

BUSHFIRE ASSESSMENT REPORT
PROPOSED 1 INTO 3 LOT SUBDIVISION

LOT 2 DP 1057313
405 Martins Creek Road, Paterson

Date: **11/10/2023**
Prepared for: **Paul Jakes**

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed 1-into-3-lot subdivision against the requirements of Section 100B of the Rural Fires Act 1997, AS3959 (2018) Construction of buildings in bushfire-prone areas and Planning for Bush Fire Protection (2019).

This report establishes that the development does not comply with the acceptable solutions of Planning for Bush Fire Protection (2019) and offers a performance-based solution to assess a single property access more than 200 metres in length from the public road.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Paul Jakes		
Site Address	405 Martins Creek Road, Paterson	Lot/Sec/DP	Lot 2 DP 1057313
Local Government Area	Dungog	FDI	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	3 lot subdivision	Type of Area	Rural Residential
Special Fire Protection Purpose	No	Flame Temperature	1090K
Application Complies with the Acceptable Solutions	No. Performance Based Solution reviewing the lack of alternate egress for proposed lot 3	Referral to NSW Rural Fire Service (NSW RFS) required	Yes. Bushfire Safety Authority Required

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	North	East	South	Southwest and West
Vegetation Structure	Grassland	Forest	Woodland	Grassland
Asset Protection Zone (APZ)	13 metres	24 metres	16 metres	12 metres
Accurate Slope Measure	9 degrees downslope	Level	2 degrees downslope	3 degrees downslope
Slope Range	6 to 10 degrees downslope	Level/Upslope	1 to 5 degrees downslope	1 to 5 degrees downslope
Planning for Bush Fire Protection (2019) Table A1.12.2 Minimum Setbacks	13 metres	24 metres	16 metres	12 metres
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-29	BAL-29	BAL-29	BAL-29

TABLE 3 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 5 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Asset Protection Zones have been determined in accordance with Planning for Bush Fire Protection (2019). The Asset Protection Zone will be maintained for the life of development and defensible space is provided onsite.	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bush Fire Protection (2019) Appendix 4.	Acceptable Solution
Public Road Access	No new public roads are proposed for this development.	Acceptable Solution
Property Access	Property access to comply with Planning for Bush Fire Protection (2019) Section 5.3b, excepting the provision of alternate egress for proposed lot 3.	<u>Performance Based Solution</u>
Fire Trail Access	No new fire trails are proposed for this development.	Acceptable Solution
Water and Utility Services	Water, electricity and gas services offer compliance with Planning for Bush Fire Protection (2019) Section 5.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed 1-into-3-lot subdivision of land located at Lot 2 DP 1057313, 405 Martins Creek Road, Paterson. The assessment acknowledges the requirements of Section 100B of the Rural Fires Act 1997 and Planning for Bush Fire Protection (2019) to protect persons, property and the environment from dangers that may arise from a bushfire.

Under the provisions of Section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2019) to reduce the risk of ignition of the development in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The land has a split zoning of R5 Large Lot Residential and C3 Environmental Management and is comprised of a single allotment 4.9 hectares in size. The proposed development includes a 1-into-3-lot subdivision with no new dwellings proposed.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features affecting the site.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of NSW National Parks and Wildlife Service's database identify no known aboriginal relics or aboriginal places, as defined by the National Parks and Wildlife Act 1974, to exist on the site.



PHOTOGRAPH 1 – WESTERN ALLOTMENT LOOKING NORTHWEST

View of the subject site looking northwest. The site is predominantly grassland with grassland also extending northwest of the site. A railway line can be seen in the distance.



PHOTOGRAPH 2 – CENTRE ALLOTMENT LOOKING NORTH TOWARDS MANAGED LAND

View of low grass located on the central allotment looking north towards the neighbouring managed property. There is maintained curtilage around the northern neighbouring dwelling and shed.



FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Dungog Council's bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bush Fire Protection (2019).

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 2-metre contour data obtained from The Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation, calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.2. The minimum Asset Protection Zone for subdivision has been demonstrated in Section 1.0 Executive Summary and Compliance Tables.

The required Asset Protection Zone is available within the subject site and neighbouring managed lands. All dwellings will be exposed to less than 29 kw/m² of radiant heat.

3.4 BUSHFIRE ATTACK LEVELS

BALs and relevant construction levels in accordance with Planning for Bush Fire Protection (2019) have been demonstrated in Section 1.0 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

BALs and relevant construction levels in accordance with AS3959 (2018) have been demonstrated in Table 4 BALs Individual Allotments. The below assessments are based on the present vegetation surrounding the site with significant scope to achieve BAL-29 or lower.

TABLE 4 – BUSHFIRE ATTACK LEVELS INDIVIDUAL ALLOTMENTS

Vegetation and Direction from the lot	Separation Distance	Recommended Construction Standards
Southwestern and Western Grassland	25 – 50 metres from Grassland	BAL-12.5 (Sections 3 and 5 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	17 – 25 metres from Grassland	BAL-19 (Sections 3 and 6 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	12 – 17 metres from Grassland	BAL-29 (Sections 3 and 7 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
Northern Grassland	28 – 50 metres from Grassland	BAL-12.5 (Sections 3 and 5 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	20 – 28 metres from Grassland	BAL-19 (Sections 3 and 6 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	13 – 20 metres from Grassland	BAL-29 (Sections 3 and 7 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
Eastern Forest	45 – 100 Metres from Forest	BAL-12.5 (Sections 3 and 5 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	33 – 45 Metres from Forest	BAL-19 (Sections 3 and 6 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	24 – 33 Metres from Forest	BAL-29 (Sections 3 and 7 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
Southern Woodland	32 - 100 metres from Woodland	BAL-12.5 (Sections 3 and 5 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	23 – 32 metres from Woodland	BAL-19 (Sections 3 and 6 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)
	16 – 23 metres from Woodland	BAL-29 (Sections 3 and 7 of AS3959 (2018) and Planning for Bush Fire Protection (2019) Section 7.5.2)



FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

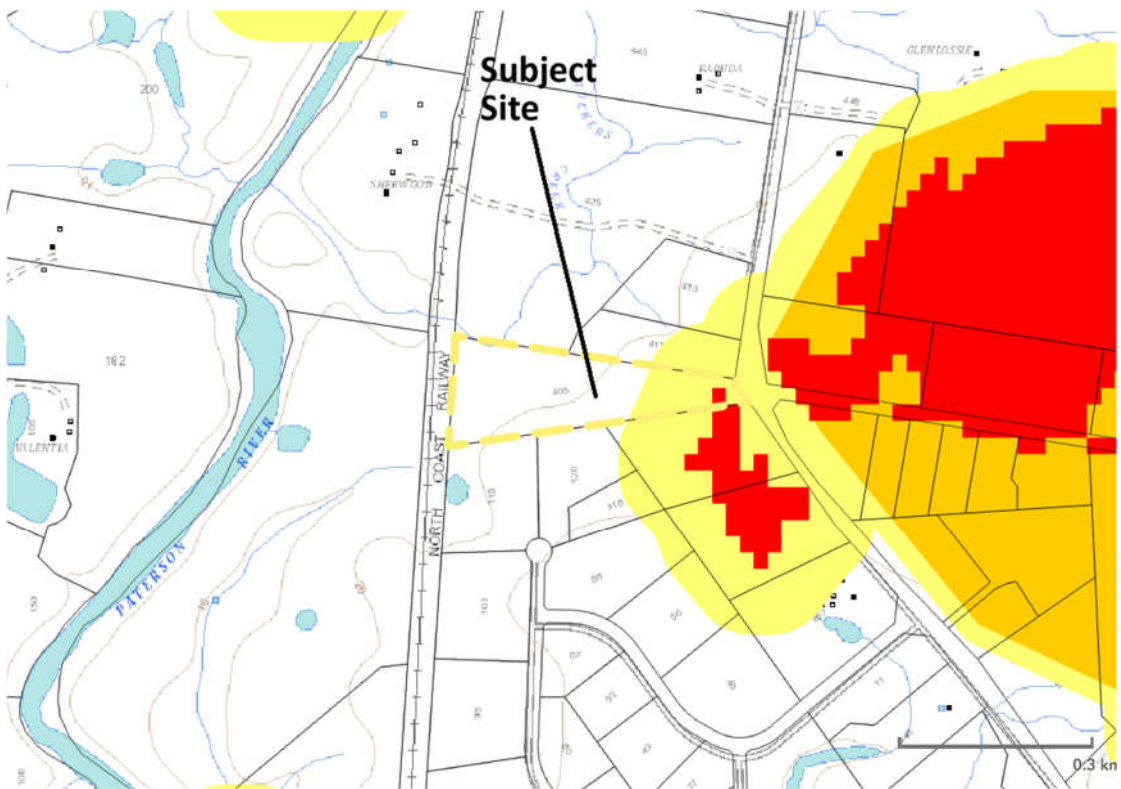


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

Two of the allotments will be less than 1 hectare in size with the westernmost proposed allotment being greater than a hectare in size with no hydrant access. A static water supply, with provision for the below capacity shall be provided. The water supply may be either a tank or pool, providing that the nominated volume of water is available for firefighting purposes.

1. Required Capacity for the eastern and central allotment – 10,000 litres
2. Required Capacity for the western allotment – 20,000 litres

The following requirements should be adhered to for the water supply:

- a) a connection for firefighting purposes is located within the Inner Protection Area (IPA) or non-hazard side and away from the structure; 65 millimetres Storz outlet with a ball valve is fitted to the outlet;
- b) ball valve and pipes are adequate for water flow and are metal;
- c) supply pipes from tank to ball valve have the same bore size to ensure flow volume;
- d) underground tanks have an access hole of 200 millimetres to allow tankers to refill directly from the tank;
- e) a hardened ground surface for truck access is supplied within 4 metres;
- f) above-ground tanks are manufactured from concrete or metal;
- g) raised tanks have their stands constructed from non-combustible material or bushfire-resisting timber (AS3959 (2018) Appendix F);
- h) unobstructed access can be provided at all times;
- i) underground tanks are clearly marked;
- j) tanks on the hazard side of the building are provided with adequate shielding for the protection of firefighters;
- k) all exposed water pipes external to the building are metal, including any fittings.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

4.3 GAS SERVICES

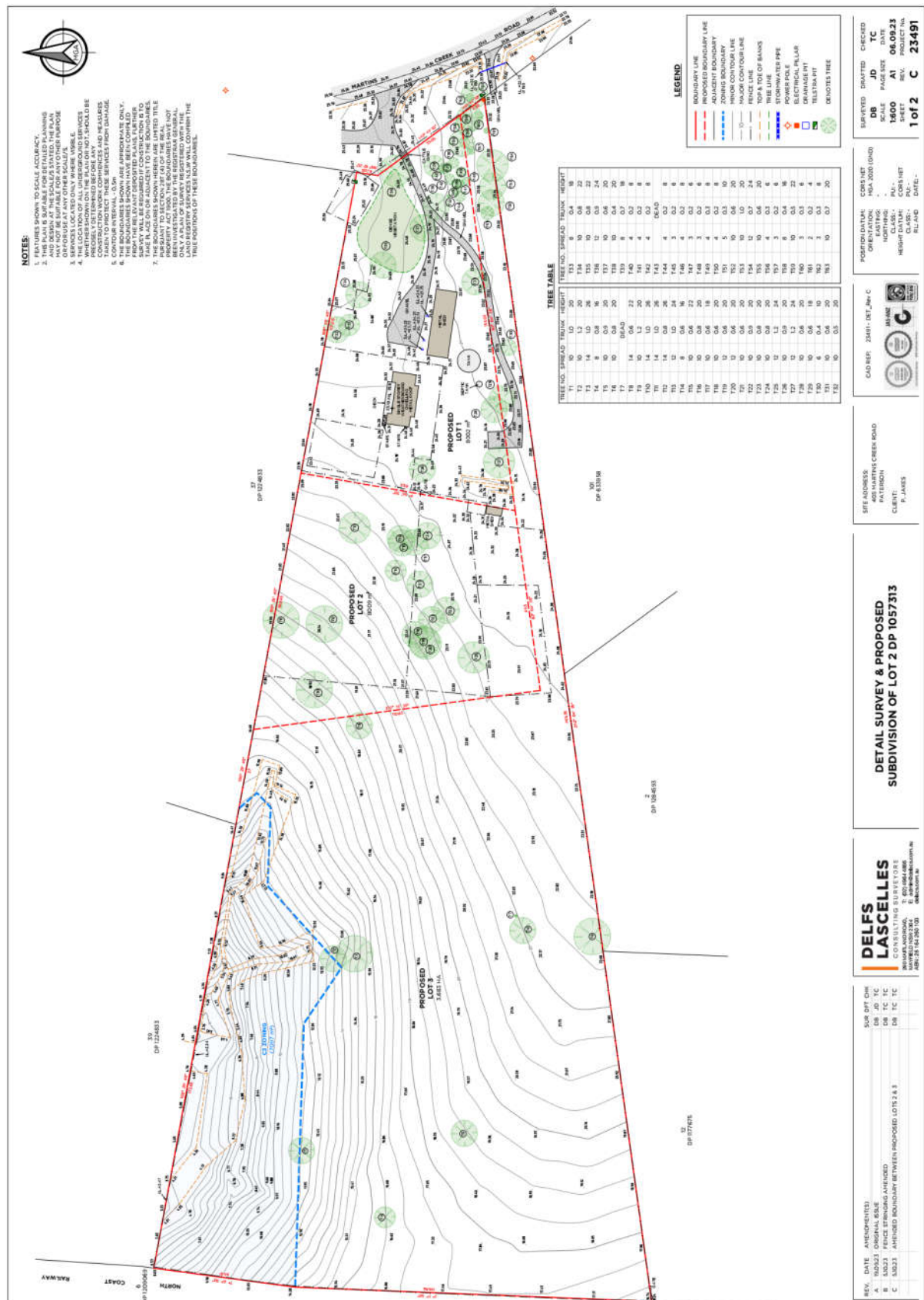
- Reticulated or bottled gas installed and maintained in accordance with AS/NZ1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10 metres and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2 metres from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.



PHOTOGRAPH 3 – SOUTHERN WOODLAND

View of adjacent property access and woodland located on the southern neighbouring property.

FIGURE 4 – SUBDIVISION PLAN



5.0 PROPERTY ACCESS

Public Road Access

The subject site is located on Martins Creek Road, being a two-lane road interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The existing public road network will remain unchanged.

Fire Trails

Fire trails do not intersect the vegetation in the local area. No new fire trails are proposed for this development.

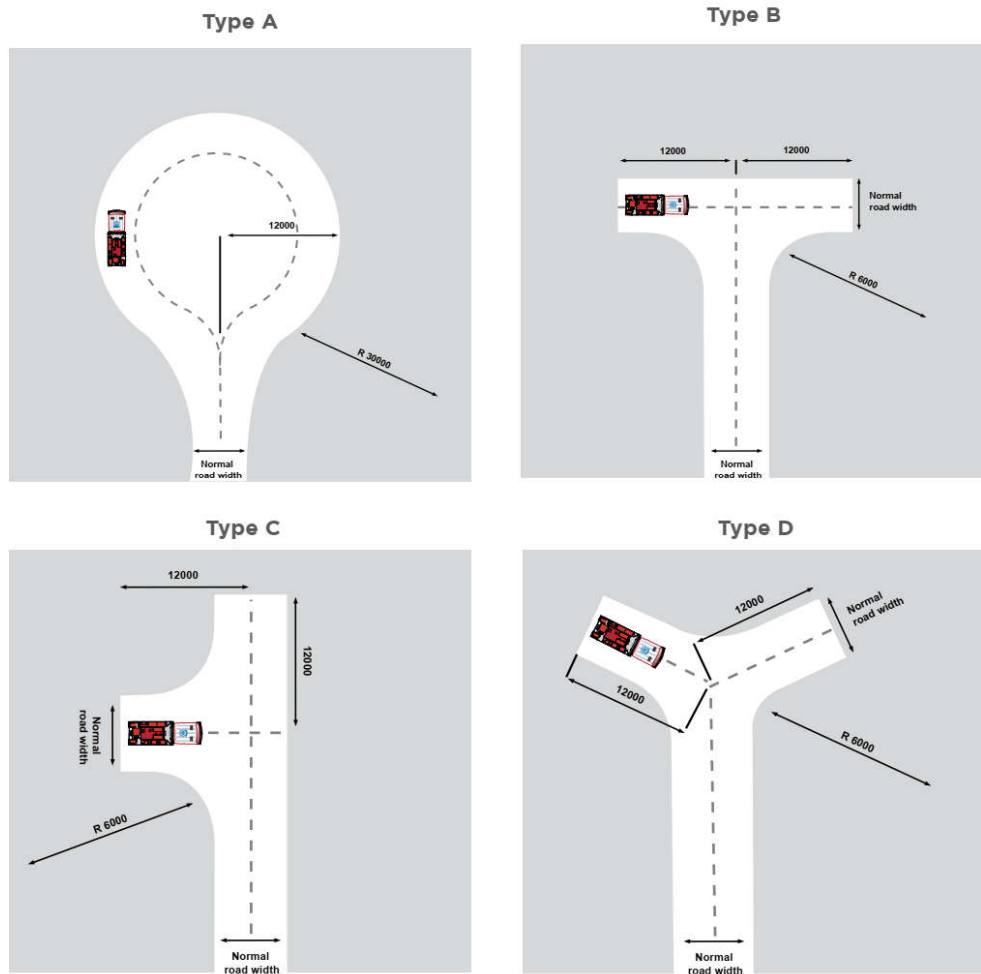
Property Access

Property access is provided by way of Martins Creek Road providing access from the public road system directly to the private land, giving firefighters access to the building.

Property access roads shall comply with Planning for Bush Fire Protection (2019) Section 5.3b excepting the provision of alternate egress for proposed lot 3:

- minimum 4m carriageway width;
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
- provide a suitable turning area in accordance with Appendix 3 (see below);
- curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress;
- 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;

Multipoint turning options.



6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6 millimetres in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

There is no known Bushfire Maintenance Plan for the site. A condition of development is to maintain the nominated asset protection zone which should be monitored by the building owner.

7.2 FIRE EMERGENCY PROCEDURES

It is recommended the future property owners or building occupants prepare a bushfire survival plan for each residence when they occupy the building.

8.0 PERFORMANCE BASED SOLUTION

At the request of the client, I have been asked to provide an unbiased safety model for the proposed development. The proposed performance based solution offers compliance with Planning for Bush Fire Protection (2019).

Proposed Performance Based Solution

The proposed Performance Based Solution examines the lack of alternate egress and considers grassland deeming provisions to offset a single property access more than 200 metres from the public road for proposed lot 3.

Methodology of Assessment

Pursuant to Section A2.4(c) of Appendix 2 in Planning for Bush Fire Protection (2019), the assessment method used by the performance solution to demonstrate compliance with the nominated performance criteria is a comparative analysis with the acceptable solutions of Planning for Bush Fire Protection (2019) relating to construction and achieving less than 29 kw/m² of radiant heat.

The assessment will be consistent with Planning for Bush Fire Protection (2019) which provides bushfire protection measures to resist three forms of impact to the building emanating from a bushfire event being –

- Direct flame contact
- Radiant heat

- Ember attack.

Planning for Bush Fire Protection (2019) does not take maintenance mechanisms into consideration for a Class 1a building and does not factor the potential impact on a dwelling via windborne objects during a bushfire event. In turn this assessment does not address these items which are consistent with Planning for Bush Fire Protection (2019).

Planning Compliance

The basis for the assessment of compliance for this site is Planning for Bush Fire Protection (2019) Section 5.

The assessment will be consistent with Planning for Bush Fire Protection (2019) which the performance criteria for the property access of the development are “firefighting vehicles are provided with safe, all-weather access to structures.”

Quantitative Analysis

The site is a rural property located on Martins Creek Road. The property access for proposed lot 3 will have a 220 metre property access handle with an assumed conservative 300 metres in length from the public road.

Based on a smoke shrouded environment a 20 km/h vehicle speed is nominated. A vehicle will traverse 300 metres in 36 seconds or 300 metres in 54 seconds via private land that is predominantly slashed grass or grazed pasture.

Proposed Lot 3

The lack of a second egress for proposed lot 3 is offset by the ability for residents to evacuate early, or shelter inside a well-protected building with defensible space. The property access to the public road is not deemed excessive in length and can be traversed in under 1 minute. The small pocket of woodland is on private land and shows signs of intermittent slashing. Planning for Bush Fire Protection (2019) Section 7.9 Grassland Deeming Provisions identifies “Where an APZ of 50m can be provided, no further BPMs are required.” This is reiterated in Planning for Bush Fire Protection (2019) A1.3 Grassland assessment “Where 50m APZ can be provided, there are no further requirements.”

Evaluation of Performance Based Solution

All weather access will be provided to a future dwelling on proposed lot 3 with safe access for firefighters and the ability for compliant asset protection zones exceeding 50 metres to be provided.

9.0 RECOMMENDATIONS

There is presently a single dwelling located onsite and no building is proposed as part of this development application. Any future building will be assessed separately under planning legislation current at time of approval. The below recommendations provide an indication of recommended measures for a future dwelling, however specific consideration should be made with the development application:

1. The proposed building works shall be constructed dependent on the chosen asset protection zone. Indicative asset protection zones and BAL construction levels are shown in TABLE 4 – BUSHFIRE ATTACK LEVELS INDIVIDUAL ALLOTMENTS. Minimum setbacks for BAL-29 have been shown in Figure 1 however the final location of the building will be determined by the development application for the individual building.
2. At the commencement of dwelling construction works and in perpetuity, the chosen asset protection zone shall be managed as outlined within Appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Service's document Standards for Asset Protection Zones.
3. Water, electricity and gas are to comply with Planning for Bush Fire Protection (2019) Section 5.

Water Services

- a. Required static water supply for the eastern and central allotment – 10,000 litres.
- b. Required static water supply for the western allotment – 20,000 litres.
4. Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.
5. Future property accesses shall comply with Planning for Bush Fire Protection (2019) Section 5.3b excepting the provision of alternate egress.
6. It is recommended that the property owner and occupants familiarise themselves with the relevant bushfire preparation and survival information provided by the NSW RFS.
7. The existing dwelling shall be upgraded to improve ember protection. This is to be achieved by enclosing all openings (excluding roof tile spaces) or covering openings with a non-corrosive metal screen mesh with a maximum aperture of 2 millimetres. Where applicable, this includes any subfloor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draft excluders.

10.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bush Fire Protection (2019). There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.

11.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Service's "Standards for Asset Protection Zones". The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refer to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be created;
2. Shrubs should not be located under trees;
3. Shrubs should not form more than 10% ground cover; and
4. Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Tree canopy cover should be less than 15% at maturity;
2. Trees at maturity should not touch or overhang the building;
3. Lower limbs should be removed up to a height of 2m above the ground;
4. Tree canopies should be separated by 2 to 5m; and
5. Preference should be given to smooth barked and evergreen trees.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Shrubs should not form a continuous canopy;
2. Shrubs should form no more than 20% of ground cover.

B. Trees:

1. Existing trees can be retained.
2. Tree canopy cover should be less than 30%; and
3. Canopies should be separated by 2 to 5m.

Grass (throughout the entire asset protection zone)

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

12.0 REFERENCES AND DISCLAIMER

References

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

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

Environmental Planning and Assessment Act 1979.

New South Wales Rural Fire Service, Planning for Bush Fire Protection (2019).

Rural Fires Act 1997.

Rural Fires Regulation 2008.

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2019) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2018) Building in bushfire-prone areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.