location.

4.5 ELECTRICITY

Optimally, it is recommended that the new sub-transmission line to connect BESS to the Muswellbrook substation be located underground.

Where this is not achievable, the installation of overhead electrical sub-transmission lines within the development area should be installed and maintained as per the Ausgrid design standards for bushfire protection.

4.6 GAS

No gas provisions are planned at this stage. If gas is proposed for any future design concept or modification, gas shall be installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities.

4.7 ACCESS MANAGEMENT

The access provisions will be suitable for heavy vehicle access and manoeuvrability, for construction and ongoing operation.

In accordance with the PBP requirements for property access, it is recommended that the existing property access road be designed (where required) to meet the minimum standards as detailed in PBP Appendix 3.

4.8 EMERGENCY MANAGEMENT PLANNING

Emergency management is required prior to construction of the BESS and will be relevant during construction, operations, and decommissioning stages. A Bushfire related emergency affecting people on the site could arise due to:

- A Total Fire Ban
- A bushfire near to or approaching the site
- A bushfire originating within the BESS site or travelling through the site.

It is recommended that a Fire Management Plan (FMP) would be prepared post approval and prior to construction and energisation. A FMP would be prepared in consultation with NSW RFS Regional Fire Control Centre. The FMP will include:

- Property Incident Plan (PIP)
- 24 hour emergency contact details including alternative telephone contact;
- Site infrastructure plan;
- Fire fighting water supply plan;
- Site access and internal road plan;
- Construction of Asset Protection Zones (APZ) and their continued maintenance;

- Location of hazards (Physical, Chemical and Electrical) that will impact on fire fighting operations and
- Procedures to manage identified hazards during fire fighting operations;
- Such additional matters as required by the NSW RFS District Office (FMP review and updates).

5. SUMMARY OF RECOMMENDATIONS

Table 1 summarises recommendations made in this report. The project would comply in full to the aims and requirements of PBP if these recommendations are implemented in full. **Note:** This bushfire assessment will be provided to the NSW RFS for review and concurrence. The NSW RFS may stipulate or recommend other mitigation measures after review of this report.

Table 1 Summary of recommendations

Bushfire Protection Measure	Section	Summary of Recommendation
Asset Protection Zone (APZ)	4.1	Minimum 10 metre wide APZ to be installed around all buildings. APZ to be managed as an Inner Protection Area (IPA) for the life of development.
Landscaping	4.2	Ongoing management of APZ to IPA standards e.g., fuel free (gravel concrete) or low-cut grass (<10cm). Vegetation screening to be consistent with APZ standards. A Landscape Plan of Management would manage landscape maintenance performance.
Construction/ Ongoing Operations	4.3	Fire Management Plan (FMP) to be developed for the project in consultation with the local NSW RFS District Office. All buildings to be constructed to the NCC general fire safety provisions.
Water Supplies	4.4	A minimum 20kL steel tank dedicated water storage to be strategically located with adequate access and fast fill points.
Electricity Services	4.5	Electrical sub-transmission lines to be underground and/or to Ausgrid power line design specifications.
Gas Services	4.6	If gas is to be installed and maintained in accordance to AS/NZS 1496:2014.
Access	4.7	Access to be upgraded/retrofitted where needed to provide for safe, reliable, and unobstructed passage by a Cat 1 firefighting vehicle within acceptable operational limits as per Section 4.5 of this document and maintained for the life of the development.
Emergency Management	4.8	Fire Management Plan to be developed for the project in consultation with the local NSW RFS District Office.

6. COMPLIANCE SUMMMARY

Table 2 details the compliance of the proposed BESS project with PBP. The project would comply in full to the aims and specific requirements of PBP if the recommended BPMs in Section 4 of this report are implemented in full.

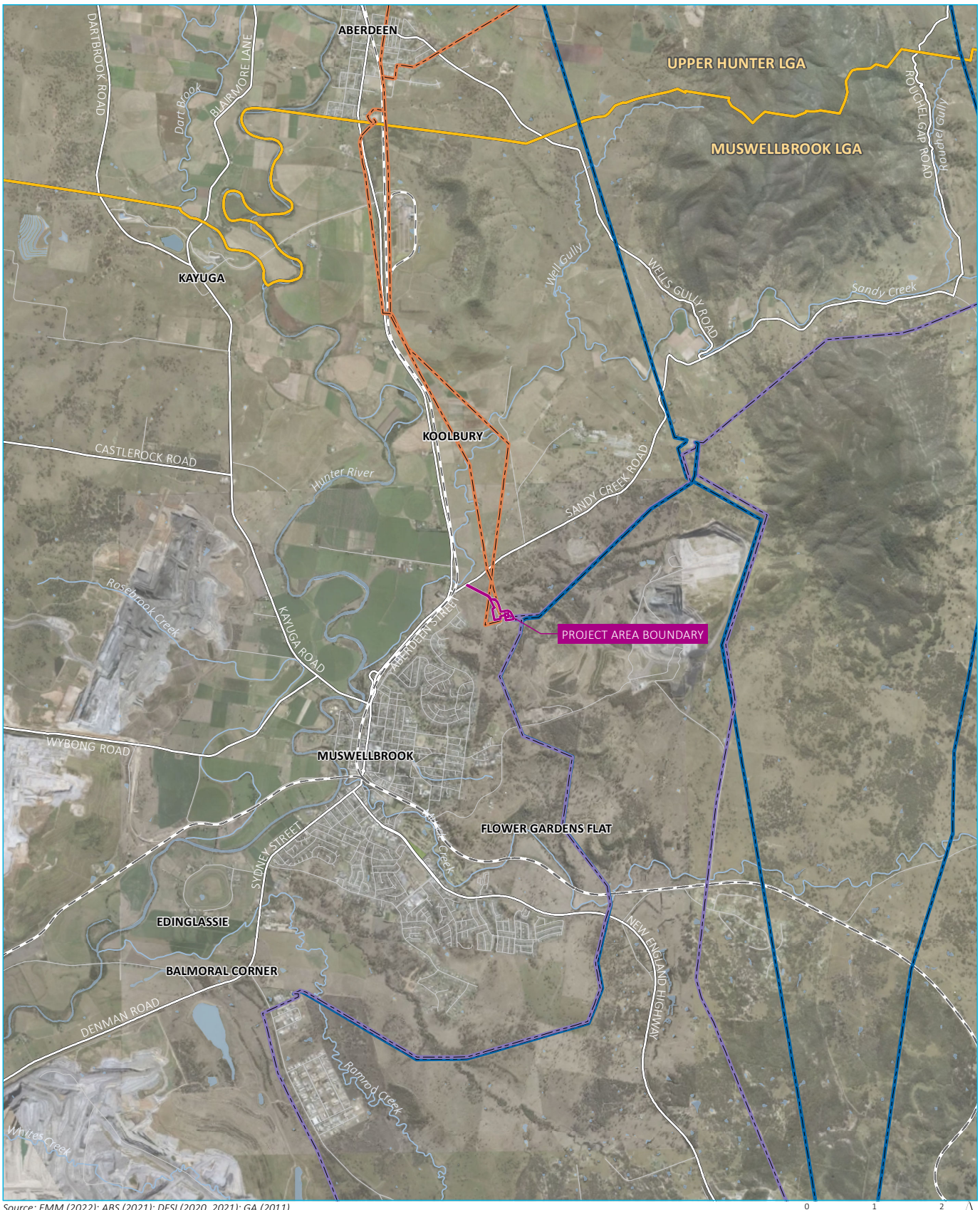
Table 2 Compliance with Aim & Objectives of PBP

Aim	**Meets Aim**	**Comment**
to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.	Yes	The location of the proposed BESS development has considered bushfire risk and applied relevant bushfire protection measures consistent with PBP to mitigate potential bushfire impact, commensurate with the risk.
General Objectives	**Meets Objective**	**Comment**
afford buildings and their occupants protection from exposure to a bush fire;	Yes	Development can achieve acceptable APZ protection and defendable space, commensurate to the identified risk.
provide for a defendable space to be located around buildings;	Yes	The development can achieve acceptable APZ protection and defendable space, commensurate to the identified risk. A minimum 10m APZ (IPA) is proposed around all buildings and structures.
provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;	Yes	Minimum 10m (APZ) ensures radiant heat levels no greater than 29kW/m^2.
ensure that appropriate operational access and egress for emergency service personnel and occupants is available;	Yes	Property access can be provided to acceptable PBP standards.
provide for ongoing management and maintenance of BPMs; and	Yes	Bushfire management and maintenance responsibility contained within the site.
ensure that utility services are adequate to meet the needs of firefighters.	Yes	Water, electricity and gas services can be provided to acceptable PBP standards

7. REFERENCES

NSW RFS Planning for Bushfire Protection 2019.

APPENDIX A. FIGURES



Source: EMM (2022); ABS (2021); DFSI (2020, 2021); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area boundary
- Rail line
- Major road
- Minor road
- Named watercourse
- Waterbody
- Local government area

Transmission line

- 33kV
- 132 kV
- 330 kV

INSET KEY

- Major road
- NPWS reserve
- State forest

Locality

Muswellbrook Battery Energy Storage System
Bushfire Risk Assessment
Figure 1

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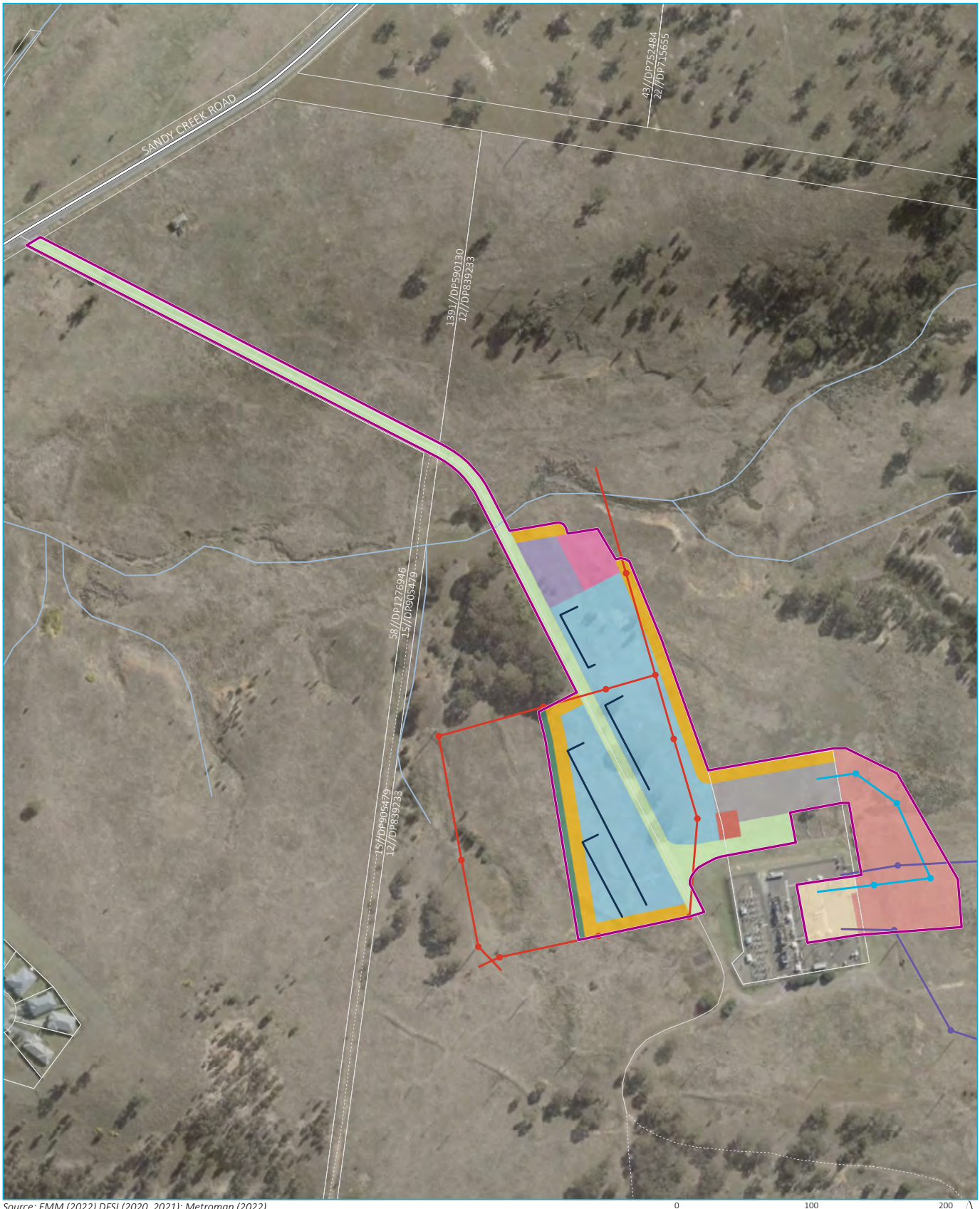

Source: EMM (2022) DFSI (2020, 2021); Metromap (2022)

0 100 200 m

GDA 1994 MGA Zone 56

N

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KEY

- Project area boundary

Existing environment

- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

BESS site layout

- Indicative Connection
- Noise Wall
- Existing 132kV overhead line
- Existing 33kV overhead line
- Ausgrid substation works
- BESS area
- Exclusion area

- Vegetation strip
- Ausgrid works
- BESS access shared
- Construction compound & laydown area
- Grid connection investigation area
- O&M area
- Substation area

Layout

Muswellbrook Battery Energy Storage System
Bushfire Risk Assessment
Figure 2

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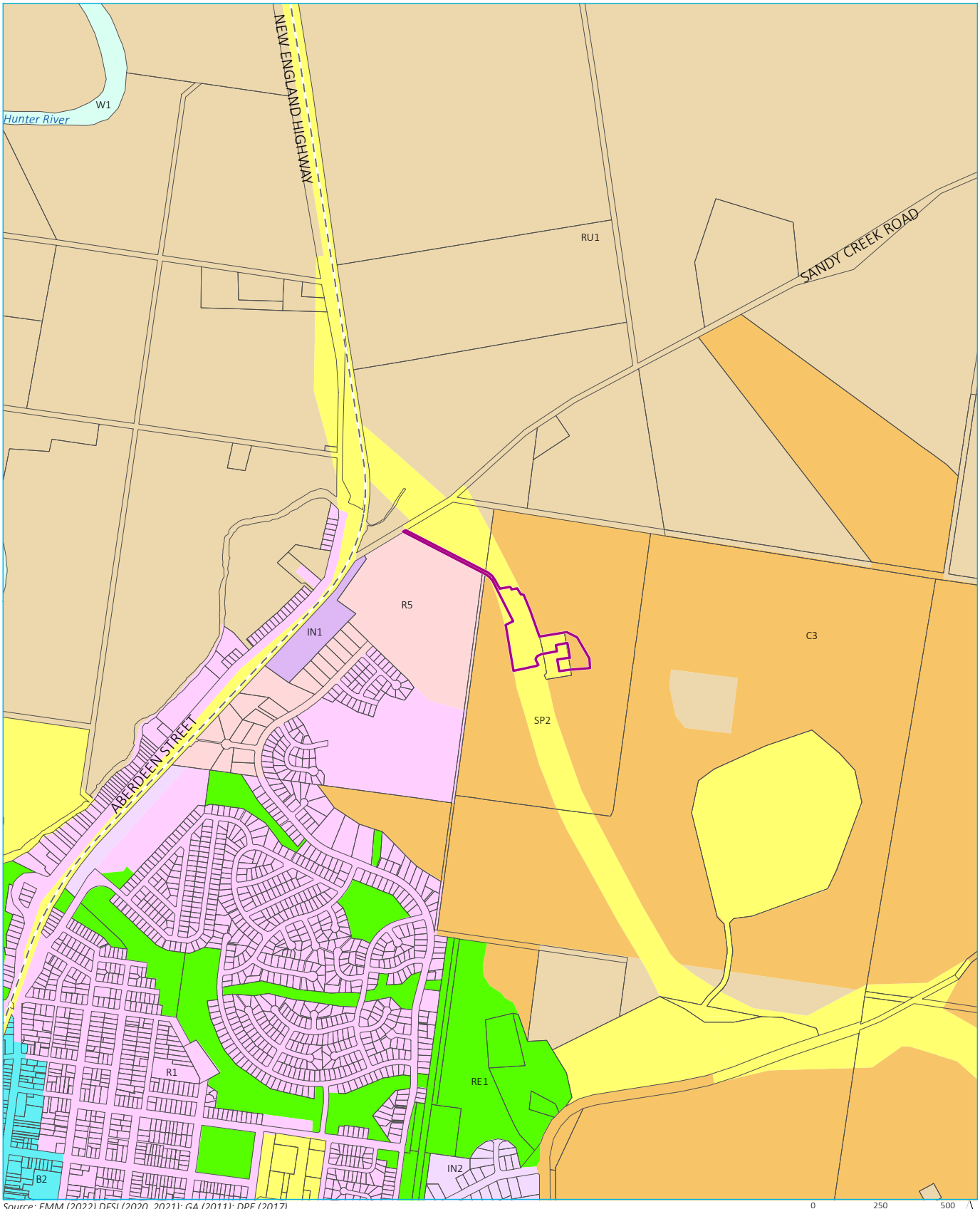

Source: EMM (2022) DFSI (2020, 2021); GA (2011); DPE (2017)

0 250 500 m

GDA 1994 MGA Zone 56

N

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KEY

- Project area boundary
- Cadastral boundary
- Rail line

Land zoning

- B2 | Local Centre
- C3 | Environmental Management
- IN1 | General Industrial
- IN2 | Light Industrial
- R1 | General Residential
- R5 | Large Lot Residential
- RE1 | Public Recreation
- RU1 | Primary Production
- SP2 | Infrastructure
- W1 | Natural Waterways

Zoning

Muswellbrook Battery Energy Storage System
Bushfire Risk Assessment
Figure 3

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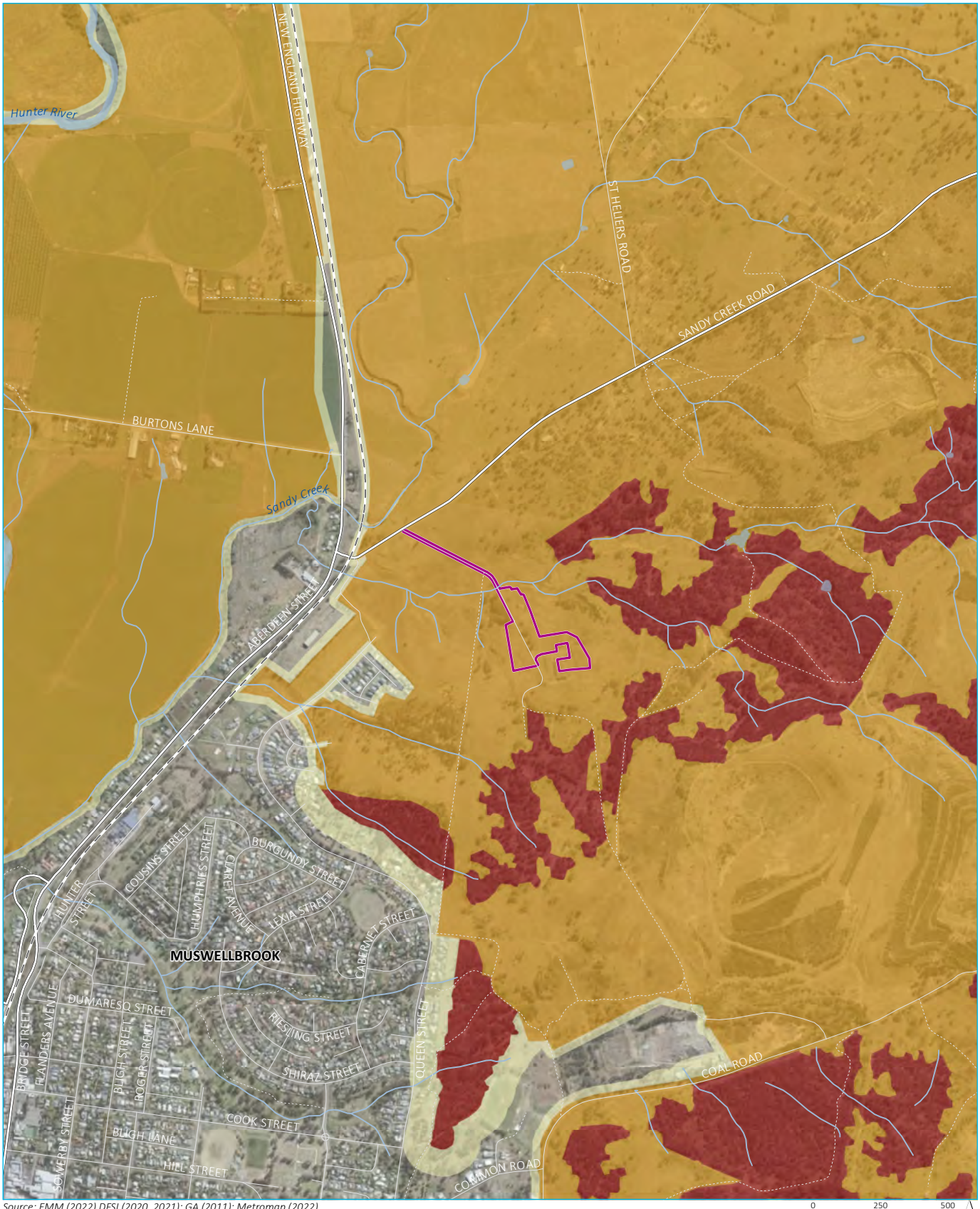

Source: EMM (2022) DFSI (2020, 2021); GA (2011); Metromap (2022)

0 250 500 m
GDA 1994 MGA Zone 56

N

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KEY

- Project area boundary

Existing environment

- Rail line
- Major road
- Minor road
- Vehicular track
- Watercourse/ drainage line
- Waterbody

Bushfire prone land

- Vegetation category 1
- Vegetation category 3
- Vegetation buffer

Bushfire Prone Land

Muswellbrook Battery Energy Storage System
Bushfire Risk Assessment
Figure 4

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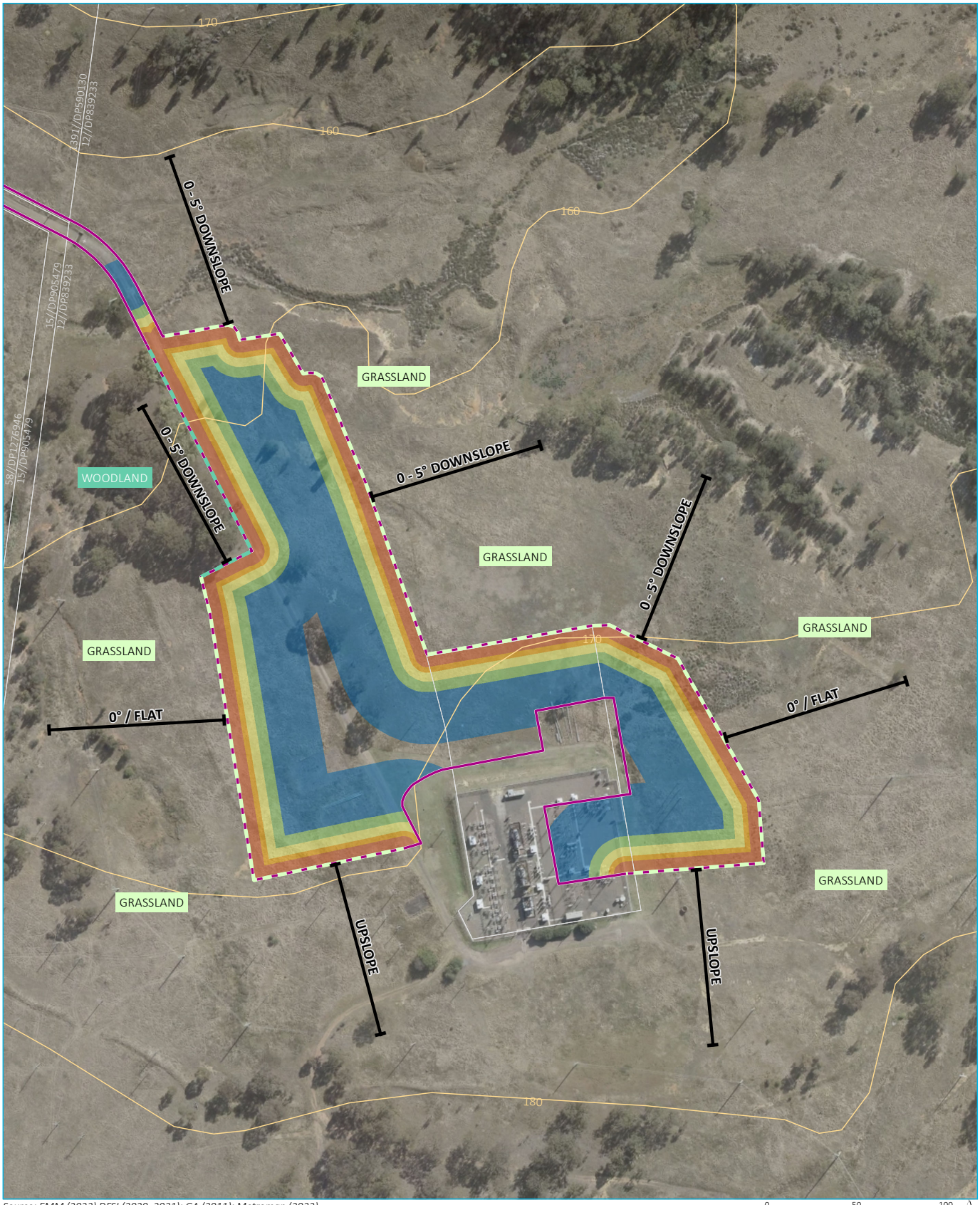

Source: EMM (2022) DFSI (2020, 2021); GA (2011); Metromap (2022)

0 50 100 m

GDA 1994 MGA Zone 56

N

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KEY

- Project area boundary
- Cadastral boundary
- Topographic contour (5 m)
- Slope (100 m)
- Edge of vegetation
- Grassland
- Woodland

Bushfire attack level

- BAL flame zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

Vegetation and heat contours

Muswellbrook Battery Energy Storage System
Bushfire Risk Assessment
Figure 5

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APPENDIX B. SITE PHOTOGRAPHS

Photo 1. Existing unnamed crown road from Sandy Creek Road to the site boundary.

Photo 2. Existing security gate and cattle grid at entry to property access road.

Photo 3. Existing sealed property access road toward Ausgrid Muswellbrook substation.

Photo 4. Ausgrid Muswellbrook substation.

Photo 5. APZ/management around perimeter of substation.

Photo 6. Looking northwest along property access road.

Photo 7. Small patch of woodland adjacent to main entry and west boundary.

Photo 8. Looking west from property access toward grassland 0 degrees/flat.

Photo 9. Grassland 0-5 degrees down-slope to the north of existing substation.

Photo 10. Grassy Woodland up-slope to the south of existing substation.