

Bushfire Constraints & Opportunities Assessment

Proposed:
**Battery Energy
Storage Facility**

At:
**57 Burgess Lane,
Calala**

Reference Number: 230179

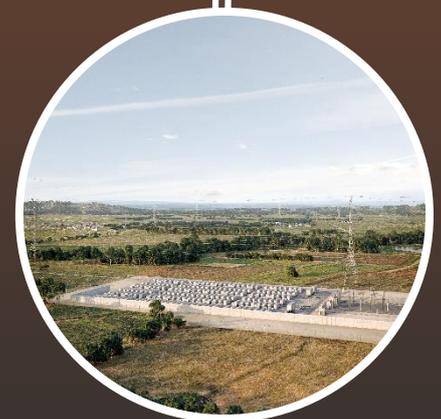
30 September 2022



Prepared By:
**Building Code & Bushfire
Hazard Solutions Pty Limited**

Tel: (02) 9457 6530
PO Box 124
Berowra NSW 2081
ABN 19 057 337 774

www.bushfirehazardsolutions.com.au



Contents

	<u>Page No.</u>
Copyright and disclaimer	2
List of Abbreviations	3
1.0 Introduction	4
2.0 Purpose	4
3.0 Location	5 - 7
4.0 Bushfire Prone Land	8
5.0 Site Assessment	9 - 10
6.0 Planning for Bush Fire Protection	11 - 14
7.0 Hazardous Industry	14
8.0 Development Risks	15
9.0 Conclusion	15 - 16
- List of Referenced Documents	
- Attachments	

Copyright:

Where agreed to by Building Code and Bushfire Hazard Solutions Pty. Ltd, this report may only be copied, distributed or forwarded to other parties in its original format. No part of this document including any wording, images, or graphics can be modified, changed or altered in any way without the express permission of Building Code and Bushfire Hazard Solutions Pty. Ltd. (Copyright Act 1968).

Where this document is found to have been used or altered in any way without the express permission of Building Code and Bushfire Hazard Solutions Pty. Ltd. including any wording, images, or graphics, Building Code and Bushfire Hazard Solutions Pty. Ltd. will not be held liable for any incidental or consequential loss or damages, financial or otherwise resulting from the use of the modified document. Building Code & Bushfire Hazard Solutions Pty. Ltd. will if it considers it necessary, seek to advise third parties including authorities of such illegal use or modifications.

Disclaimer:

This report has been prepared with due care and diligence by Building Code and Bushfire Hazard Solutions Pty. Ltd and the statements and opinions contained in this report are given in good faith and in the belief on reasonable grounds that such statements and opinions are correct and not misleading bearing in mind the necessary limitations noted in previous paragraphs.

Further, no responsibility is accepted by Building Code and Bushfire Hazard Solutions Pty. Ltd. or any of its officers or employees for any errors, including errors in data which is supplied by a third party, or which Building Code and Bushfire Hazard Solutions Pty. Ltd. is required to estimate, or omissions howsoever arising in the preparation of this report, provided that this will not absolve Building Code and Bushfire Hazard Solutions Pty. Ltd. from liability arising from an opinion expressed recklessly or in bad faith.

Any representation, statement of opinion, or advice expressed or implied in this document is made in good faith on the basis that Building Code and Bushfire Hazard Solutions Pty. Ltd. employees and / or agents are not liable (whether by reason of negligence, lack of care or any other reason) to any person, company or their agents for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above.

List of Abbreviations

APZ	Asset Protection Zone
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Tamworth Regional Council
DA	Development Application
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
NCC	National Construction Code
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SSDA	State Significant Development Application
SWS	Static Water Supply

1.0 Introduction

Building Code and Bushfire Hazard Solutions Pty Ltd has been engaged by Equis Australia to provide a Bushfire Constraints and Opportunities Assessment for the proposed stand-alone 300 megawatt (MW)-1200MWh battery energy storage system (BESS) at 57 Burgess Lane, Calala.

The large-scale BESS Project will use lithium-ion battery technology to store and release energy back into the NSW's electricity grid. The Project will be connected to the existing 330 kV Tamworth substation via a new underground electrical easement.

The BESS facilities will be equipped with a Supervisory Control and Data Acquisition (SCADA) and Battery Management Systems (BMS). These two systems jointly monitor the operational and fault status of the system to ensure seamless and safe operation of the BESS, including State of Charge (SOC), voltage, current, power limits, pressures, smoke and temperatures. The SCADA operates to mitigate the risk of fire by shutting down battery modules / racks if monitored conditions are outside of those permissible for safe operation.

The subject site comprises of one (1) existing allotment legally identified as Lot 17 DP 629969. The site is zoned RU4: Primary Production Small Lots and located within Tamworth Regional Council's local government area.

This report addresses the bushfire planning considerations and identifies the constraints and opportunities for the future BESS development.

The planning trigger in New South Wales for the consideration and application of Bushfire Protection Measures for new development is whether the site is identified on the local Councils bushfire prone land map (BPLM) as containing Category 1, 2 or 3 Vegetation or Vegetation Buffer.

In this instance the subject site is depicted on Council's Bushfire Prone Land Map as containing Category 3 Vegetation. The subject site is therefore considered 'bushfire prone'.

2.0 Purpose

The purpose of this report is to outline the bushfire planning constraints and opportunities that would be applicable to the proposed BESS at 57 Burgess Lane, Calala.

This assessment relies on the following:

- Aerial imagery of the subject area (NSW Spatial Services & Nearmap);
- 1 metre contour mapping of the subject area (Elevation and Depth Foundation Spatial Data – Geoscience Australia)
- NSW Planning Portal Spatial Viewer
- Context Plan, prepared by Equis Australia Management Pty Ltd (Rev No 1, dated 11.07.22)
- Site Layout Plan, prepared by Equis Australia Management Pty Ltd (A-102)

This document is for design purposes only and not suitable for submission as supportive documentation.

3.0 Location

The subject site comprises of one (1) existing allotment known as 57 Burgess Lane, Calala and legally identified as Lot 17 DP 629969.

The extent of the overall site and development site is depicted on Figure 01 below.

The subject site is located within Tamworth Regional Council's local government area and zoned RU4: Primary Production Small Lots.

The overall site has street frontage to Calala Lane to the north and abuts neighbouring rural allotments to all remaining aspects. The development site will be accessed via Cala Lane to the north via a proposed access drive.

The overall site is approximately 36 hectares in size with the development site being approximately 5 hectares in size.



Figure 01: Aerial view of the overall site (thick red outline), development site (yellow outline) and 140m assessment buffer (blue outline) (C/- Nearmap)

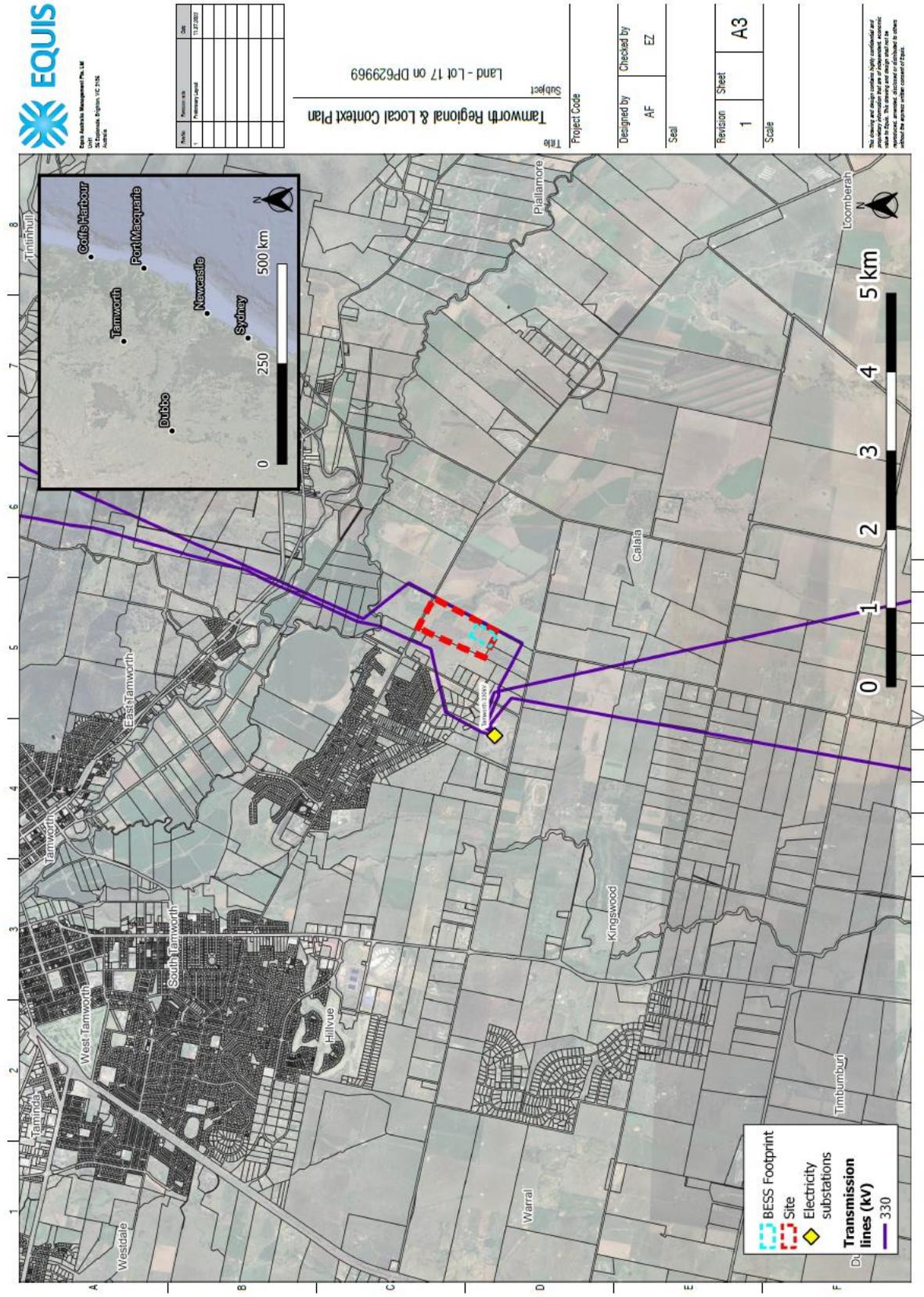


Figure 02: Extract of the current Context Plan

Tamworth BESS

Site layout
200MW - 800MWh
Lot 17/DP629969
 Note: This plan is indicative for development approval only and subject to detailed design changes.

- Legend**
- Equis project extent
 - Property parcel
 - Equis property (parcel)
 - Existing transmission line - Capacity (kV)
 - 132
 - 330
 - Proposed transmission line option**
 - Option 1
 - Option 2
 - Option 3
 - Proposed design**
 - Auxiliary Transformers and Control Room
 - Road
 - PE & Enclosures
 - PE Inverters
 - Steel Water Tank
 - Substation Fence
 - Switchgear
 - Switchyard
 - BESS concept plan**
 - BESS footprint
 - Easement
 - Proposed access



A-102



Scale: 1:3,750 @ A3
 Spatial Reference GDA2020 MGA Zone 56
 This drawing and design contains highly confidential and proprietary information that we will not be made available to the public. This drawing and design shall not be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the project manager.



Figure 03: Extract of the current Site Layout Plan

4.0 Bushfire Prone Land

Section 10.3 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)* requires councils, where a Bush Fire Risk Management Plan applies, to record a bush fire prone land map after consulting with the Commissioner of the NSW RFS. The Commissioner will designate lands to be bush fire prone within an area and, when satisfied that the lands have been recorded on a map, certify the map as the Bush Fire Prone Land map.

The planning trigger in New South Wales for the consideration and application of Bushfire Protection Measures for new development (*Planning for Bush Fire Protection* and Australian Standard 3959 – *Construction of buildings in bush fire prone areas*) is whether a site is identified on the local councils Bushfire Prone Land Map as containing Category 1, 2 or 3 Vegetation or the Vegetation Buffer.

In this instance the subject site is depicted on Council's Bushfire Prone Land Map as containing Category 3 Vegetation. The subject site is therefore considered 'bushfire prone'.

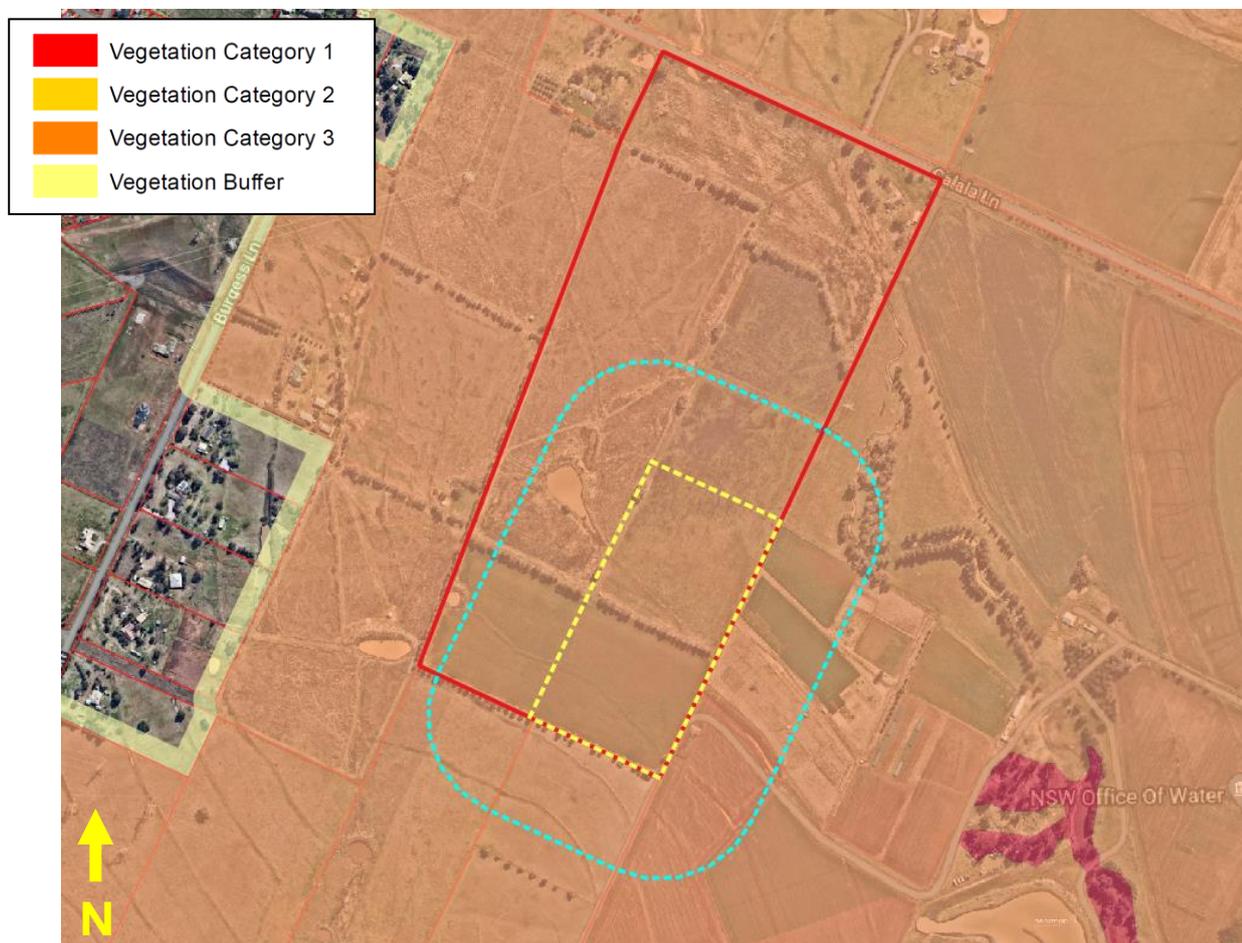


Figure 04: Excerpt from Council's Bushfire Prone Land Map, overall site (thick red outline), development site (yellow outline) and 140m assessment buffer (blue outline)

5.0 Site Assessment

The site assessment has been undertaken by desktop relying on the information referenced in section 2 of this report. No physical inspection has occurred at the time of preparing this assessment and must be undertaken prior to any submission report to validate the following desktop assessment.

Vegetation:

Any future bushfire assessment must consider existing vegetation within neighbouring allotments (to a distance of 140 metres) and retained or proposed vegetated areas within the site.

High resolution aerial imagery indicates the development site largely comprises of slashed / grazed pastures, with a single row of trees dividing internal paddocks.

For the purpose of this assessment it has been assumed that all grounds within the development site will be either built upon, maintained to the standard of an Asset Protection Zone or considered low threat vegetation under A1.10 of PBP.

Where it is identified that vegetation must be retained / rehabilitated within the development site or overall site this advice will need to be updated.

The neighbouring property to the southeast of the development site was observed to be actively cultivating and harvesting crops.

The neighbouring properties to the southwest of the development site were observed to be periodically slashed.

As these neighbouring properties present a potential threat at times it is appropriate to assess them as containing Grassland hazards.

Similarly, it is appropriate to assess the vegetation within the balance of the overall site as a Grassland hazard.

For the purpose of this assessment, the vegetation posing a hazard to the all aspects has been conservatively assessed to be Grassland.

Slope:

The slope of the land under the classified vegetation has a direct influence on the forward rate of spread, fire intensity and radiant heat exposure. The effective slope is considered to be the slope under the classified vegetation which will most significantly influence bushfire behaviour toward the development site.

In accordance with A1.4 'Determine slope' of PBP the slope assessment is to be derived from the most detailed contour data available.

The slope that would **most significantly** influence bushfire and grassfire behaviour was determined from topographic imagery (1 metre contours sourced from ELVIS - Geoscience Australia).

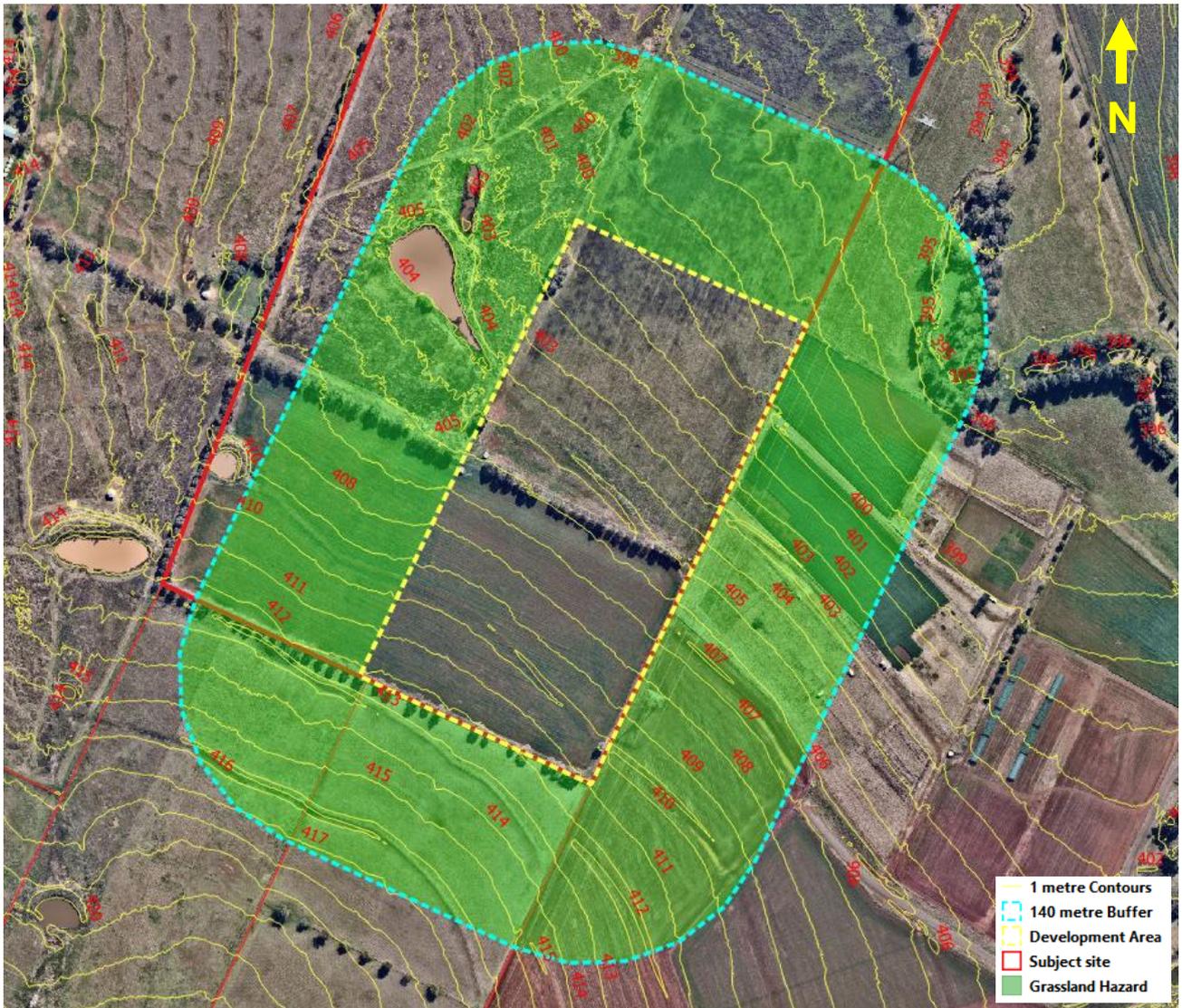


Figure 05: 1 metre contours of the subject area

6.0 Planning for Bush Fire Protection

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service.

The subject site is mapped as being bushfire prone on Tamworth Regional Council BPLM and consequently *Planning for Bush Fire Protection* would be triggered for any future development.

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development.

PBP while being a guideline addressing new development in bushfire prone areas primarily focuses on residential development (e.g. new dwellings, subdivision) and Special Fire Protection Purpose developments (e.g. child care centres, hospitals, schools etc.).

Chapter 8 of PBP addresses 'Other Developments' which describes any type of development that is not covered by Chapters 5 to 7 of that document. Chapter 8 includes commercial uses, industrial uses, tertiary institutions, infrastructure and development which involves large numbers of people.

To comply with the requirements for 'other developments' compliance with the aim and objectives of PBP must be demonstrated. The aim and objectives of PBP are as follows:

The aim of PBP is 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.

The objectives are to:

- I. afford buildings and their occupants protection from exposure to a bush fire*
- II. provide for a defensible space to be located around buildings*
- III. provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition*
- IV. ensure that appropriate operational access and egress for emergency service personnel and residents is available*
- V. provide for ongoing management and maintenance of bush fire protection measures*
- VI. ensure that utility services are adequate to meet the needs of firefighters.*

In addition the application must provide an appropriate combination of bushfire protection measures.

PBP is silent on Battery Energy Storage Systems and therefore we have considered the provisions assigned to Wind and Solar Farms (section 8.3.5 of PBP) as this type of development displays various commonalities to the proposal.

In accordance with section 8.3.5 of PBP the following should be provided:

- a minimum 10m APZ for the structures and associated buildings/infrastructure; and
- the APZ must be maintained to the standard of an IPA for the life of the development.

Note 01: Infrastructure for the purposes of requiring APZ excludes road access to the site and power or other services to the site and associated fencing.

Note 02: An Asset Protection Zone (APZ) is an area between the development (in this instance proposed Warstila GridSolv Quantum Units, Power Conversion Units, Substation and O&M Storage Buildings) and the identified hazards where the fuels are maintained to a minimum to prevent the spread of fire between the hazard and the building / asset.

The current Site Layout Plan indicates that there is a 20-30 metre buffer available around the proposed Warstila GridSolv Quantum Units, Power Conversion Units, Substation and O&M Storage Buildings, exceeding the minimum APZ.

Essential equipment should be designed and housed in such a way as to minimise the impact of grassfires on the capabilities of the infrastructure during emergencies. It should also be designed and maintained so that it will not serve as an ignition source to surrounding grasslands / crops.

A Bush Fire Emergency Management and Operations Plan will be required prior to the operation of the facility. This Plan should identify all relevant risks and mitigation measures associated with the construction and operation of the BESS. This should include:

- detailed measures to prevent or mitigate fires igniting;
- work that should not be carried out during total fire bans;
- availability of fire-suppression equipment, access and water;
- storage and maintenance of fuels and other flammable materials;
- notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate; and
- appropriate bush fire emergency management planning.

It is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under the section 99 of the *Rural Fires Act 1997*.

Access

Planning for Bush Fire Protection addresses design considerations for roads for properties determined to be bushfire prone.

In this instance we recommend that following access provisions;

- property access roads are two-wheel drive, all weather roads.
- the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.
- minimum 4m carriageway width;
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
- suitable turning area in accordance with Appendix 3 (see Figure 06 overleaf) or loop around the development site;

- curves have a minimum inner radius of 6m and are minimal in number;
- the minimum distance between inner and outer curves is 6m;
- the crossfall is not more than 10 degrees;
- maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and

Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed.

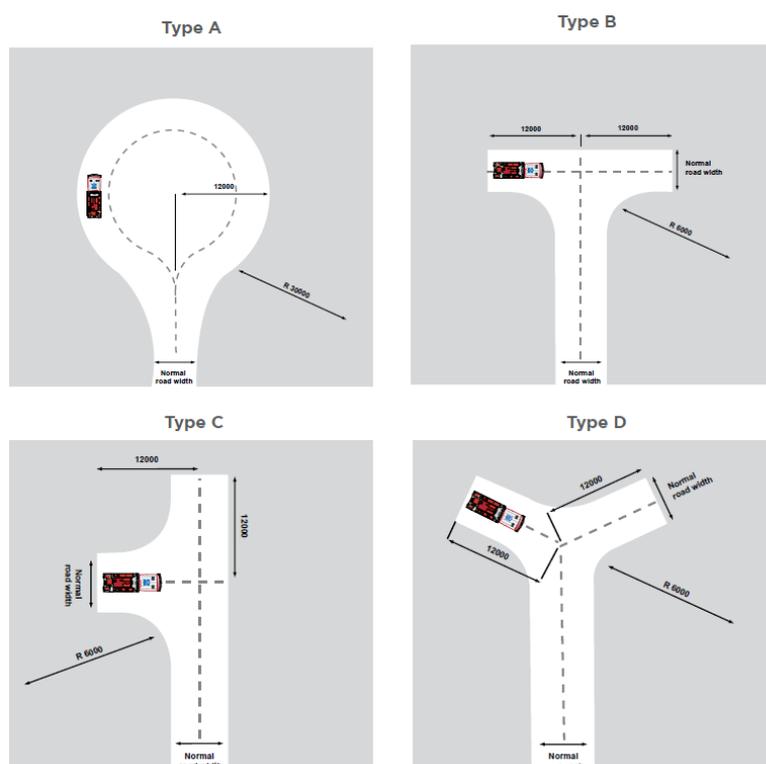


Figure 06: Multipoint turning options detailed in A3.3 of PBP

Water Supply

An adequate supply of water is essential for firefighting purposes.

Water capacities, access for firefighters (tanker or pedestrian) and the provision of appropriate connections must be considered when determining if a proposed water source is suitable.

In this regard the following recommendations should be achieved for the onsite static water supply:

- a minimum capacity of 50,000 litres;
- a connection for firefighting purposes is located on the non-hazard side and away from structures; 65mm Storz outlet with a ball valve is fitted to the outlet;
- ball valve and pipes are adequate for water flow and are metal;
- supply pipes from tank to ball valve have the same bore size to ensure flow volume;

- underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is supplied within 4m;
- above-ground tanks are manufactured from concrete or metal;
- raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959);
- unobstructed access provided at all times;
- underground tanks are clearly marked;
- all exposed water pipes external to the building are metal, including any fittings;

7.0 Hazardous Industry

While it is understood that the proposal would not be considered Hazardous Industry some developments by their very nature are considered to be hazardous, for their ability to either start fires or their susceptibility to the impact of bushfire.

Planning for Bush Fire Protection lists a number of hazardous industries that should not be permitted on bushfire prone land. Generally hazardous industries should not be located within 100 metres of a bushfire hazard and / or within 50 metres of a Grassland hazard.

Hazardous industries include but are not limited to:

- power generating works
- sawmills
- junk yards
- liquid fuel depots
- hazardous industries/storage
- chemical industries/storage
- service stations
- ammunition storage/manufacture
- fireworks manufacture/storage.

There is a pathway to have hazardous industries considered / approved on bushfire prone land however this would involve extensive consultation with the NSW Rural Fire Service and the preparation of a detailed performance-based solution / Bushfire Design Brief.

8.0 Development Risks

Bushfire protection measures can have a significant impact on development costs, viability and timing. Understanding the relevant specifications and requirements of Planning for Bush Fire Protection at the due diligence phase is essential to ensure that the development can be delivered on time, within budget and with the desired yield.

Yield:

We have identified that the current proposal has capacity to comply with the relevant specifications and requirements of *Planning for Bush Fire Protection*.

The future application will need to satisfy the aim and objectives of PBP and should incorporate the recommendations contained herein.

Timing of development:

It is of our opinion that should the proposed development comply with the detail contained herein then we will be in a position to put forward a favourable report for submission to the relevant consent authority.

End Product:

The application of the Bushfire Protection Measures described herein will have minimal impact on cost and design.

9.0 Conclusion

In this instance the subject site is depicted on Tamworth Regional Council's Bushfire Prone Land Map as containing designated Category 3 Vegetation and is therefore considered 'bushfire prone'.

Any future development must demonstrate compliance with the relevant specifications and requirements detailed within *Planning for Bush Fire Protection 2019* as outlined herein.

It is of our opinion that should the proposed development comply with the detail contained herein then we will be in a position to put forward a favourable report for submission to the relevant consent authority.

Comments provided are based on advice received from the NSW Rural Fire Service and the requirements of the *Environmental Planning and Assessment Act 1979* and *Planning for Bush Fire Protection 2019*.

Should you have any further questions please do not hesitate in contacting myself.

Prepared by
Building Code & Bushfire Hazard Solutions



Andrew Muirhead
Bushfire Consultant
Graduate Certificate in Bushfire Protection
Diploma of Engineering
FPA Australia BPAD Level 2 Accredited Practitioner
BPAD Accreditation No. BPAD46966



Reviewed by
Building Code & Bushfire Hazard Solutions



Stuart McMonnies
Manager Bushfire Section
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
FPA Australia BPAD Level 3 Accredited Practitioner
BPAD Accreditation No. BPAD9400



List of Referenced Documents

Australian Building Codes Board (2019). *National Construction Code Volume One - Building Code of Australia*. ABCB

ELVIS -Elevation -Foundation Spatial Data. Elevation.fsdf.org.au. Available at: <http://elevation.fsdf.org.au/>

Environmental Planning and Assessment Act 1979

Equis Australia Management Pty Ltd (2022). Context Plan, Rev No 1, dated 11.07.22

Equis Australia Management Pty Ltd (2022). Site Layout Plan, A-102

Keith, D. (2004). "Ocean Shores to Desert Dunes" Department of Environment and Conservation, Sydney

NSW Department of Planning and Environment (2019). *Planning Portal*. Accessed at: <https://www.planningportal.nsw.gov.au/>

NSW Rural Fire Service (2019). *Planning for Bush Fire Protection. A Guide for Councils, Planners, Fire Authorities and Developers*.

Rural Fire Service NSW (2005). *Standards for Asset Protection Zones*

Standards Australia (2018). *AS3959 Construction of buildings in bushfire-prone areas*.

Acknowledgements to:

Geoscience Australia
Nearmap
Street-directory.com.au

Attachments

Attachment 01: Additional design principles for emergency service vehicle access
Appendix 3 PBP

APPENDIX 3

ACCESS

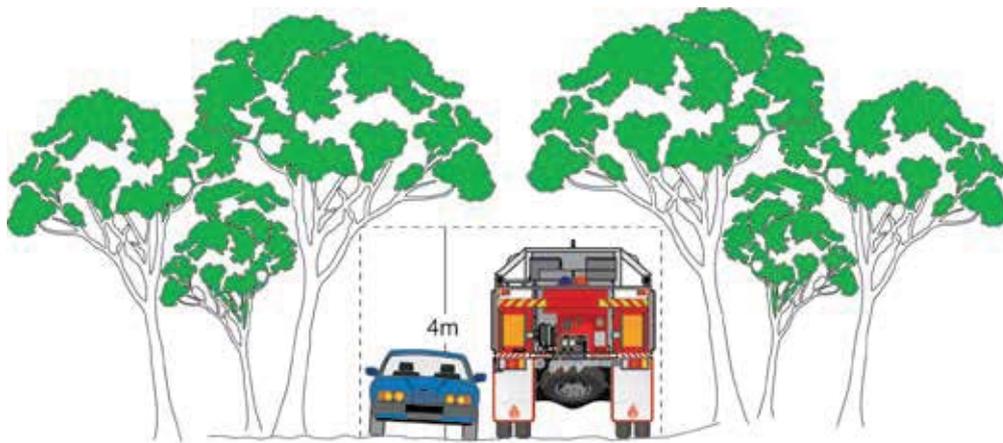
This appendix provides design principles for emergency service vehicle access.

A3.1 Vertical clearance

An unobstructed clearance height of 4 metres should be maintained above all access ways including clearance from building construction, archways, gateways and overhanging structures (e.g. ducts, pipes, sprinklers, walkways, signs and beams). This also applies to vegetation overhanging roads.

Figure A3.1

Vertical clearance.



A3.2 Vehicle turning requirements

Curved carriageways should be constructed using the minimum swept path as outlined in Table A3.2.

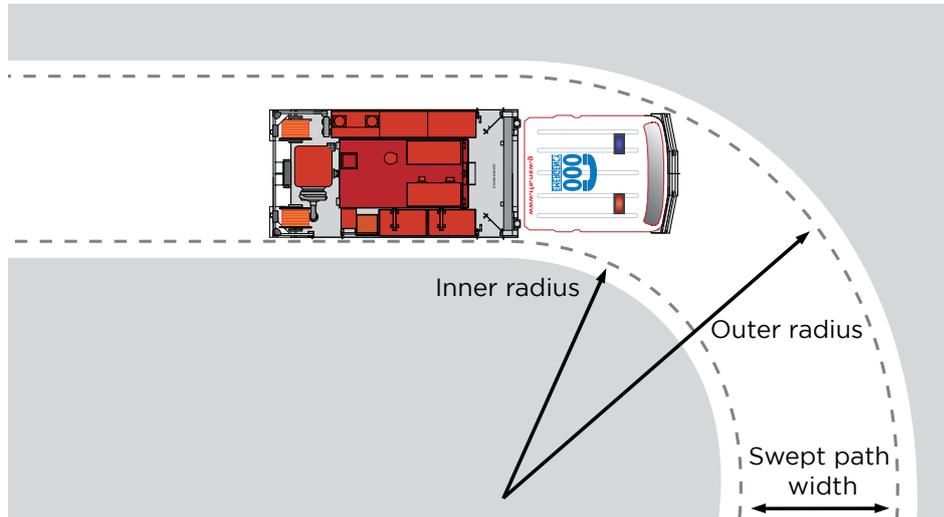
Table A3.2

Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5

Figure A3.2a

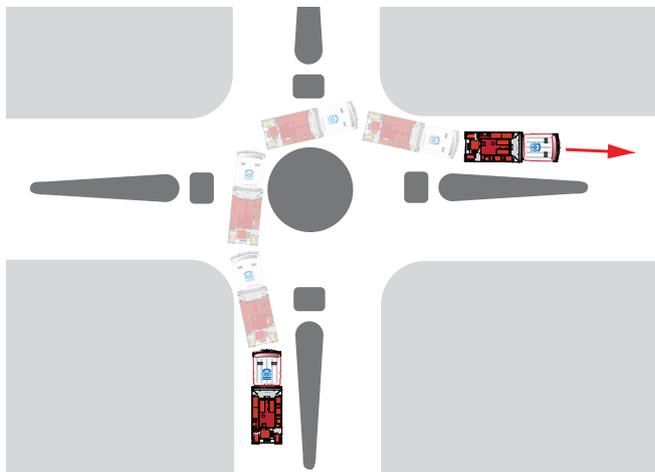
Swept path width for turning vehicles.



The radius dimensions given are for wall to wall clearance where body overhangs travel a wider arc than the wheel tracks (vehicle swept path). The swept path shall include an additional 500mm clearance either side of the vehicle.

Figure A3.2b

Roundabout swept path.



Example of a swept path as applied to a roundabout. The distance between inner and outer turning arcs allows for expected vehicle body swing of front and rear overhanging sections (the swept path).

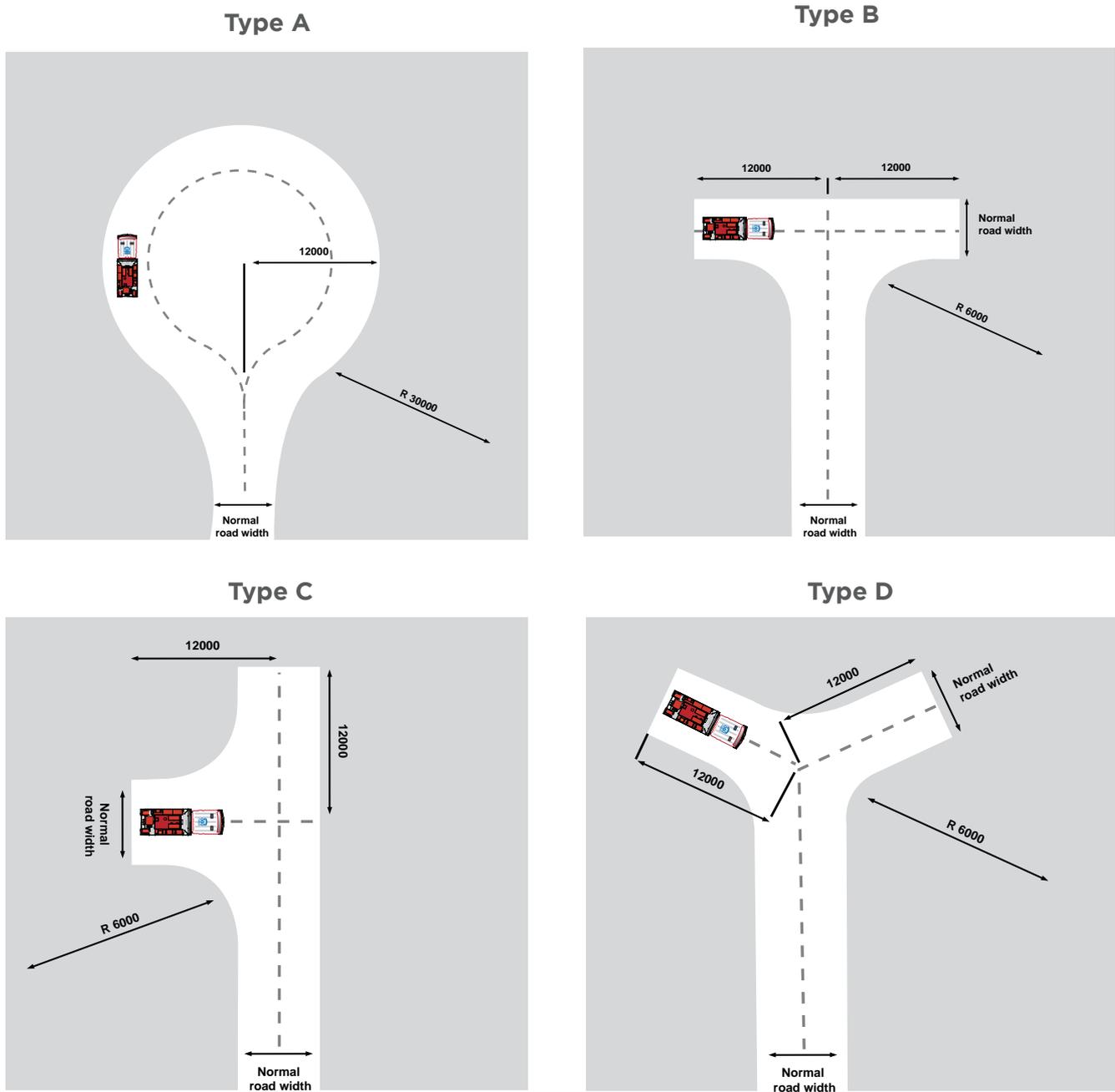
A3.3 Vehicle turning head requirements

Dead ends that are longer than 200m must be provided with a turning head area that avoids multipoint turns. "No parking" signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

Figure A3.3

Multipoint turning options.



A3.4 Passing bays

The construction of passing bays, where required, shall be 20m in length and provide a minimum trafficable width at the passing point of 6m.

Figure A3.4

Passing bays can provide advantages when designed correctly. Poor design can and does severely impede access.



A3.5 Parking

Parking can create a pinch point in required access. The location of parking should be carefully considered to ensure fire appliance access is unimpeded. Hydrants shall be located outside of access ways and any parking areas to ensure that access is available at all times.

Figure A3.5

Hydrants and parking bays.

