

APPENDIX C

BUSHFIRE ASSESSMENT REPORT





BUSHFIRE ASSESSMENT REPORT

151 BACK CREEK, GUNDAROO

Lot 20 DP832724

2 lot Rural Residential Subdivision

Prepared for Thea (Marina) Blomley &
Zenja Pearl

Version 1.0

Ref: RM.98.25



November 18, 2024

DOCUMENT CONTROL

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EXECUTIVE SUMMARY

Thea (Marina) Blomley & Zenia Pearl C/O DPS Yass has engaged EMBER Bushfire Consulting to prepare a Bushfire Assessment Report for a proposed two-lot Rural Residential Subdivision at 151 Back Creek Road, Gundaroo (the *subject site*). As the Yass Valley Council declared, the proposed subdivision is located on bushfire-prone land.

This assessment adopts a methodology provided under the requirements of Section 100B of the Rural Fires Act and the Rural Fire Regulations (2022) to assess the adequacy of bushfire protection of the subdivision as planned.

The development proposal divides a single ~328.7 Ha property into two titles, Large Rural Blocks being Lot 1-165.4 Ha and Lot 2-163.3 Ha. Lot 1 includes the existing dwellings and associated infrastructure. Both lots are the subject of this report.

This report establishes the level of bushfire threat to the development. It examines the six NSWRFs *Planning for Bushfire Protection* PBP (2019) bushfire protection measures (BPM) for the proposed building envelope on Lot 2 and its future dwelling. PBP (2019) is the basis for this assessment.

To improve the level of bushfire protection for the existing dwellings on Lot 1, construction enhancements, where required, are recommended to

increase ember protection and ensure adequate and available firefighting water supplies.

The *subject site* has multiple static water supplies that provide sufficient firefighting water for the existing dwelling. The secondary dwelling will require a new metal or concrete water tank. The new lot will require its own firefighting water supply to serve the future dwelling at the development time.

Although the surrounding environment possesses a bushfire threat to both lots, this threat can be moderated to an acceptable level given the standard suite of bushfire protection measures offered by PBP (2019) and with which the proposed development can comply.

The proposed building envelope on Lot 2 will incorporate an asset protection zone (APZ) to an acceptable bushfire risk level compliant with PBP (2019).

Access to the new building envelope off Back Creek Road will satisfy the performance criteria and intent for access arrangements set out in PBP (2019).

Based on the bushfire assessment and the recommendations contained in this report, the proposed development is deemed to comply with the specific and broad objectives of PBP (2019), Section 100B of the Rural Fires Act and the requirements of the Rural Fire Regulations (2022) and therefore suitable for submission to the NSWRFs for the issuing of a bush fire safety authority.

KEY DETAILS OF DEVELOPMENT

Table 1 – Development Summary

Information	Detail
Lot & DP Number	Lot 20 DP 832724
Street Address	151 Back Creek Road, Gundaroo.
Property name	Strathern
Local Government Area	Yass Valley Council (YVC)
Zoning of subject land	RU1– Primary Production
Zoning of adjoining lands	RU1– Primary Production
Proposed lot sizes	Lot 1-165.4 Ha & Lot 2-163.3 Ha.
Staging issues	Nil
Development	Large Lot Rural Residential Subdivision
Type of assessment	100B for Bushfire Safety Authority
Fire weather area	Southern Ranges
Fire Danger Index	100
Vegetation over the <i>subject site</i>	Grasslands, woodland & forest
Slope Range	Upslope to 0-5° downslope
Environmental constraints	Back Creek running through the <i>subject site</i>
Cultural constraints	Nil known
Method of meeting performance requirements	Using acceptable solutions.

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1 INTRODUCTION

1.1 BACKGROUND AND AIM

Thea (Marina) Blomley & Zenia Pearl C/O DPS Yass has engaged EMBER Bushfire Consulting to prepare a Bushfire Assessment Report for a proposed two-lot Rural Residential Subdivision at 151 Back Creek Road, Gundaroo (the *subject site*).

The development proposal is located on declared bushfire-prone land and, as a result, is subject to Division 4.8 of the *Environmental Planning and Assessment Act (1979) (EP&A Act)* and Section 100B of the *Rural Fires Act (1997)*.

Under the *Rural Fires Act (1997)*, the development proposal must be shown to conform with the broad aim and objectives of the NSW Rural Fire Service (NSW RFS) document *Planning for Bushfire Protection, PBP (2019)* and, therefore, is the essential reference document for this assessment.

This report aims to document the potential bushfire impact on the *subject site* and assess the bushfire protection measures offered by the development proposal that address life safety, improve property protection and facilitate fire service intervention.

1.2 OBJECTIVES AND SCOPE OF THIS BUSHFIRE ASSESSMENT

The purposes of this report are to:

- Determine the bushfire threat to the proposed development,
- demonstrate to the "Consent Authority" that the development proposal meets the specific objectives of PBP (2019) for subdivisions and
- support the development application by showing that the site is suitable for development given the bushfire threat.

The scope of this report is defined by the specific objectives and performance requirements for residential and rural residential subdivisions set out in Chapter 5 of PBP (2019) and reproduced here in Section 3.

The following six bushfire protection measures will be assessed to determine the suitability of the development proposal:

1. Asset Protection Zones (APZs),
2. Landscaping,
3. Building Construction Standards (BAL),
4. Access,
5. Water supplies and utilities (Services) and
6. Emergency Management Arrangements

1.3 LIMITATIONS AND DISCLAIMER

This report is primarily concerned with assessing the capacity of the proposed development to withstand the impacts of a bushfire, including ember attack, radiant heat and flame contact.

Where necessary, protection measures will be recommended to provide satisfactory protection to the occupants and the structures themselves.

It should be kept in mind that the measures prescribed cannot guarantee that the proposed development will survive a bushfire event on every occasion. This is primarily due to the reliance on vegetation management, the unpredictable behaviour of fire, and extreme weather conditions.

EMBER Bushfire Consulting has prepared this report with all reasonable diligence. The information in this report has been gathered from field investigations of the site and plans provided by the developer.

Table 2 - Stakeholders

Stakeholder	Role	Contact	Detail
Thea (Marina) Blomley & Zenja Pearl	Owners	Marina	0449251468
DPS Yass	Surveyors/Developer	Rachel Doberer	0409888034
YVC	Consent Authority	Not Given	(02) 6226 1477
NSWRFS	Consent Authority	Not Given	4475 1300

1.4 SITE DESCRIPTION

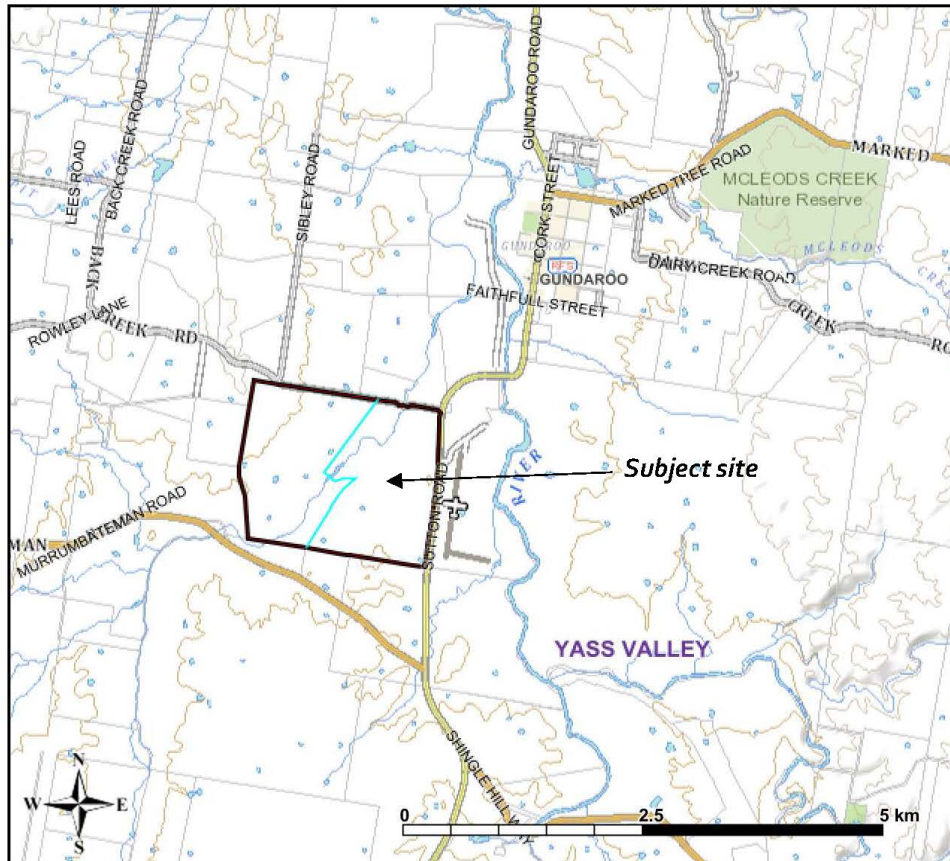


Figure 1 - Subject site regional context to Gundaroo village. FireMaps FPAA (2024)

The *subject site* is in Southeastern NSW ~ 4.3 km southwest of Gundaroo, NSW. See Figure 1

The *subject site* is currently zoned as RU1 – Primary Production as are the surrounding blocks.

There are two existing residential dwellings. A dwelling consisting of two buildings on concrete slabs with brick walls and a metal roof, and a secondary dwelling on a concrete slab with timber clad walls and a metal roof.

There are three Class 10a buildings (sheds / workshops / ancillary buildings) near the main dwelling, being a farm shed, carport and storage shed. All these buildings are greater than 6 m from the existing dwelling.

The existing property access road connects to Back Creek Road a six-meter-wide sealed public two way through road.

On the date of the site visit, 24 October 2024, the managed gardens within the curtilage of the existing dwelling were found to have an adequate level of vegetation and structure maintenance, and general build quality.

1.5 SITE DESCRIPTION CONTINUED

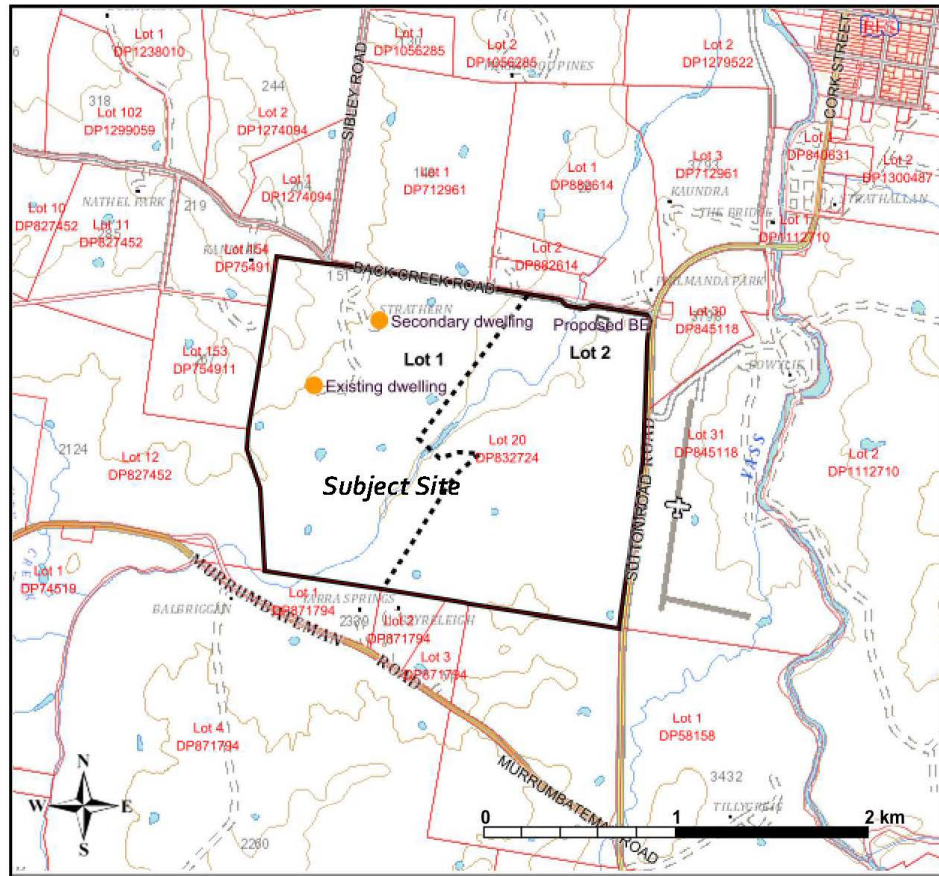


Figure 2 - Subject site local context. FireMaps FPA8 (2024)

Vegetation over the *subject site* is mainly RU1 livestock grazing grasslands paddocks. On the eastern boundary there is a regenerating woodland and to the northwest corner a combination of mainly woodland and forest formations.

Back Creek runs through the middle of the *subject site* from the south to the north. Back Creek corridor is mapped as being biodiverse.

There are multiple dams over the *subject site* are suitable as additional static water supplies. Both dwelling have multiple water tanks fed from roof structures and bore/dam water.

The landform of the *subject site* is generally undulating sloping up from Back Creek to the western boundary. Most slopes are in the upslope to 5° downslope range.

1.6 THE DEVELOPMENT PROPOSAL

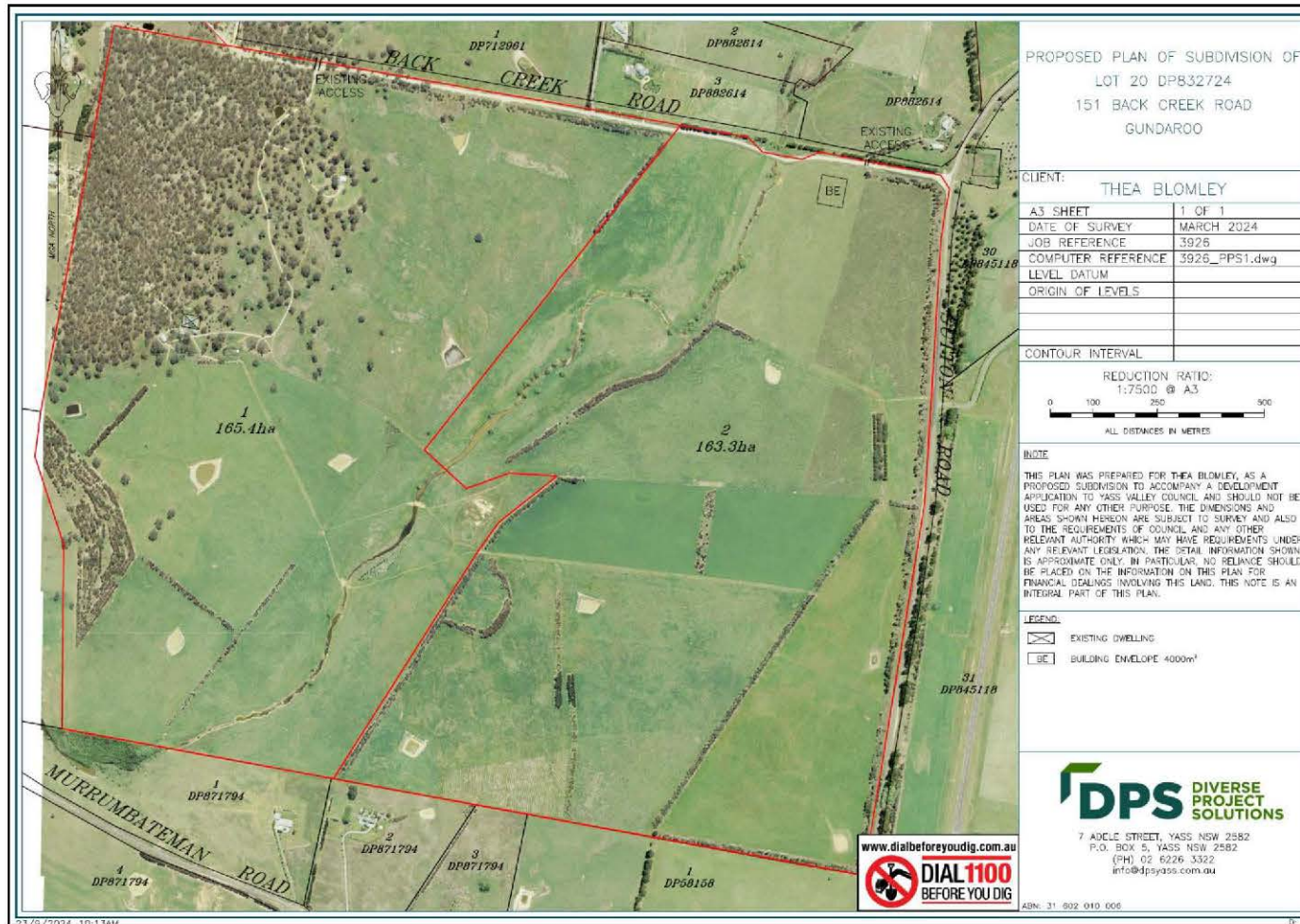


Figure3 – The proposed 2-lot subdivision. DPS Yass (2024)

1.7 DEVELOP PROPOSAL OVERVIEW

The development proposal is to divide what is currently a single ~328 Ha block into two, separate title Large Rural Residential Blocks.

The proposed building envelope on Lot 2 will be provided with Asset Protection Zones (APZ) to ensure that any future dwelling will not exceed 29 kW/m² radiant heat flux, as a component of the performance-based design for access, and a *AS:3959 Construction of Building in Bushfire-prone Land* BAL-29 construction standard. Class 10a structures <6m from a dwelling are to be constructed in accordance with Clause 8.3.2 PBP (2019).

Access to the new building envelope will comply with the access requirements of Table 5.3b PBP (2019).

The proposed new dwelling on Lot 2 when occupied, will not unduly increase the volume of traffic on the public road system during a bushfire emergency.

The development proposal is limited to the formal subdivision of the lot, the preparation of one building envelope and property access to Lot 2. It is not intended for the proposal to include any further subdivision or the erection of any new structures, water tanks, gas or electricity supplies.

2 ASSESSING THE BUSHFIRE THREAT

2.1 METHODOLOGY

The methodology adopted to prepare this report is as follows:

Table 3 - Report Methodology

Method	Task	Considerations
Desktop analysis	Review available mapping resources, policy documents & development plans	Online Maps Development Control Plans Local Environmental Plan
Site inspection	Evaluate the site's context, determine bushfire threat, options for asset protection zones, access roads and infrastructure.	Ground truth online mapping data, validate vegetation class, obtain site measurements, and assess existing structures and infrastructure.
Assessment of proposal against the NSWRFs Planning for Bushfire Protection PBP (2019) and Australian Standard 3959 – 2018.	Assess the development proposal against the performance criteria of PBP (2019).	Does the proposal comply with the performance criteria of PBP (2019)?
Report	Preparation and publication of bushfire assessment report	Demonstrate that the proposal meets the aims and objectives of PBP (2019).

2.2 GENERAL BUSHFIRE ENVIRONMENT

The following environmental factors are adopted for Lot 2 to determine the potential bushfire threat posed to the proposed building envelope.

Table 4 - Bushfire behaviour factors

Factor	Value
Fire Weather Area	Southern Ranges
FDI	100
Predominant Vegetation Classification Lot 2	Grasslands and regenerating Woodland
Effective Slope Lot 2	Ranging from upslope to 0-5° downslope

Relevant bushfire planning information for the *subject site* as published by YVC and NSW State Government is provided in Section 2.3 and 2.4 below.

2.3 SUBJECT SITE BUSHFIRE-PRONE LAND

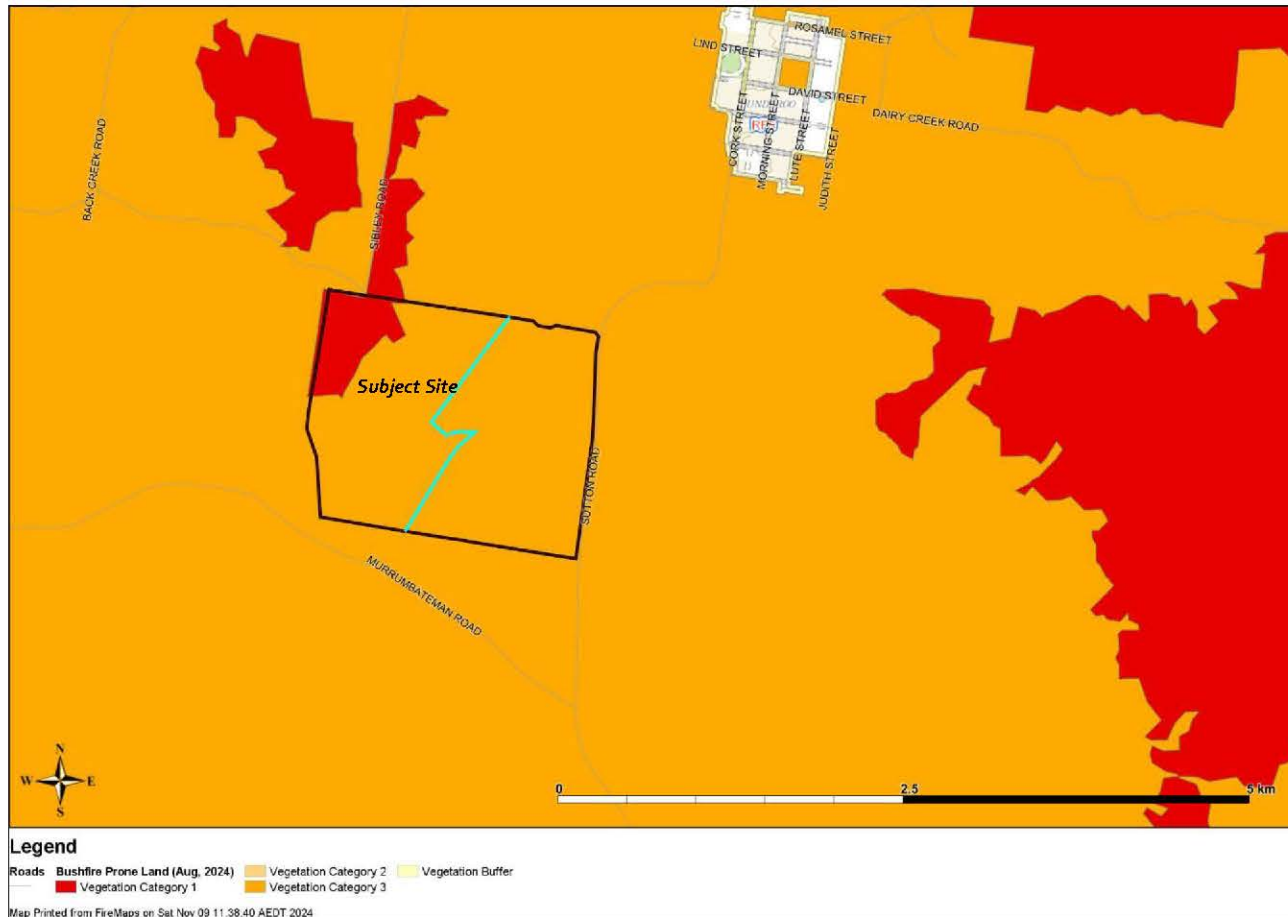


Figure 4 – Subject site Bushfire-Prone Land Map declared bush fire prone by YVC and NSWRFs. FireMaps FPAA (2024)

2.4 VEGETATION FORMATIONS INFLUENCING THE SUBJECT SITE

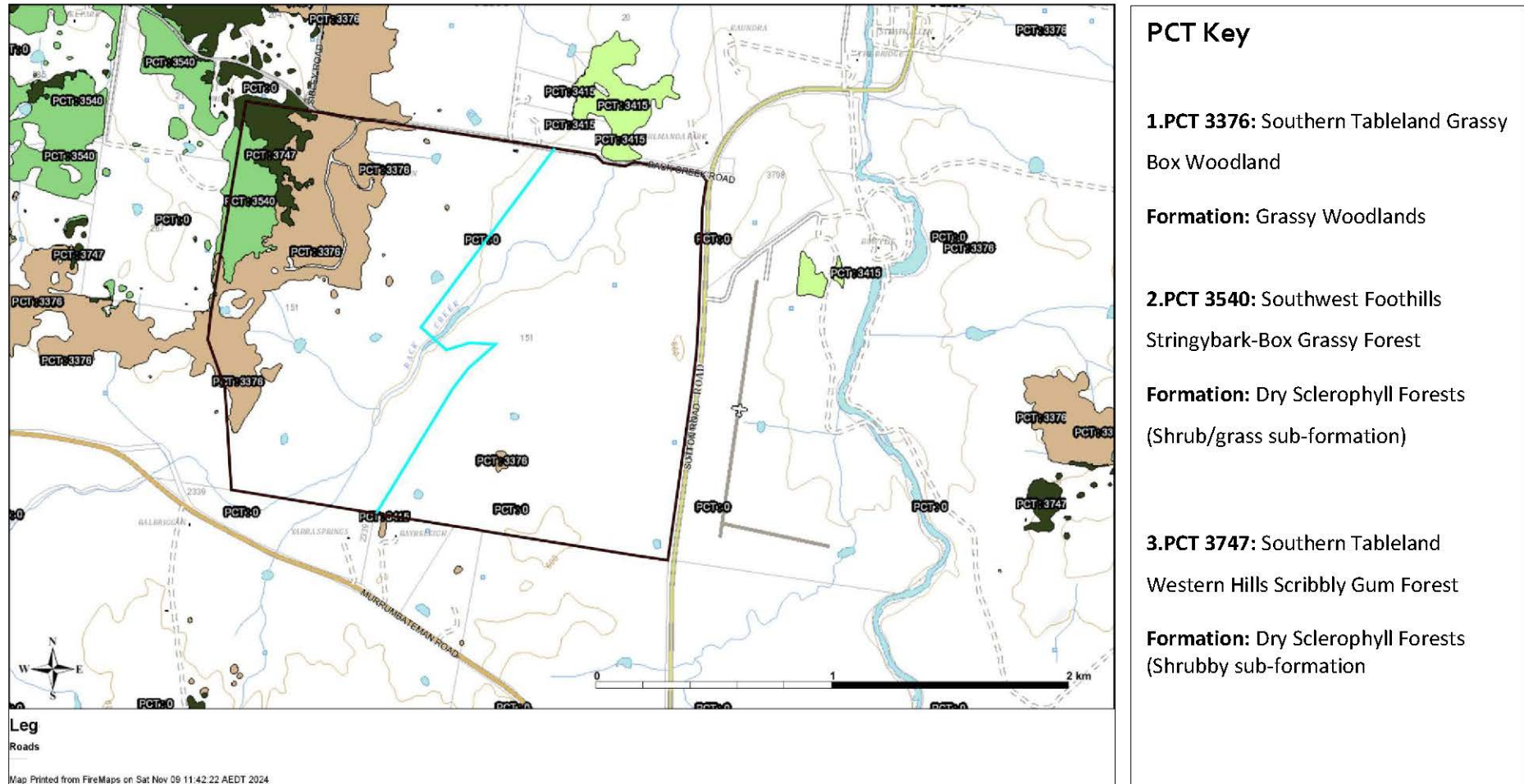


Figure 5 – Subject site PCT vegetation classification, SEED (NSW Gov. 2024) overlay on FireMaps (FPAA 2024)

3 BUSHFIRE PROTECTION ASSESSMENT

The NSWRFSS requires the appraisal of the proposed development against specific objectives set out in PBP (2019). These objectives are:

- Minimise perimeters of the subdivision exposed to the bush fire hazard,
- Minimise vegetated corridors that permit the passage of bush fire towards buildings,
- Provide for the sighting of future dwellings away from ridge tops and steep slopes, within saddles and narrow ridge crests,
- Ensure that separation distances (APZs) between a bush fire hazard and future dwellings enable a radiant heat level not to exceed 29kW/m^2 ,
- Ensure the ongoing maintenance of asset protection zones,
- Provide adequate Access from all properties to the public road network for residents and emergency service,
- Provide Access to hazardous vegetation to facilitate bush fire mitigation works and property protection and
- Ensure the adequate supply of water and other services to facilitate effective firefighting.

PBP (2019) offers six bushfire protection measures (BPM) that work together to provide residential structures with acceptable protection against bushfire impact. To ensure that a satisfactory level of protection is provided, each measure will be assessed against the performance requirements detailed in PBP (2019).

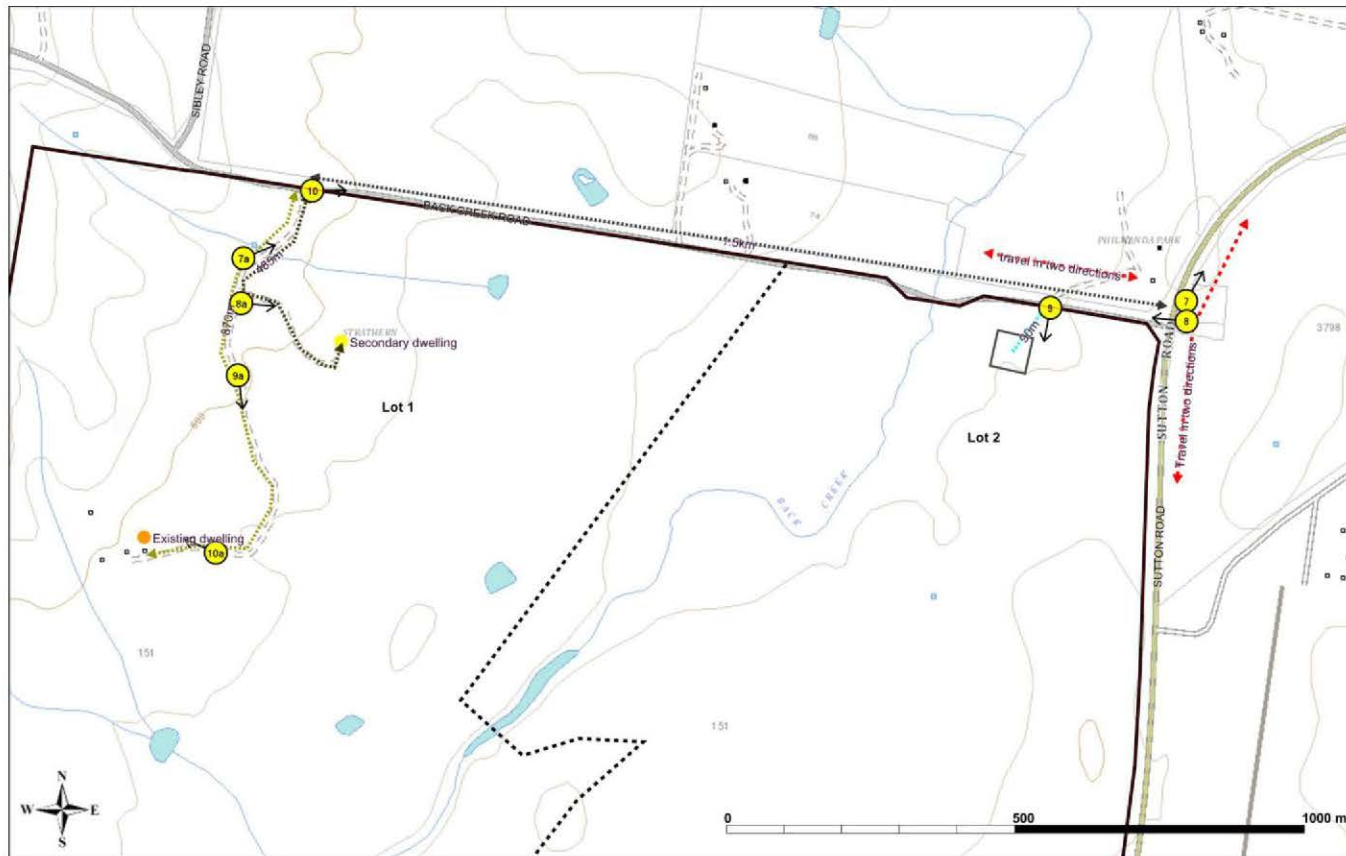
3.1 SPRINKLER SYSTEMS AND OTHER PROTECTION MEASURES.

It is not proposed that bush fire sprinkler systems or other fire protection measures be introduced into the development.

3.2 BUSHFIRE EMERGENCY PLANNING

EMBER Bushfire Consulting recommends a "prepare and leave early" approach to bushfire emergencies. Even after any recommendations have been adopted, the nature of bushfires in extreme conditions can be very unpredictable and extremely dangerous. Any "stay and defend" decision should be thoroughly evaluated and planned. It is highly recommended that all residents prepare an NSWRFSS Bushfire Survival Plan before the onset of the bushfire season.

4 ACCESS BOTH LOTS



Legend

Photopoints	Proposed building envelope	Lot 2 access	Existing PAR secondary dwelling	Existing dwelling	Secondary dwelling	Roads
●	□	↔	↔	●	●	—
	Proposed building envelope 63m x 63m	↔ 1.5km	↔ 90m	● Existing dwelling	● Secondary dwelling	
		↔ Existing PAR dwelling	↔ Travel in two directions			

Map Printed from FireMaps on Fri Nov 15 11:23:28 AEDT 2024

Figure 6 – Proposed and existing access design. FireMaps FPAA (2024) (McGregor, 2024) Photo points refer to Figures 7-10 & 7a & 10a below. The purple area is the biodiversity corridor for Back Creek.

4.1 ACCESS PHOTOS



Figure 7 – Looking northeast towards Gundaroo on Sutton Road (McGregor, 2024)

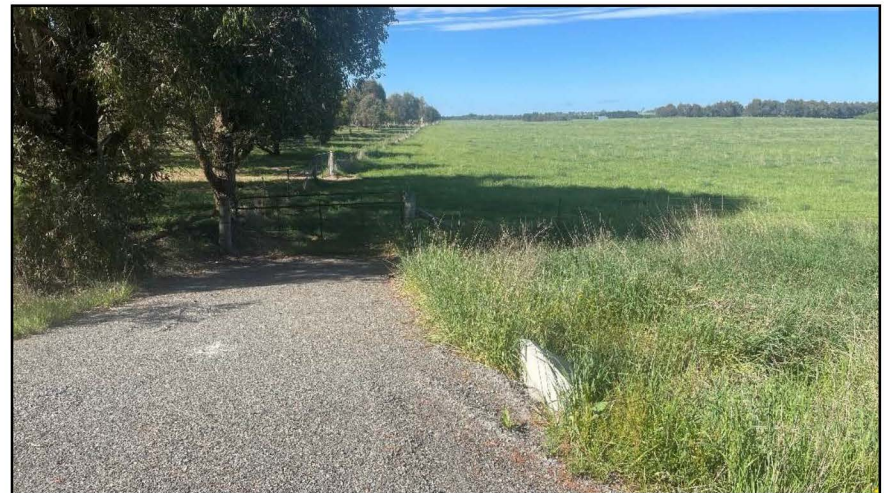


Figure 9 – Existing entry and gate to Lot 2 building envelope (BE) (McGregor, 2024)



Figure 8 – Looking west on Back Creek Road. (McGregor, 2024)



Figure 10 – Looking east on Back Creek Road towards Sutton Road. (McGregor, 2024)

4.2 ACCESS PHOTOS CONTINUED



Figure 7a – Looking northeast on the existing property access road (PAR). (McGregor, 2024)



Figure 9a – Looking south on Lot 1 existing PAR. (McGregor, 2024)



Figure 8a – Looking east on Lot 1 secondary dwelling PAR. (McGregor, 2024)

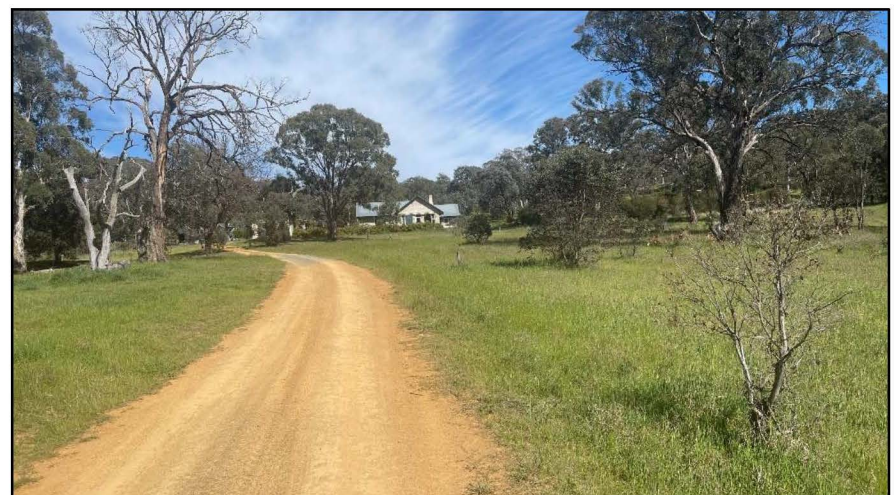


Figure 10a – Looking west towards the existing dwelling. (McGregor, 2024)

5 LOT 2 ASSESSMENT



Figure 11 - Proposed building envelope located on Lot 2. (DPS Yass, 2024)

5.1 PHOTOS FROM PROPOSED LOT 2 BE



Figure 12 – Looking north over grasslands to Back Creek Road. (McGregor, 2024)



Figure 14 - Looking south over grasslands (livestock grazing paddocks). (McGregor, 2024)



Figure 13 – Looking east to regenerating woodlands. (McGregor, 2024)



Figure 15 - Looking west over grasslands towards Back Creek. (McGregor, 2024)

5.2 LOT 2 - BUILDING ENVELOPE, APZ AND VEGETATION

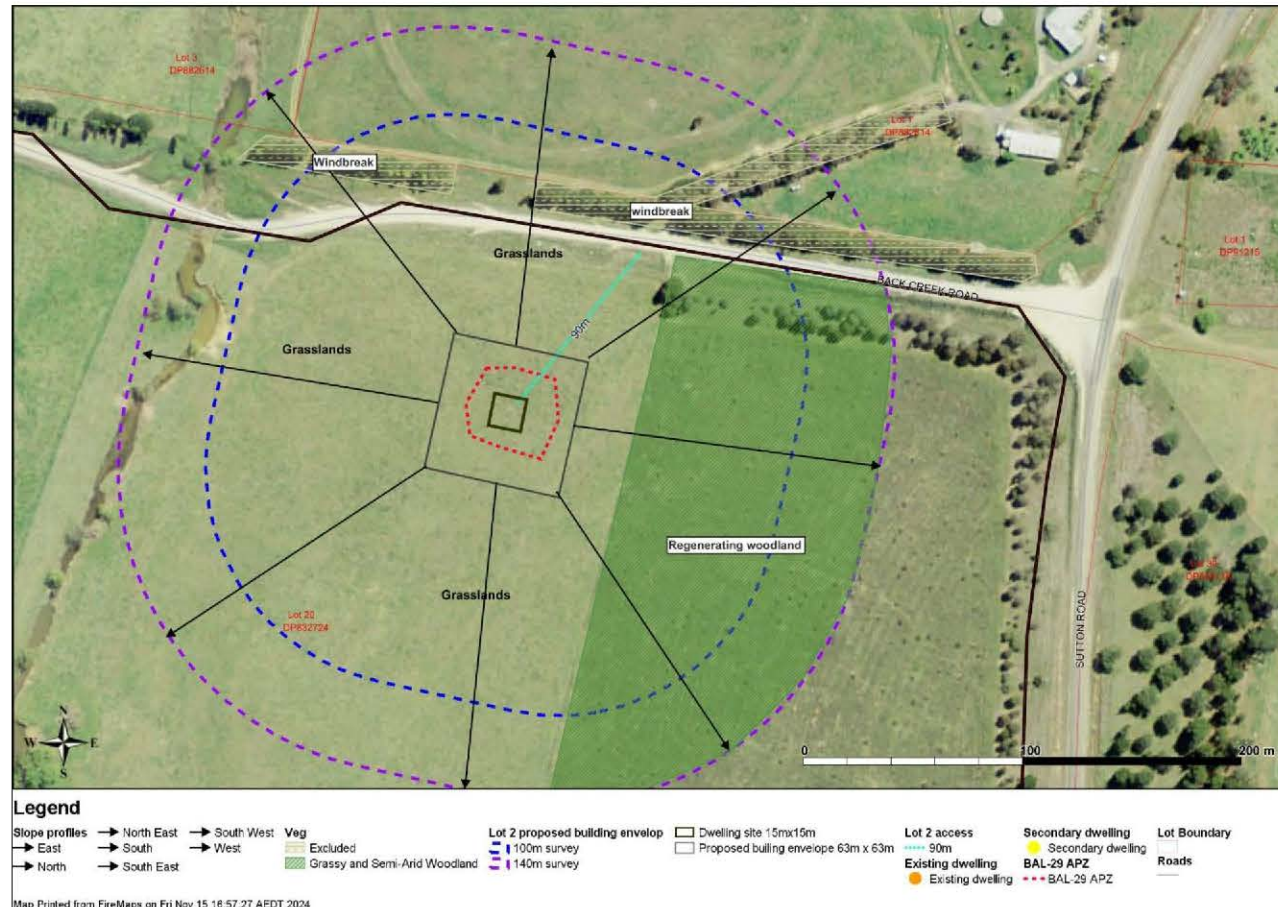


Figure 16 - Proposed building envelope, BAL-29 sized APZ, dwelling site and predominate vegetation. FireMaps FPAA (2024) (McGregor, 2024)

5.3 LOT 2- EFFECTIVE SLOPE ANALYSIS

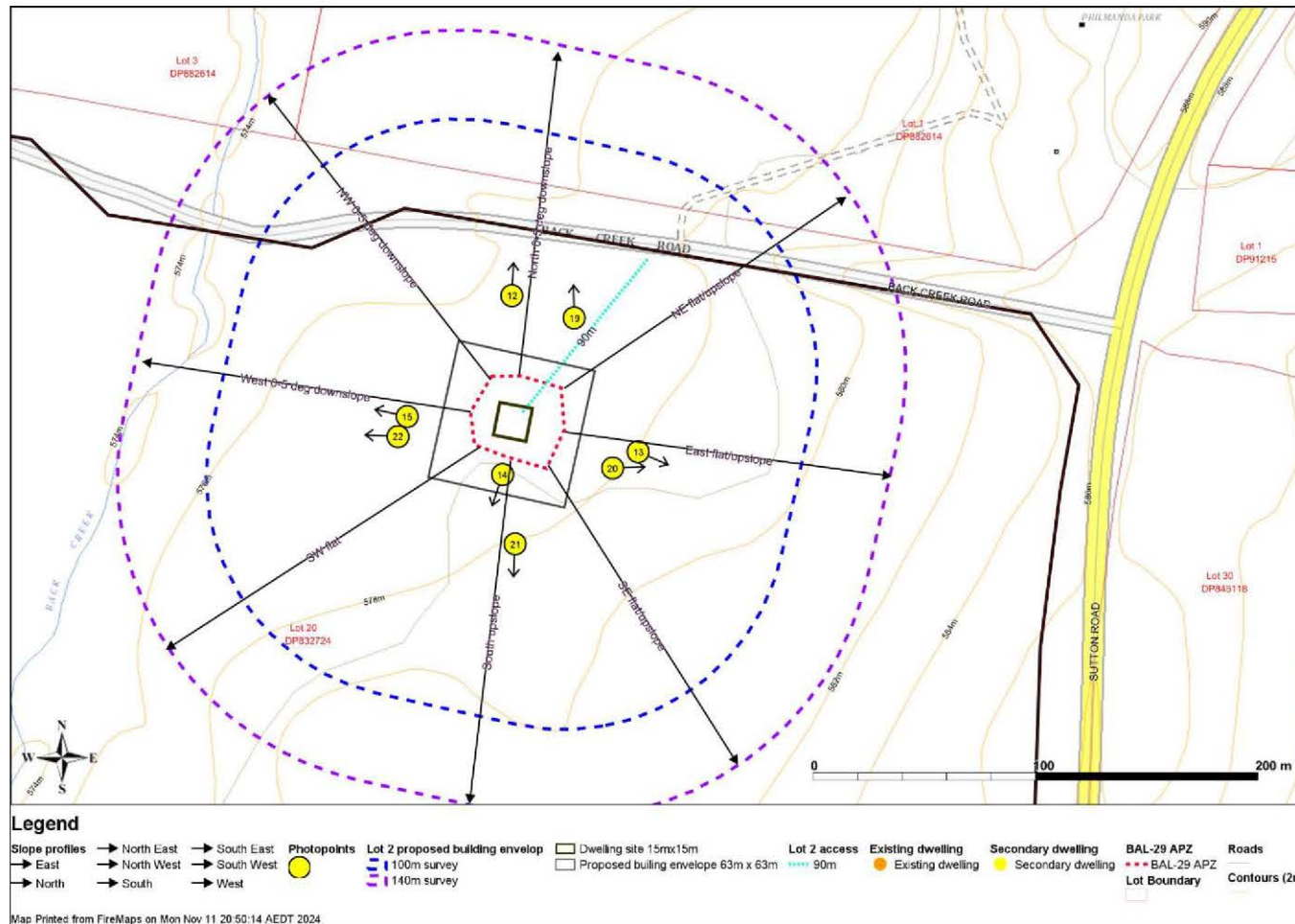


Figure 17 – Effective slope on FireMaps FPA (2024). Photo points 12-15 & 19-22 refer to Figures 12-15 & 19-22. (McGregor, 2024)

5.4 LOT 2-APZ DETAILS

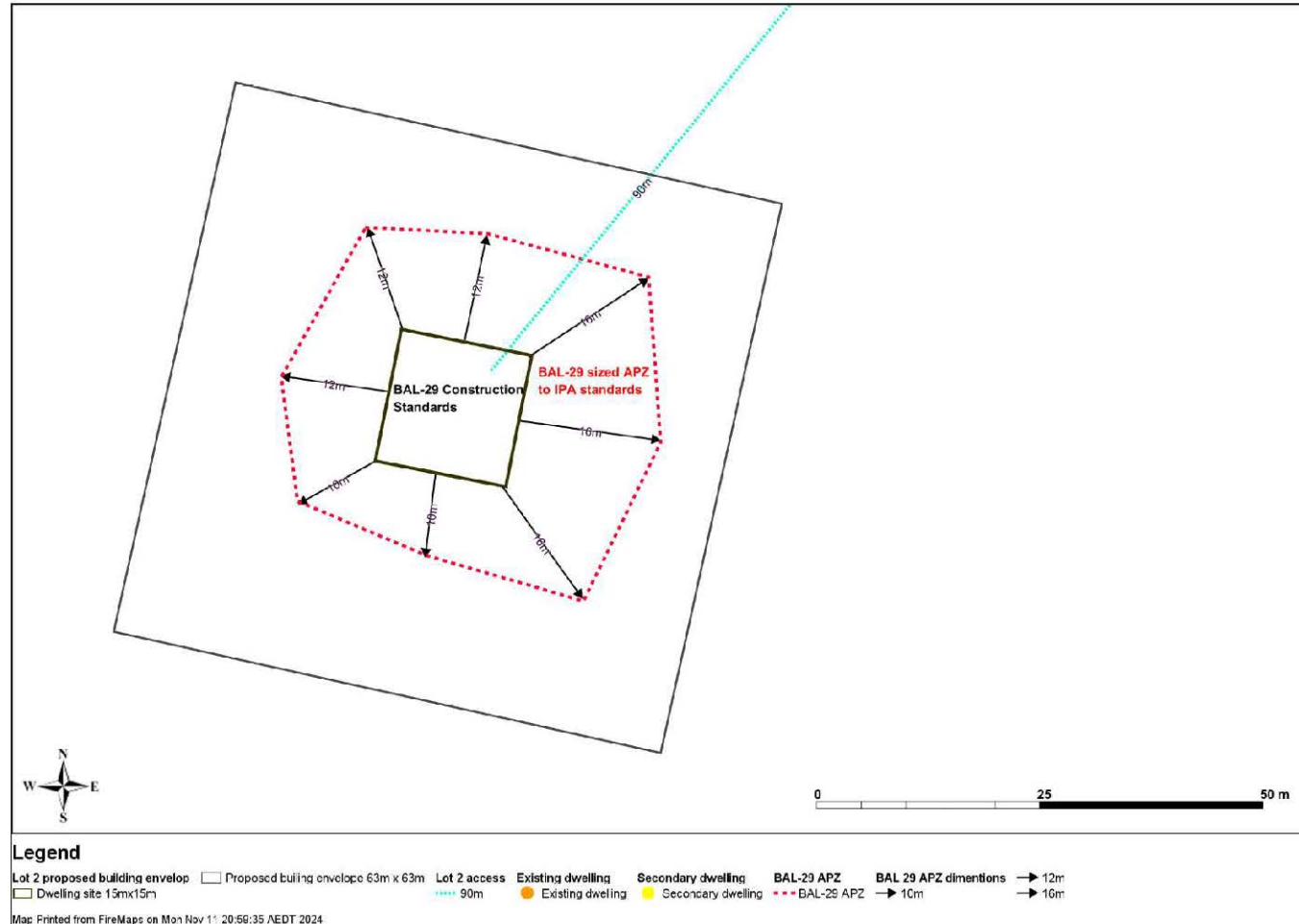


Figure 18– BAL-29 sized APZ details. FireMaps FPAA (2024). (McGregor, 2024)

5.5 LOT 2-THODELITE PHOTOS



Figure 19 – Photo showing 0-5 ° downslope to the north (McGregor,2024)



Figure 21 – Photo showing upslope to the south (McGregor,2024)



Figure 20 – Photo showing flat/upslope to the east (McGregor,2024)



Figure 22 – Photo showing flat/upslope the west (McGregor,2024)

5.6 LOT 2 -ASSESSMENT DISCUSSION AND RECOMMENDATIONS

EFFECTIVE SLOPE AND PREDOMINATE VEGETATION

Discussion:

Figure 4 shows bushfire-prone land of mostly Category 3 vegetation with Category 1 vegetation on the northwestern corner of the *subject site*.

Figure 5 shows cleared and PCT formations of woodland and forest.

Figure 16 shows the determined predominant vegetation formations of grasslands and woodlands (regenerating).

Figure 17 details the effective slope ranging from 0° to 5° downslope.

1. ASSET PROTECTION ZONES (APZ)

Discussion:

Table 5 details the BAL-29 APZ dimensions required around the presumed 15m x 15m dwelling site within the building envelope, as per Table A1.12.2 PBP (2019).

Table 5 - Required BAL-29 APZ dimensions for a future dwelling on Lot 2.

Aspect	Predominate Vegetation Formation	Effective Slope	Required APZ	OPA Available
North	Grasslands	0° - 5° downslope	12m	N/A
Northeast	Woodlands	Flat/upslope	16m	N/A
East	Woodlands	Flat/Upslope	16m	N/A
Southeast	Woodlands	Flat/Upslope	16m	N/A

South	Grasslands	Upslope	10m	N/A
Southwest	Grasslands	Flat/Upslope	10m	N/A
West	Grasslands	0° - 5° downslope	12m	N/A
Northwest	Grasslands	0° - 5° downslope	12m	N/A

Note: Outer Protection Areas, as a component of the APZ, are available in forest vegetation as per Table A1.12.4 PBP (2019)

Table 6 - APZ compliance report from Table 5.3a PBP (2019)

Acceptable solutions	Compliance
APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI	Yes
APZs are managed in accordance with the requirements of Appendix 4	Yes
APZs are wholly within the boundaries of the development site	Yes
APZs are located on lands with a slope less than 18 degrees.	Yes

The APZ for Lot 2 meet the acceptable solutions and, therefore, the performance criteria provided by PBP (2019).

2. CONSTRUCTION STANDARDS

Discussion:

Presently set at **BAL-29** within the presumed dwelling site (15mx15m) of the building envelope (BE). A subsequent future bushfire assessment at building application time may lower the BAL construction level, depending on its location within the BE.

Note: The proposed dwelling site and APZ within the building envelope reduce the potential impact on flora and fauna.

Recommendations:

- The construction standard is presently set at BAL-29 as per AS3959-2018 Amd 2:2020, or
- NASH Standard (2014) Steel Framed Construction in Bushfire Areas, and
- The *Additional Construction Requirements* found in Clause 7.5, PBP (2019)
- Any Class 10a buildings are to be constructed under Clause 8.3.2 PBP (2019)

The construction standards for Lot 2 are capable of meeting the acceptable solutions and, therefore, the performance criteria provided by PBP (2019).

3. LANDSCAPING AND FENCING:

Discussion:

Landscaping within the APZ must comply with Appendix 4 – *Asset Protection Zone Standards*, PBP (2019), provided in Attachment A of this report.

Fencing is to be compliant with section 7.6 PBP (2019).

Table 7 - Landscaping compliance report from Table 5.3a PBP (2019)

Acceptable solutions	Compliance
Landscaping is in accordance with Appendix 4	Yes
Fencing is constructed in accordance with Section 7.6	Yes

Landscaping and fencing for Lot 2 are capable of meeting the acceptable solutions and, therefore, the performance criteria provided by PBP (2019).

4. ACCESS:

Discussion:

The proposed property access road (PAR) from the centre of the building envelope of Lot 2 is ~90m long and connects to Back Creek Road (a 6m wide sealed public through road), offering travel in two directions. The most likely evacuation route would be to travel 251m on Back Creek Road to Sutton Road.

Table 8 is a compliance report for Access to Lot 2. (Shown in Figure 6).

Table 8 - Access provisions compliance report from Table 5.3b PBP (2019)

Acceptable Solution	Compliance
General Access Requirements	
Property access roads are two-wheel drive, all-weather roads.	Yes
Perimeter roads provided for residential subdivisions of three or more allotments.	N/A
Subdivisions of three or more allotments have more than one access point.	N/A
Traffic management devices do not prohibit access by emergency services.	N/A
Max. grades for sealed roads do not exceed 15 degrees.	Yes
Max. average grade does not exceed 10 degrees.	Yes
All roads are through roads	Yes
Dead end roads are not more than 200 m in length Include a 12m turning circle	Yes
Kerb and guttering provided on perimeter roads with roll top on hazard side.	N/A
In forest, woodland and heath situations, secondary access is provided.	N/A
One-way public roads are no more than 3.5m wide	N/A
Perimeter and non-perimeter road surfaces and bridges rated to 23 tonnes. Bridges indicate load rating.	Yes, bridges if applicable

Hydrants located outside of parking reserves and road carriageways. Hydrants in accordance with AS 2419.1:2005.	N/A
Access for Cat. 1 fire appliance within 4 m of static water supplies.	Yes
Property Access Requirements Lot 2	
Min. carriageway width of 4 m.	Yes
In forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide.	N/A
A minimum vertical clearance of 4m to any overhanging obstruction.	Yes
Provide a suitable turning head. Appendix 3 PBP (2019).	Yes
Minimal number of curves. Curves to have min. inner radius of 6m.	Yes
Min. distance between inner and outer curves is 6m	Yes
Cross fall no greater than 10 deg.	Yes
Max. grades for sealed roads do not exceed 10 degrees.	Yes
Max. grades for unsealed roads do not exceed 10 degrees.	Yes
Development of more than 3 dwellings has formalised access and not by right of way.	N/A
Some short constrictions may apply	N/A

The proposed internal access arrangements are viewed as providing:

- Firefighter access to structures and water supplies,
- Evacuation routes for both residents and firefighters,
- Access to APZ for ongoing maintenance, and
- Access to areas of bushfire hazard for firefighting and hazard mitigation purposes.

Therefore, the proposed PAR and public road system are capable of meeting the acceptable solutions to satisfy the performance criteria of Access 5.3.2 and the intent of 3.4 Access arrangements PBP (2019). Attachment-C

5. WATER SUPPLIES AND UTILITIES (SERVICES)

Discussion:

The provision of water, electricity, and gas services to Lot 2 will occur while constructing a future dwelling. These services are to be provided under the specifications and standards set out in PBP (2019) and Attachment B in this report.

Table 9 – Services- Water Electricity & Gas compliance report Table 5.3c PBP (2019)

Acceptable solution	Compliance
Water supplies	
Reticulated water is to be provided to the development where available	N/A
A static water and hydrant supply is provided for non-reticulated development or where reticulated water supply cannot be guaranteed	Yes Static
Static water supplies shall comply with Table 5.3d.	Yes
Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1.2005	N/A
Hydrants are not located within any road carriageway	N/A
Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads	N/A
Fire hydrant flows and pressures comply with the relevant clauses of Australian Standard AS 2419.1.2005	N/A
All above-ground water service pipes are metal, including and up to any taps	Yes
Above ground water storage tanks shall be of concrete or metal	Yes
Electricity Services	
Where practicable, electrical transmission lines are underground	Yes
Where overhead electrical transmission lines are proposed:	
Lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas	Yes
No part of a tree is closer to a power line than the distance set out in ISSC ₃ <i>Guideline for Managing Vegetation Near Power Lines</i>	Yes

Gas Services	
Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 – <i>The storage and handling of LP Gas</i> , the requirements of relevant authorities, and metal piping is used.	Bottled gas (if used)
All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazards side.	Yes
Connections to and from gas cylinders are metal.	Yes
Polymer-sheathed flexible gas supply lines are not used	Yes
Above-ground gas service pipes are metal, including and up to any outlets.	Yes

Recommendations:

- Future dwelling: Install a 20,000L (metal or concrete or underground) firefighting water tank with a 70mm Stortz coupling near the residence when constructed.
- Install a static water supply sign at the entry to the property (See local RFS Captain)

The Services for Lot 2 are capable of meeting the acceptable solutions and, therefore, the performance criteria provided by PBP (2019).

6. EMERGENCY MANAGEMENT PLANNING

Discussion:

Before occupation of a new dwelling, residents should develop an *NSWRFS Bushfire Survival Plan*.

ASSESSMENT CONCLUSION

The proposed subdivision has been assessed and found capable of the following:

- APZs can provide sufficient space and reduced fuel loads to ensure radiant heat levels at the building will not exceed 29 kW/m².
- Landscaping can be managed to minimise flame contact, reduce radiant heat levels, minimise embers and reduce the effect of smoke on residents and firefighters.
- Safe operational Access can be provided to structures and water supplies for emergency services while providing suitable Access for evacuating residents and fire management and APZ management purposes.
- Providing water for the protection of buildings during and after the passage of a bush fire. Gas and electricity services are located so as not to contribute to the risk of fire to a building.

6 LOT 1 EXISTING DWELLING



Figure 23 – The existing dwelling east facade. (McGregor, 2024)

LOT 1 FEATURES

- An existing single storey residential dwelling, on a concrete slab with brick walls and a metal roof with an external two storey bedroom building of a similar structure.
- There are three Class 10a buildings (sheds / workshops / ancillary buildings), being a carport, storage shed and farm shed.
- Located on the proposed 165.4 Ha lot of the subdivision.
- Garden landscaping surrounding the dwelling was found to be in an adequate maintained condition, with a good defensible space.
- It is recommended that future maintenance and design of the gardens consider Appendix 4- *Asset Protection Zone Requirements, Inner Protection Areas* recommendations.
- The existing 4m wide property access road (PAR) is well formed and is 870m from Back Creek Road.
- A large turning head is located at the southern side of the dwelling.

6.1 LOT 1 EXISTING DWELLINGS AND WATER SUPPLIES



Figure 24 – Northwest facade of the existing dwelling. (McGregor, 2024)



Figure 26 –Western façade of the existing dwelling. (McGregor, 2024)



Figure 25 – PAR and turning head to the south of the existing dwelling. (McGregor, 2024)



Figure 27 – Large underground concrete water tank with hatches. (McGregor, 2024)

6.2 LOT 1 PHOTOS CONTINUED



Figure 24a – One of two large concrete water tanks uphill from the underground tank.



Figure 26a –Storage shed near the two concrete water tanks. (McGregor, 2024)



Figure 25 a– Class 10a carport south of the existing dwelling (McGregor, 2024)



Figure 27a – Existing farm shed with access road. (McGregor, 2024)

6.3 LOT 1 ASSESSMENT DISCUSSION AND CONCLUSION

Under clause 5.1.3 *Existing dwellings* PBP (2019), existing dwellings are not subject to development consent when creating a subdivision. On this basis, certain conditions are applied to any existing dwelling (if required) to upgrade water supplies for firefighting and improve ember protection measures.

Be advised that the NSWRFs may add additional conditions above clause 5.1.3 of PBP (2019) as it feels necessary to offer further protection to the structures, occupants, and firefighters during a bushfire.

SERVICES – WATER:

Lot 1 is provided with the following static water supplies:

- A large underground concrete water tank. See Figure 27.
- Two large above-ground concrete water tanks. See Figure 28.
- Bore water supply.
- Multiple dams throughout the *subject site*.

Recommendation:

- Install a static water supply sign near the underground water tank that is visible from the turning head of the PAR.

- Install a static water supply sign at the entrance to the property.
(Contact the local RFS Captain)

These static water supplies meet the requirements detailed in Table 5.3 of PBP (2019) and, therefore, are capable of meeting the acceptable solutions set out in PBP (2019) (provided in Attachment B of this report).

EMBER PROTECTION:

To improve ember protection to the existing dwelling, specific enhancements are recommended. These recommendations can be found in:

- NSWRFs (0914) *Upgrading of existing buildings*, Minimal Protection Measures. See Attachment D

Note:

- The fitting of metal gutter and valley guards is at the owner's discretion. Gutter guards can reduce leaf and debris build-up and improve rainwater harvesting.

Conclusion: Lot 1 existing dwelling has been assessed and found capable of providing the required ember protection measures.

LOT 1- EXISTING DWELLING POTENTIAL BAL-29 APZ

- A BAL-29-sized APZ around the existing dwelling would fit within the property boundary.
- The closest boundary is 282m to the west of the existing dwelling.

Table 10 – Distance to the closest boundary from the existing dwelling.

Aspect	Predominate Vegetation Formation	Effective Slope	Distance to the property boundary	BAL-29 sized APZ requirement
West	Woodlands / Forest	Upslope	282m	24m

Note: All other aspects are within the interior of the property.

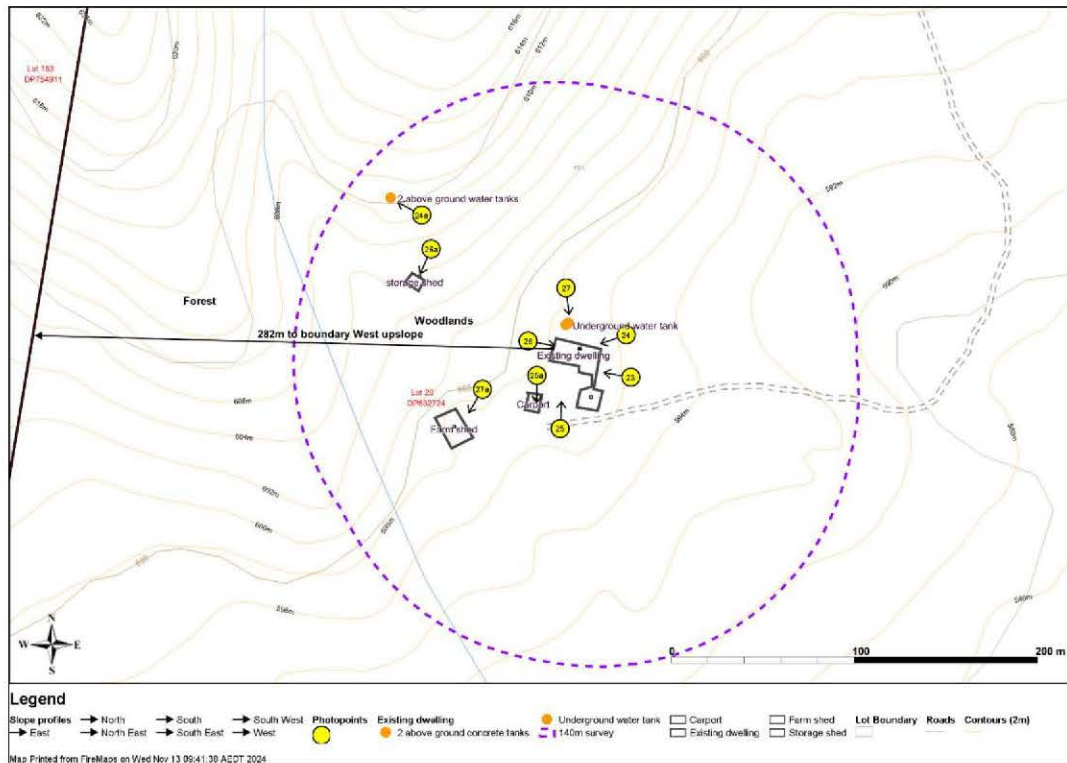


Figure 28 – Distance to closest boundary from the existing dwelling, slope and vegetation. FireMaps FPAA (2024) (McGregor, 2024). Photo points 23-27 & 24a-27a refer to Figures 24-27 & 24a-27a.

7 LOT 1 SECONDARY DWELLING



Figure 29 – Existing secondary dwelling with large turning head. (McGregor, 2024)

LOT 1 FEATURES-Secondary Dwelling

- An existing single storey residential dwelling, on a concrete slab with timber lined walls and a metal roof.
- There are several Class 10a buildings (sheds / workshops / ancillary buildings) greater than 6m from the from the existing dwelling
- Located on the proposed 165.4 Ha lot of the subdivision.
- Garden landscaping surrounding the dwelling was found to be in excellent maintained condition, with a good defensible space.
- It is recommended that future maintenance and design of the gardens consider Appendix 4- *Asset Protection Zone Requirements, Inner Protection Areas*.
- The existing 4m wide property access road (PAR) is well formed and is 485m from Back Creek Road.
- A large turning head is located at the eastern side of the dwelling.

7.1 LOT 1 EXISTING DWELLINGS AND WATER SUPPLIES



Figure 30 – Northern facade of the existing secondary dwelling. (McGregor, 2024)



Figure 32 –Northern well maintained APZ. (McGregor, 2024)



Figure 31 – Western façade of the existing secondary dwelling. (McGregor, 2024)



Figure 33 – Two plastic water tanks in the western rear yard. (McGregor, 2024)

7.2 LOT 1 ASSESSMENT DISCUSSION AND CONCLUSION

Under clause 5.1.3 *Existing dwellings* PBP (2019), existing dwellings are not subject to development consent when creating a subdivision. On this basis, certain conditions are applied to any existing dwelling (if required) to upgrade water supplies for firefighting and improve ember protection measures.

Be advised that the NSWRFs may add additional conditions above clause 5.1.3 of PBP (2019) as it feels necessary to offer further protection to the structures, occupants, and firefighters during a bushfire.

SERVICES – WATER:

Lot 1 is provided with the following static water supplies:

- Several plastic water tanks. See Figure 33.
- Several nearby dams to the south of the existing dwelling.

Recommendation:

- Install a 10,000L metal or concrete water tank with 65mm Stortz coupling and shut off valve near the existing PAR near the secondary dwelling to improve static water supply availability for both firefighters and residents.
- Install a static water supply sign at the entrance to the property.
(Contact the local RFS Captain)

These static water supplies meet the requirements detailed in Table 5.3 of PBP (2019) and, therefore, are capable of meeting the acceptable solutions set out in PBP (2019) (provided in Attachment B of this report).

EMBER PROTECTION:

To improve ember protection to the existing dwelling, specific enhancements are recommended. These recommendations can be found in:

- NSWRFs (0914) *Upgrading of existing buildings*, Minimal Protection Measures. See Attachment D

Note:

- The fitting of metal gutter and valley guards is at the owner's discretion. Gutter guards can reduce leaf and debris build-up and improve rainwater harvesting.

Conclusion: Lot 1 existing dwelling has been assessed and found capable of providing the required ember protection measures.

LOT 1- EXISTING DWELLING POTENTIAL BAL-29 APZ

- A BAL-29-sized APZ around the existing dwelling would fit within the property boundary.
- The closest boundary is 244m to the north of the existing dwelling.

Table 10 – Distance to the closest boundary from the existing dwelling.

Aspect	Predominate Vegetation Formation	Effective Slope	Distance to the property boundary	BAL-29 APZ requirement
South	Grasslands / Woodlands	Upslope	244m	12m

Note: All other aspects are within the interior of the property.

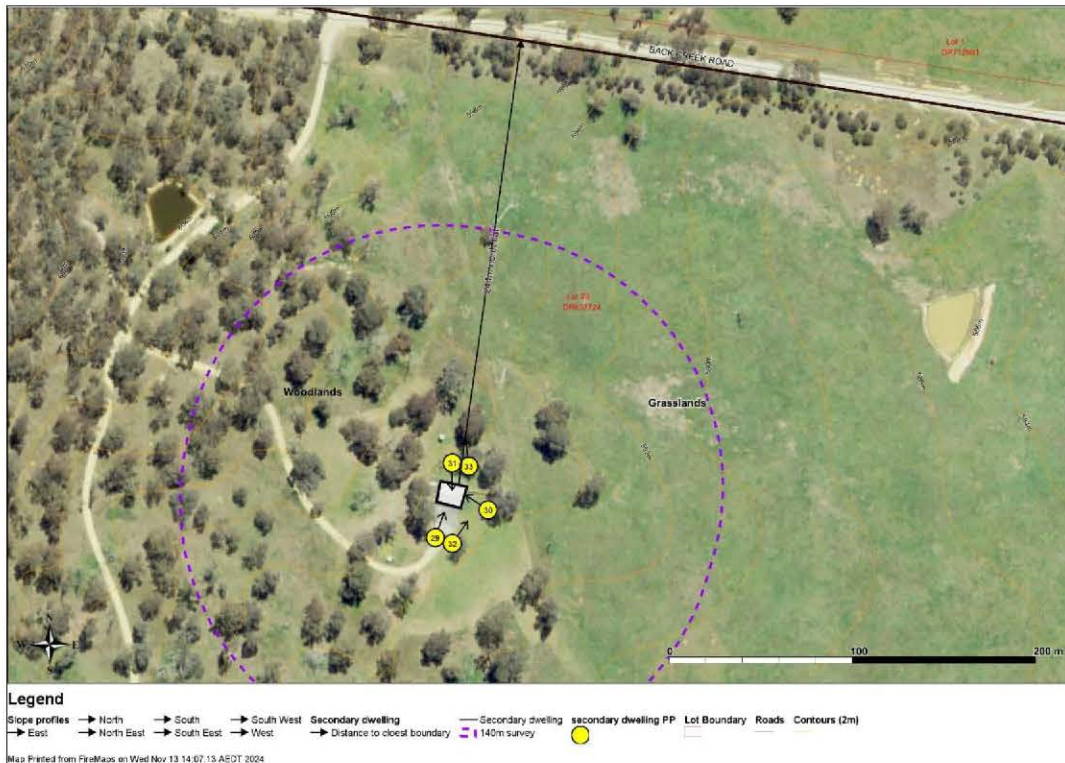


Figure 34 – Distance to closest boundary from existing dwelling, slope and vegetation. FireMaps FPAA (2024) (McGregor, 2024). Photo points 29-33 refer to Figures 29-33.

8 ENVIRONMENTAL CONSIDERATIONS

Information regarding the potential impact that the proposed development may have on the environmental and cultural values of the site is required as part of the issuing of the bush fire safety authority by the NSWRFSA.

EMBER Bushfire Consulting understands from the proponent that any necessary environmental and cultural investigations are being taken as part of the development application process and will be submitted as part of the Statement of Environmental Effects. Furthermore, if the recommended protection measures impact any environmental or culturally sensitive areas of the lot, a consultation will be made to provide alternative protection measures. At this bushfire assessment, no known environmental or cultural values or significant environmental features have been identified on the subject site.

9 ENVIRONMENTAL CONSIDERATIONS

Information regarding the potential impact that the proposed development may have on the environmental and cultural values of the site is required as part of the issuing of the bush fire safety authority by the NSWRFSA.

EMBER Bushfire Consulting understands from the proponent that any necessary environmental and cultural investigations are being taken as part

of the development application process and will be submitted as part of the Statement of Environmental Effects. Furthermore, if the recommended protection measures impact any environmental or culturally sensitive areas of the lot, a consultation will be made to provide alternative protection measures. At this bushfire assessment, no known environmental or cultural values or significant environmental features have been identified on the subject site.

10 CONCLUSION

Thea (Marina) Blomley & Zenia Pearl C/O DPS Yass have engaged Ember Bushfire Consulting to prepare a Bushfire Assessment Report for a proposed two-lot Rural Residential Subdivision at 151 Back Creek Road, Gundaroo (the subject site).

The development proposal divides the existing RU 1 block into two: large rural lots.

This report establishes the level of bushfire threat to the proposed development and examines the PBP (2019) six bushfire protection measures for the future dwelling on Lot 2.

Access to the new building envelope off Back Creek Road will satisfy the performance criteria and intent for access arrangements set out in PBP (2019).

The existing dwellings have access to multiple static water supplies, providing sufficient supply for firefighting. A recommendation for an additional compliant water tank has been made to improve the static water supply at the secondary dwelling.

The new lot will require its own firefighting water supply to serve the future dwelling at the development time.

To improve the level of ember protection for the existing dwellings, construction enhancements where required are recommended to increase ember protection.

In this report, the development is not known to have any significant environmental or cultural values requiring consideration as part of this assessment.

Based on the bushfire assessment and the recommendations contained in this report, the proposed development is deemed to comply with the specific and broad objectives of PBP (2019) and the requirements of the *Rural Fire Regulations (2022)* and, therefore, suitable for submission to the NSWRFSA for the issuing of a bush fire safety authority.

Be advised that the NSWRFSA may alter recommendations or impose additional conditions as it feels necessary to offer further protection to the structures, occupants, and firefighters during a bushfire.

11 RECOMMENDATIONS

11.1 ASSET PROTECTION ZONES

Table 5 - Required BAL-29 APZ dimensions for a future dwelling on Lot 2.

Aspect	Predominate Vegetation Formation	Effective Slope	Required APZ	OPA Available
North	Grasslands	0° - 5° downslope	12m	N/A
Northeast	Woodlands	Flat/upslope	16m	N/A
East	Woodlands	Flat/Upslope	16m	N/A
Southeast	Woodlands	Flat/Upslope	16m	N/A
South	Grasslands	Upslope	10m	N/A
Southwest	Grasslands	Flat/Upslope	10m	N/A
West	Grasslands	0° - 5° downslope	12m	N/A
Northwest	Grasslands	0° - 5° downslope	12m	N/A

Note: Outer Protection Areas, as a component of the APZ, are available in forest vegetation as per Table

A1.12.4 PBP (2019)

11.2 LANDSCAPING & FENCING

- Lot 2 - Landscaping and fencing within the APZ of any future dwelling must comply with Table 5.3A PBP (2019).
- Lot 1&2- It is recommended that future maintenance of the gardens consider Appendix 4- *Asset Protection Zone Requirements* Inner Protection Area (IPA) recommendations.

11.3 BUSHFIRE CONSTRUCTION STANDARDS

Lot 2 - Future Dwelling

Set at **BAL-29** within the proposed dwelling site of the building envelope.

- BAL-29 is as per AS3959-2018 Amd 2020: or
- NASH Standard (2014) Steel Framed Construction in Bushfire Areas, and,
- The *Additional Construction Requirements* are found in Clause 7.5 PBP (2019).
- Class 10a structures <6m from a dwelling are to be constructed under Clause 8.3.2 PBP (2019).

Note: A subsequent future bushfire assessment at building application time may lower the BAL construction level, depending on its location within the BE.

Lot 1 - Existing Dwellings

Ember proofing recommendations currently not provided to:

- NSWRF (0914) *Upgrading of existing buildings*, the applicable Minimal Protection Measures. See Attachment D.

11.4 ACCESS

Lot 2

To comply with the applicable acceptable solutions in Table 8 of this report.

11.5 SERVICES (WATER, ELECTRICITY AND GAS)

Lot 2

- To comply with the applicable acceptable solutions in Table 9 of this report.
- Install a 20,000L (metal or concrete or underground) firefighting water tank with a 65mm Stortz coupling must be installed near the future dwelling.

Lot 1

Existing dwelling:

- Install a static water supply sign near the underground water tank that is visible from the turning head of the PAR.

Secondary Dwelling:

- Install a 10,000L metal or concrete water tank with 65mm Stortz coupling and shut off valve near the existing PAR near the secondary dwelling.

Both Lots

- Install a static water supply sign at the entry to the properties (contact the local RFS Captain).

11.6 EMERGENCY MANAGEMENT PLANNING

Lot 2

- Develop an *NSWRFS Bushfire Survival Plan* before occupation of the new dwelling.

Lot 1

- As required, update the Bushfire Survival Plans for the existing dwellings.

12 REFERENCES

Australian Building Codes Board (ABCB), 2019, *National Construction Code - Building Code of Australia Volume 1 & 2*, Canberra

Keith D, 2004, *Ocean Shores to Desert Dunes: the native vegetation of NSW and the ACT*, Dept of Environment and Conservation, NSW Government.

NASH (2014), *Steel Framed Construction in Bushfire Areas (2014)*, National Association of Steel Framed Housing Inc.

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NSW Rural Fire Service, 2005, *Standards for Asset Protection Zones*. Sydney

NSW Rural Fire Service, 2019, *Planning for Bushfire Protection*. Sydney

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http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0018/4365/Building-Best-Practice-Guide.pdf

Standards Australia, 2019, AS 3959-2019 Amd 2-2020 *Construction of buildings in Bushfire Prone Areas* SAI Global, Melbourne.

13 ATTACHMENT A – APZ

APPENDIX 4

ASSET PROTECTION ZONE STANDARDS

In Australia, bush fires are a natural and essential aspect of the landscape as many plants and animals have adapted to fire as part of their life cycle. However, development adjacent to bush land areas has increased the risk of fire impacting on people and their assets. The impact on property and life can be reduced with responsible preparation and management of bush fire hazards.

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps in reducing vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset protection zones

An APZ is a fuel-reduced area surrounding a built asset or structure.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at: www.rfs.nsw.gov.au/resources/publications.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset
- an area of reduced bush fire fuel that allows suppression of fire
- an area from which backburning or hazard reduction can be conducted,
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset
- damage to the built asset from intense radiant heat
- ember attack.

The APZ should be located between an asset and the bush fire hazard.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an inner protection area (IPA) and an outer protection area (OPA).

Inner protection areas (IPAs)

The IPA is the area closest to the asset and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and be a defensible space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the dwelling, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Trees:

- canopy cover should be less than 15% (at maturity)
- trees (at maturity) should not touch or overhang the building
- lower limbs should be removed up to a height of 2m above ground
- canopies should be separated by 2 to 5m
- preference should be given to smooth barked and evergreen trees.

Shrubs:

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings
- shrubs should not be located under trees
- shrubs should not form more than 10% ground cover
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaves and vegetation debris should be removed.

Outer protection areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. Vegetation within the OPA can be managed to a more moderate level. The reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathways to crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

In practical terms the OPA is an area where there is maintenance of the understorey and some separation in the canopy.

When establishing and maintaining an OPA the following requirements apply:

Trees:

- tree canopy cover should be less than 30%
- trees should have canopy separation
- canopies should be separated by 2 to 5m

Shrubs:

- shrubs should not form a continuous canopy
- shrubs should form no more than 20% of ground cover

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaf and other debris should be mown, slashed or mulched.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA to the standards given above should be undertaken on an annual basis, in advance of the fire season, as a minimum.

14 ATTACHMENT B – SERVICES

Table 5.3c

Performance criteria and acceptable solutions for water, electricity and gas services for residential and rural residential subdivisions

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
FOR WATER SUPPLIES	<ul style="list-style-type: none"> > a water supply is provided for firefighting purposes 	<ul style="list-style-type: none"> > reticulated water is to be provided to the development, where available; > a static water supply is provided where no reticulated water is available.
	<ul style="list-style-type: none"> > water supplies are located at regular intervals > the water supply is accessible and reliable for firefighting operations 	<ul style="list-style-type: none"> > fire hydrant spacing, design and sizing comply with the Australian Standard AS 2419.1:2005; > hydrants are not located within any road carriageway; > reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
	<ul style="list-style-type: none"> > flows and pressure are appropriate 	<ul style="list-style-type: none"> > fire hydrant flows and pressures comply with AS 2419.1:2005.
	<ul style="list-style-type: none"> > the integrity of the water supply is maintained 	<ul style="list-style-type: none"> > all above-ground water service pipes are metal, including and up to any taps.
FOR ELECTRICITY SERVICES	<ul style="list-style-type: none"> > location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings 	<ul style="list-style-type: none"> > where practicable, electrical transmission lines are underground; > where overhead, electrical transmission lines are proposed as follows: <ul style="list-style-type: none"> > lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; > no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.
FOR GAS SERVICES	<ul style="list-style-type: none"> > location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. 	<ul style="list-style-type: none"> > reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; > all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; > connections to and from gas cylinders are metal; > polymer-sheathed flexible gas supply lines are not used; > above-ground gas service pipes are metal, including and up to any outlets.

Table 5.3d

Water supply requirements for non-reticulated developments or where reticulated water supply cannot be guaranteed

DEVELOPMENT TYPE	WATER REQUIREMENTS
Residential lots (<1000m ²)	5000L/lot
Rural-residential lots (1000-10,000m ²)	10,000L/lot
Large rural/lifestyle lots (>10,000m ²)	20,000L/lot
Multi-dwelling housing (including dual occupancies)	5000L/dwelling

15 ATTACHMENT C- ACCESS

Table 5.3b

Performance criteria and acceptable solutions for access for residential and rural residential subdivisions

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
<ul style="list-style-type: none"> firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation 	<ul style="list-style-type: none"> property access roads are two-wheel drive, all-weather roads; and perimeter roads are provided for residential subdivisions of three or more allotments; and subdivisions of three or more allotments have more than one access in and out of the development; and traffic management devices are constructed to not prohibit access by emergency services vehicles; and maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; and all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; and where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; and where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.
<ul style="list-style-type: none"> the capacity of access roads is adequate for firefighting vehicles 	<ul style="list-style-type: none"> the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.
<ul style="list-style-type: none"> there is appropriate access to water supply 	<ul style="list-style-type: none"> hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; hydrants are provided in accordance with AS 2419.1:2005; there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.

Table 5.3b *Continued*

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
<ul style="list-style-type: none"> firefighting vehicles can access the dwelling and exit safely 	<p>No specific access requirements apply in an urban area where a 70 metre unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).</p> <p>In circumstances where this cannot occur, the following requirements apply:</p> <ul style="list-style-type: none"> minimum carriageway width of 4m; in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and provide a suitable turning area in accordance with Appendix 3; and curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; and the minimum distance between inner and outer curves is 6m; and the crossfall is not more than 10°; and maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads; and a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way. <p>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</p>
PROPERTY ACCESS	
The intent may be achieved where:	
<ul style="list-style-type: none"> access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface 	<ul style="list-style-type: none"> perimeter roads are two-way sealed roads; and 8m carriageway width kerb to kerb; and parking is provided outside of the carriageway width; and hydrants are located clear of parking areas; and there are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and the maximum grade road is 15° and average grade is 10°; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
<ul style="list-style-type: none"> access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating 	<ul style="list-style-type: none"> minimum 5.5m width kerb to kerb; and parking is provided outside of the carriageway width; and hydrants are located clear of parking areas; and roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

16 ATTACHMENT D- EMBER PROOFING

BUILDING ELEMENT	MINIMAL PROTECTION MEASURES	ADDITIONAL PROTECTION MEASURES
GENERAL	Seal all gaps (>3mm) around the house (excluding subfloor) with: <ul style="list-style-type: none"> appropriate joining strips; flexible silicon based sealant; or mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium. 	<ul style="list-style-type: none"> Install a bush fire sprayer system. (Please contact a bush fire consultant or relevant industry expert to discuss options) Seal all gaps (>3mm) around the house (excluding subfloor) with: <ul style="list-style-type: none"> appropriate joining strips flexible silicon based sealant; or mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium.
WALLS	Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding when they are being replaced for maintenance or other reasons.	<ul style="list-style-type: none"> Replace wall materials with non-combustible materials Install sarking with a flammability index of not more than 5 behind weatherboards or other external cladding.
SUBFLOOR	Removal of combustible materials and keeping areas clear and accessible.	<ul style="list-style-type: none"> Enclose subfloor with non-combustible material.
DOORS	Install weather strips, draught excluders or draught seals at the base of side-hung doors.	<ul style="list-style-type: none"> Replace external doors with non-combustible or solid timber doors with minimum thickness of 35mm. Replace or over-clad parts of door frames less than 400mm above the ground, decks and similar elements or fittings with non-combustible material. Install weather strips, draught excluders or draught seals at the base of side-hung doors.
VENTS & WEEPHOLES	Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.	<ul style="list-style-type: none"> Seal vents and weepholes in external walls with mesh (with an aperture size of 2 mm) of corrosion resistant steel, bronze or aluminium.
ROOFS	Seal around roofing and roof penetrations with a non-combustible material. Install sarking with a flammability index of not more than 5 beneath existing roofing when it is being replaced for maintenance or other reasons. If installed, gutter and valley leaf guards shall be non-combustible.	<ul style="list-style-type: none"> Replace fascia and roof materials with non-combustible materials. Seal around roofing and roof penetrations with a non-combustible material. Install sarking with a flammability index of not more than 5 beneath existing roofing. If installed, gutter and valley leaf guards shall be non-combustible.
WINDOWS	Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and openable windows	<ul style="list-style-type: none"> Installing appropriately tested shutters to doors and windows Install mesh with a maximum aperture of 2mm, made from corrosion resistant steel, bronze or aluminium to all external doors and windows Replacing glass with toughened or laminated safety glass Replace overhead glazing with 'grade a' safety glass
EXTERNAL STRUCTURES		<ul style="list-style-type: none"> External structures to be located >10 metres from the main dwelling.
DECKING		<ul style="list-style-type: none"> Replace decking with non-