

**BUSHFIRE ASSESSMENT
PERFORMANCE-BASED SOLUTION**

PROPOSED BUILDING CHANGE OF USE AND ADDITIONS

**LOT 18 DP 1279754
360 Wallarobba Brookfield Road, Wallarobba**

Date: 17/03/2026

Prepared for: Stephen Bartrop

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I hereby declare that I am a BPAD accredited bushfire practitioner.		
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Date	17/03/2026	

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Document Status

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed building change of use and additions against the requirements of Section 4.14 of the Environmental Planning and Assessment Act 1979, 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 achieve the performance criteria.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Stephen Bartrop		
Site Address	360 Wallarobba Brookfield Road, Wallarobba	Lot/Sec/DP	Lot 12 DP 832457
Local Government Area	Dungog	FDI	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	building change of use and additions	Type of Area	Rural
Special Fire Protection Purpose	No	Flame Temperature	1090K
Application Complies with Acceptable Solutions	No. Performance Based Solution reviewing detailed fire modelling	Referral to NSW Rural Fire Service (NSW RFS) required	Council determination on referral

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	North	East	South	West
Vegetation Structure	Grassland	Grassland	Forest	Grassland
Distance to Vegetation	28 metres	100 metres	47 metres	28 metres
Accurate Slope Measure	6 degrees downslope	Level/Upslope	9 degrees downslope	5 degrees downslope
Slope Range	>5 to 10 degrees downslope	Level/Upslope	>5 to 10 degrees downslope	>0 to 5 degrees downslope
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-12.5	BAL-LOW	BAL-12.5 *	BAL-12.5

The highest BAL, being BAL-12.5 applies to the entire building.

*Determined using a detailed fire model.

TABLE 3 – PLANNING FOR BUSH FIRE PROTECTION (2019) 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.	<u>Performance Based Solution</u>
Siting and Design	Buildings have been designed to minimise the risk of bushfire attack.	Acceptable Solution
Construction Standards AS3959 (2018)	Bushfire Attack Levels have been determined in accordance with Planning for Bush Fire Protection (2019) and AS3959 (2018). An AS3959 Method 2 Detailed Fire Model has been prepared for the site. The highest BAL, being BAL-12.5 applies to the entire building. The proposed building increases dwelling density with the development complying with section 8.2.1 of Planning for Bush Fire Protection (2019). All dwellings will be exposed to radiant heat thresholds of less than 29 kw/m².	<u>Performance Based Solution</u>
Private and or Public Road Infrastructure	The public road system is not affected or changed as part of this application.	Acceptable Solution
Property Access	The property access shall comply with Planning for Bush Fire Protection (2019) Section 7.	Acceptable Solution
Water and Utility Services	Water, electricity and gas services offer compliance with Planning for Bush Fire Protection (2019) Section 7.	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bush Fire Protection (2019) Appendix 4.	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 building change of use and additions for existing building located at Lot 12 DP 832457, 360 Wallarobba Brookfield Road, Wallarobba, in order for the Council to make determination of the proposed development pursuant to the requirements of Section 4.14 of the Environmental Planning and Assessment Act 1979.

Features on or adjoining the site that may mitigate the impact of a bushfire on the proposed development

The forest to the south of the site has reduced direct fire runs and transitions into grassland to the southwest of the site. This will result in reduced fire intensity and size. Grazing pasture is the dominant vegetation to the north and west.

Likely environmental impact of any proposed bush fire protection measures

No native vegetation removal is required for the development.

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 building change of use and additions in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The proposed development includes the change of use of an existing dairy building to a secondary dwelling. Alterations and additions are also proposed for the building.

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 somewhat inaccurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using NSW RFS (2019) Comprehensive Vegetation Fuel Loads.

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



PHOTO 1 - EXISTING BUILDING LOOKING SOUTHWEST

View of the existing dairy looking southwest. The dairy is proposed to be converted into a secondary dwelling and additions will extend the building footprint.



PHOTO 2 - SOUTHERN FOREST

View of forest located south of the site. Eucalypts dominate the tree canopy with an understorey of grasses and native shrubs.

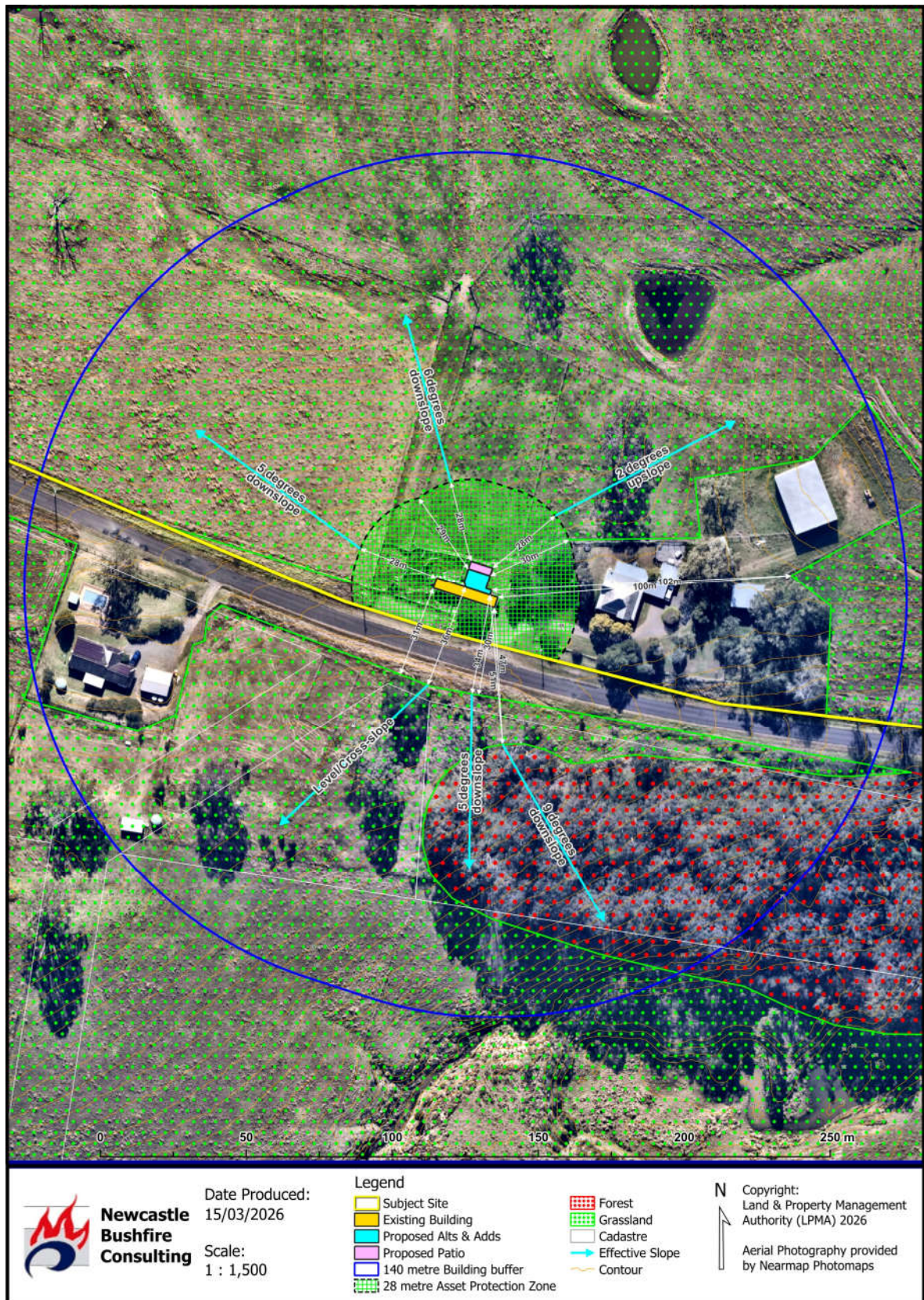


FIGURE 1 – SITE CONSTRAINTS MAP

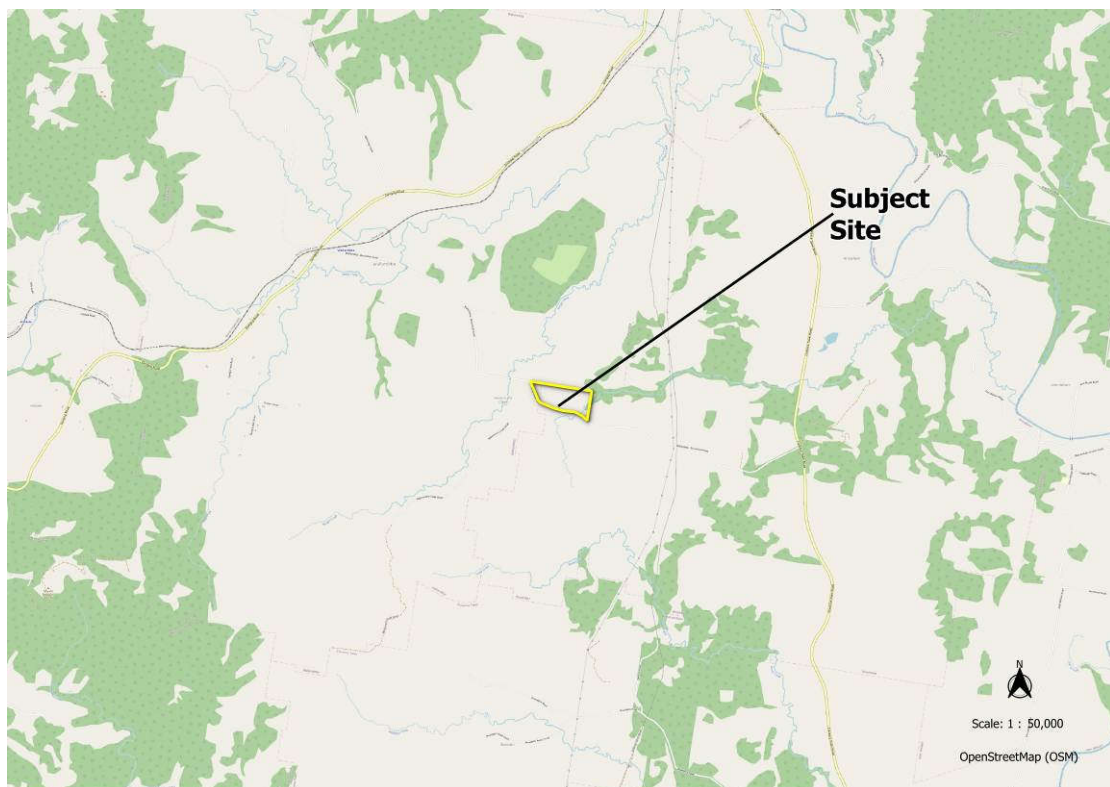


FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

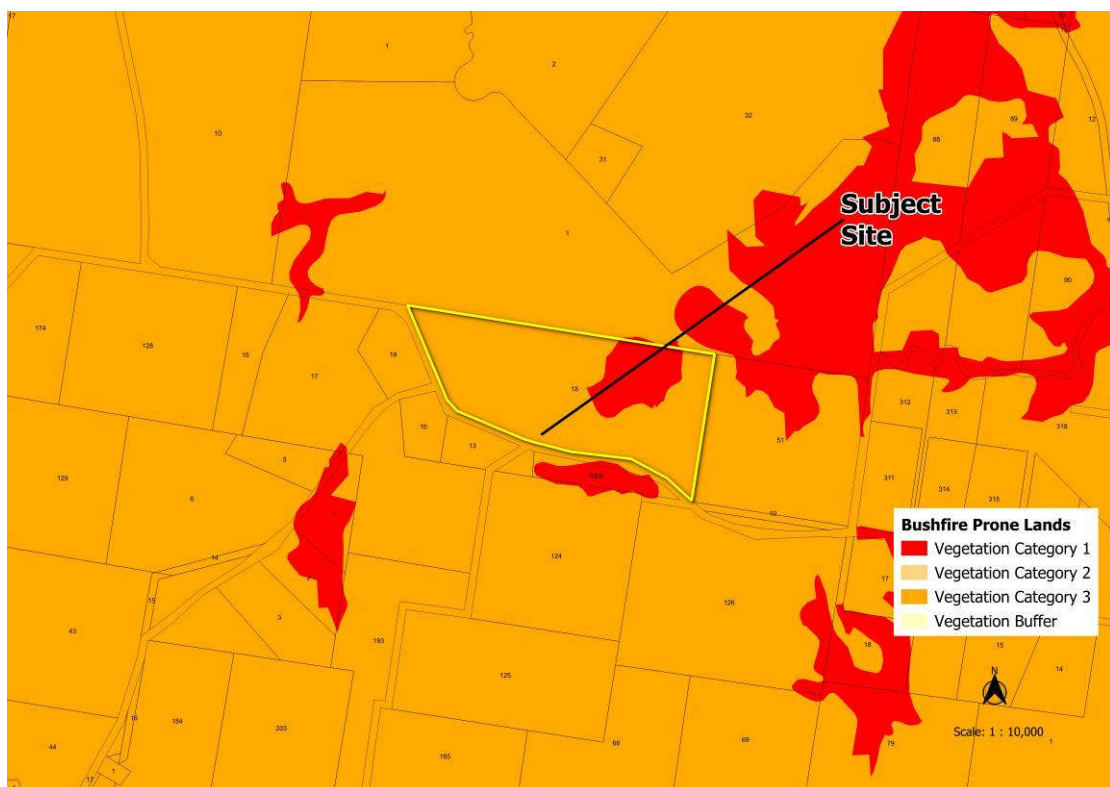


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

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 BUSHFIRE ATTACK LEVELS

BALs and relevant construction levels in accordance with Planning for Bush Fire Protection (2019) have been demonstrated in Section 1 Executive Summary and Compliance Tables.



PHOTO 3 - WESTERN GRAZING PASTURE

View of grazing pasture located west of the site. The grass exceeds 10 centimetres in length and has been deemed a grassland threat.

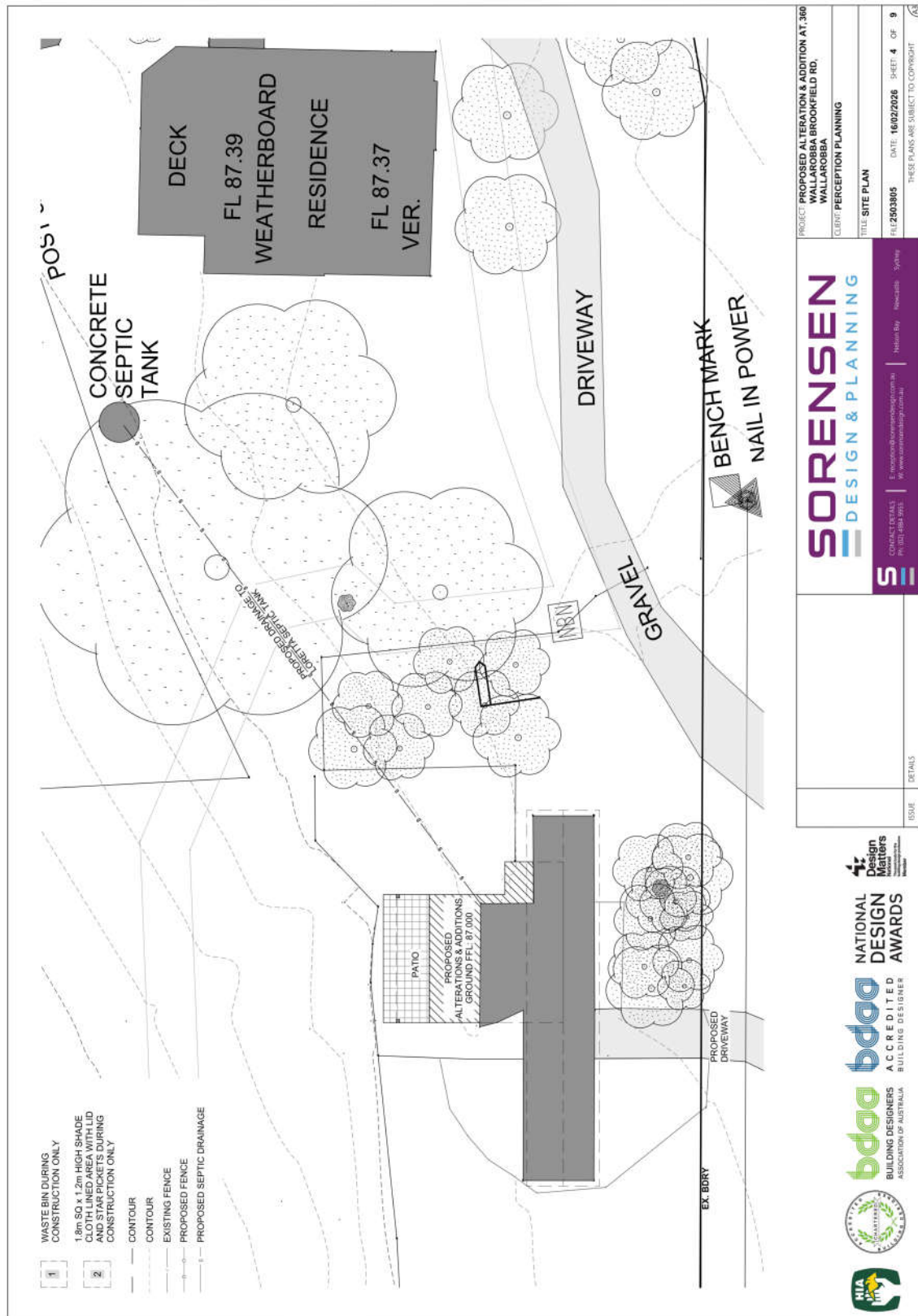


FIGURE 4 – SITE PLAN

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

The site is in size with no hydrant access. Either an additional hydrant shall be installed in accordance with AS2419.1 or a static water supply, with provision for a minimum 20,000 litres shall be provided. The 20,000 litre water supply may be either a tank or pool, providing that the 20,000 litres is available for firefighting purposes. 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. No part of a tree shall be closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

4.3 GAS SERVICES

- Reticulated or bottled gas to be installed and maintained in accordance with AS1596 (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.

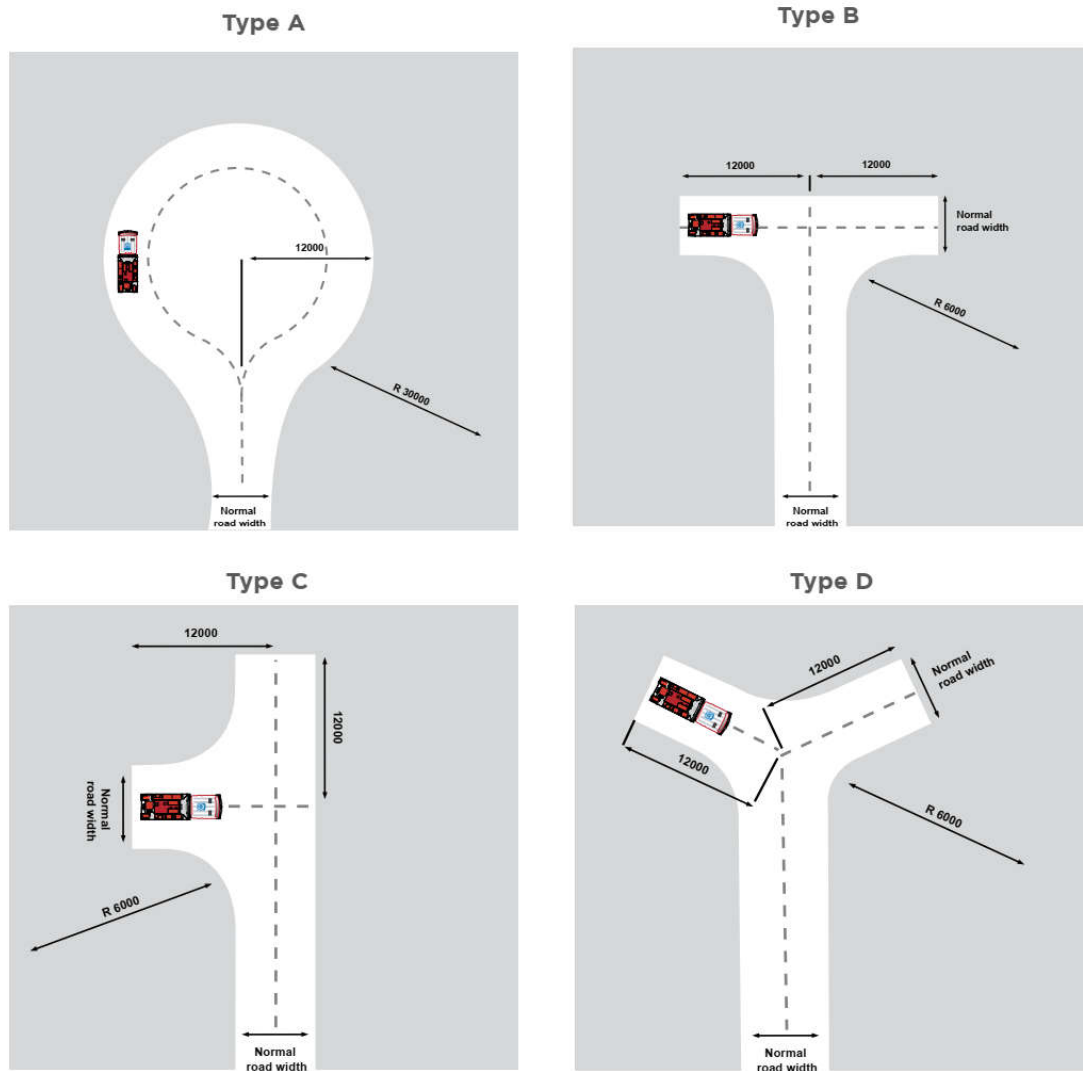
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and be at least 2 metres from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

5.0 PROPERTY ACCESS

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

The existing property access complies with Section 7 of Planning for Bush Fire Protection (2019) with a compliant turning area available between the two dwellings.

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 be 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 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 achieves compliance with the objectives of Planning for Bush Fire Protection (2019).

Proposed Performance Based Solution

The proposed Performance Based Solution determines the Bushfire Attack Level (BAL) using an AS3959 (2018) Method 2 Detailed Fire Model and NSW RFS (2019) Comprehensive Vegetation Fuel Loads for the southern vegetation. All other vegetation has been assessed using a simplified fire model.

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 asset protection zones and construction.

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 Class 1a building and does not factor the potential impact on a dwelling via windborne objects during a bushfire event.

Quantitative Analysis

Vegetation Structure Assessment

Penny Watson (2012) conducted a thorough assessment of vegetation structures throughout New South Wales and is deemed current best practice in assessing peak fuel loads. Watson (2012) identifies that Hunter Macleay Dry Sclerophyll Forest has a maximum surface and elevated fuel loading of 14 tonnes per hectare using a peak accumulation curve. NSW RFS (2019) Comprehensive Vegetation Fuel Loads summarises Watson fuel loads and adds an overall fuel load. This classification of forest is identified within the NSW SEED PCT mapping.

Fire Weather Parameters

Douglas et al. (2014) define forest fire dangers using Extreme Value Analysis in Determining Annual Probability of Exceedance for Bushfire Protection Design. The FFDI for a 1 in 50 year event based upon Williamstown weather station is FFDI 106, with this having been used in all fire models.

Design Fire Modelling Inputs

Surface Fuel Load: 14 tonnes per hectare
Overall Fuel Load: 24.6 tonnes per hectare
Elevation of receiver: 3 metres
Site Slope: 3 degrees downslope
Vegetation Slope: 9 degrees downslope

Construction Standard Performance Criteria

It is demonstrated that the proposed building can withstand bushfire attacks in the form of wind, smoke, embers, radiant heat and flame contact.

Design Fire Outputs

Radiant Heat Flux: 12.03 kw/m² (BAL-12.5)

Qualitative Analysis

AS3959 (2018) Construction of buildings in bushfire-prone areas and Planning for Bush Fire Protection (2019) detail the calculations required for detailed fire modelling and Newcastle Bushfire Consulting's proprietary modelling tool uses these. The detailed fire models have been provided in Appendix 2.0 of this report.

Redundancies are included in the design fire for rate of spread and flame length and a conservative measure of bushfire attack is provided to the building.

8.0 COMPLIANCE WITH PERFORMANCE REQUIREMENTS OF PLANNING FOR BUSH FIRE PROTECTION (2019)

The compliance with performance requirements of Planning for Bush Fire Protection is listed below.

Performance Criteria	Acceptable Solution	Performance Based Solution
In relation to APZ:		
APZs are provided commensurate with the construction of the building; A defensible space is provided.	An APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1.	The site has defensible space. The owner will be able to prepare the house for fire and extinguish small spot fires, and the firefighters will be able to shelter within the property if fire impacts.
APZs are managed and maintained to prevent the spread of a fire to the building.	APZs are managed in accordance with the requirements of Planning for Bush Fire Protection (2019) Appendix 4.	Complies with acceptable solution.
The APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are wholly within the boundaries of the development site. APZs are located on lands with a slope less than 18 degrees.	Complies with acceptable solution.
In relation to construction standards:		
The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the National Construction Code 2019 and as modified by Section 7.5.	BAL-12.5 construction is based on an AS3959 Method 2 detailed fire model.
Proposed fences and gates are designed to minimise the spread of bushfire.	Fencing and gates are constructed in accordance with Section 7.6.	Shall comply with acceptable solution.

Proposed Class 10a buildings are designed to minimise the spread of bushfire.	Class 10a buildings are constructed in accordance with Section 8.3.2.	Not applicable.
In relation to access requirements:		
Safe, operational access is provided (and maintained) for emergency service personnel in suppressing a bushfire while residents are seeking to relocate in advance of a bushfire (satisfying the intent and performance criteria for access roads in Section 7).	Compliance with Section 7 for property access roads.	Complies with acceptable solution.
In relation to water supplies:		
An adequate water supply is provided for firefighting purposes.	Reticulated water is to be provided to the development, where available.	Complies with acceptable solution.
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant spacing, design and sizing comply with the relevant clauses of AS2419.1:2005; Hydrants are not located within any road carriageway; and Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	Complies with acceptable solution.
The integrity of the water supply is maintained.	All above-ground water service pipes external to the building are metal, including and up to any taps.	Can comply with acceptable solution.
In relation to electrical services:		
Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	Complies with acceptable solution.
In relation to gas services:		
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	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 10 metres and shielded on the hazard side; Connections to and from gas cylinders are metal;	Can comply with acceptable solution.

	Polymer-sheathed, flexible gas supply lines are not used; and Above-ground gas service pipes are metal, including and up to any outlets.	
In relation to landscaping:		
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Compliance with the NSW RFS Asset Protection Zone Standards (see Appendix 4); A clear area of low cut lawn or pavement is maintained adjacent to the house; Fencing is constructed in accordance with Section 7.6; and Trees and shrubs are located so that: the branches will not overhang the roof; the tree canopy is not continuous; and any proposed windbreak is located on the elevation from which fires are likely to approach.	Can comply with acceptable solution.

9.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The existing dairy building and the proposed building works shall comply with Sections 3 and 5 (BAL-12.5) in accordance with AS3959 (2018) Construction of buildings in bushfire-prone areas or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas - 2014 as appropriate and the additional construction requirements of Planning for Bush Fire Protection (2019) Section 7.5.2.
2. At the commencement of building works and in perpetuity, the property around the building to a distance of 28 metres where onsite and to the southern property boundary, shall be maintained as an inner protection area (IPA) 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 Section 7 of Planning for Bush Fire Protection (2019).
Water Services
 - a. A 20,000 litre static water supply with firefighting fittings is required.
4. The property access shall comply with Section 7 of Planning for Bush Fire Protection (2019).

5. Landscaping is to be undertaken in accordance with Planning for Bush Fire Protection (2019) Appendix 4 and managed and maintained in perpetuity.
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. To assist in achieving a better bush fire protection outcome for the overall property, consideration should be given to the implementation of the NSW RFS document Best Practice Guidelines - Dwelling Upgrades for the upgrading of existing building(s) in order to comply with the intent of Planning for Bush Fire Protection (2019) and AS3959 (2018) Construction of buildings in bushfire-prone areas.

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 Services “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. Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
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 APPENDIX 2.0 DETAILED FIRE MODEL



NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 17/03/2026

Assessment Date: 17/03/2026

Site Street Address: 360 Wallarobba Brookfield Road, Wallarobba

Assessor: Phillip Couch; Newcastle Bushfire Consulting

Local Government Area: Dungog

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: Southern Forest

Vegetation Information

Vegetation Type: Hunter Macleay DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 9 Degrees

Vegetation Slope Type: Downslope

Surface Fuel Load(t/ha): 14

Overall Fuel Load(t/ha): 24.6

Vegetation Height(m): 0.9

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 3 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): 3

APZ/Separation(m): 47

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1090

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg) 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 8.72

Radiant Heat(kW/m2): 12.03

Flame Angle (degrees): 73

Flame Length(m): 23.27

Maximum View Factor: 0.203

Rate Of Spread (km/h): 3.13

Inner Protection Area(m): 39

Transmissivity: 0.778

Outer Protection Area(m): 8

Fire Intensity(kW/m): 39733

13.0 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).

Watson, P. (2012) Fuel Load Dynamics in NSW Vegetation

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses the risk and provides recommendations to reduce it to a community-accepted level. It is of paramount importance that the recommendations be adhered to for the life of the structure and that all maintenance be 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) Construction of buildings 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. External combustible cladding is not recommended.