KHS Ecology & Bushfire

Bushfire Assessment Report

for proposed Alterations & Additions to existing dwelling & new shed with studio, 131 Nangawooka Road Green Gully NSW 2850

Lot 112 DP 756917

Mid-Western Local Government Area

September 2024

Prepared for: Property Owner, Robert Coppolino

Prepared by: KHS Ecology & Bushfire Pty Ltd

Assessment details & declaration

Development type	Residential Infill development • additions to existing main dwelling (Class 1a), • new shed (Class 10a) with habitable studio (Class 1a)
Property Address	131 Nangawooka Road Green Gully NSW 2850, Lot 112 DP 756917
Council	Mid-Western Regional Council
Owner/ Proponent	Robert Coppolino
Plan reference	Site Plan prepared Todd Berryman, May 2024
Assessment method	Method 1, *Planning for Bush Fire Protection 2019*
Site inspection date	Site photographs provided by owner, 10/08/2024,
ASSESSMENT SUMMARY	The site is affected by hazard vegetation comprising 'Short Heath' and 'Woodland' of varying slope. This assessment recommends that building construction complies with section 3 (General) and section 7 (BAL–29) of Australian Standard *AS3959 (2018) Construction of buildings in bushfire-prone areas* – for the new additions to the dwelling and the new habitable studio (part of shed). The following APZ distances are commensurate with BAL 29 construction and need to be established through vegetation management: Main dwelling APZ: • NORTH to 12m • EAST to 13m • SOUTH to 17m • WEST to 12m. Shed studio APZ: • NORTH to 9m • EAST to 9m • SOUTH to 17m • WEST to 12m. Other bushfire protection measures relating to water supply, electricity and gas, landscaping must comply with PBP as described in **section 3** of this report.
Referral to the RFS	**Referral to RFS not required. Council can approve BAL–29 development.**
Declaration	This assessment has been prepared by an Accredited Bushfire Planning and Design (BPAD) consultant with qualifications recognised by the NSW Rural Fire Service. [redacted] [redacted] *Grad Dip Bushfire Protection, PhD, BSc (Hons)* [redacted] Director, Ecologist and Bushfire Consultant KHS Ecology & Bushfire Pty Ltd [redacted] [redacted] BPAD Bushfire Planning & Design Accredited Practitioner Level 2
KHS project No.	#241185

Document versions

Report Date	Version	Comment
7/09/2024	Draft report	Draft report prepared
11/09/2024	Final report	Additional analysis to addess habitable studio part of shed. Report issues to client for submission with the Development Application to Mid-Western Regional Council

DISCLAIMER: This assessment has been prepared in good faith and based on and limited by the information provided and available data and conditions at the time of the assessment. The contents of this report are the professional and objective opinions of the author. Consent authorities may differ in their opinion in relation to the subject matter in this report and may impose different requirements than those described in this report. To the maximum extent permitted by law, the author disclaims any liability arising from or damages in relation to the findings and advice contained herein.

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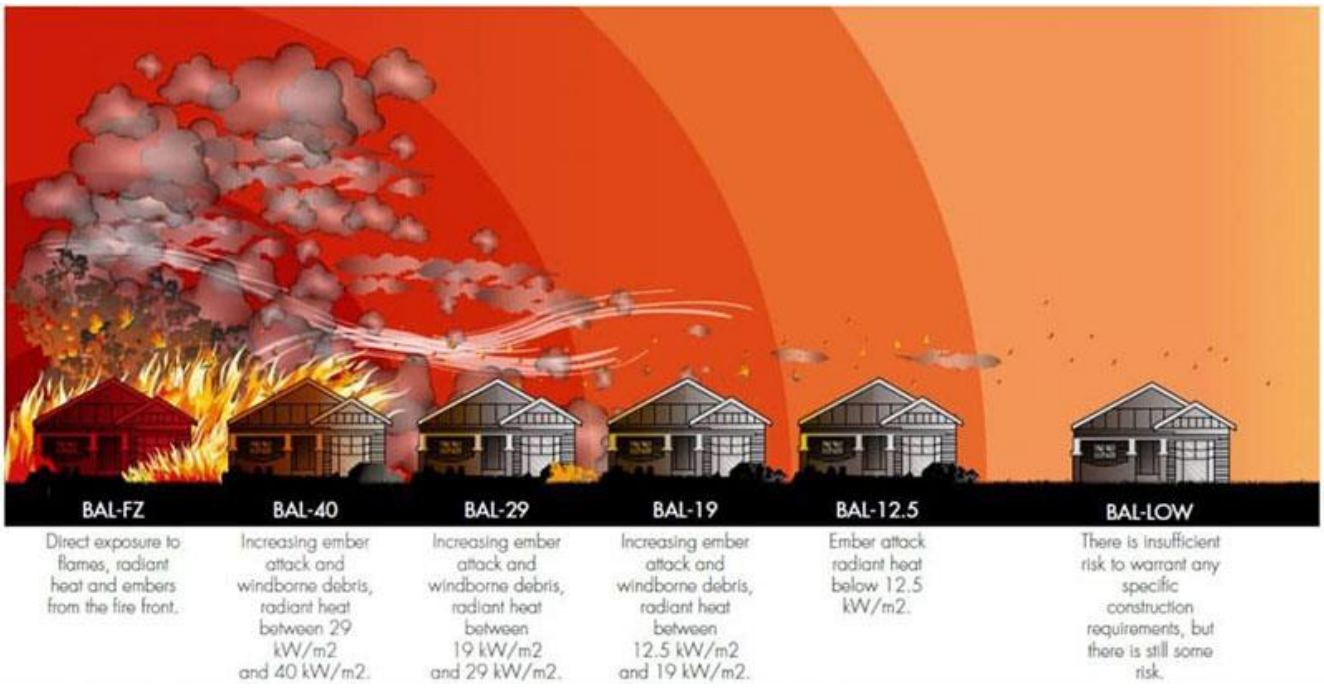
Tables and Figures



1 Introduction and background

1.1 Background

KHS Ecology & Bushfire Pty Ltd was engaged by the owner of 131 Nangawooka Road Green Gully, Mr Robert Coppolino, to prepare a Bushfire Assessment Report in relation to the proposed Alterations & Additions to an existing house and new shed with habitable studio at the property.

The location of the property is shown in Figure 1-1. The development site is located in the centre of the property as shown in Figure 1-2.

This report includes a Bushfire Attack Level (BAL) assessment and a summary of bushfire protection measures required to comply with *Planning for Bush Fire Protection 2019* (PBP), for the proposed additions to the existing dwelling and to the proposed habitable studio part of the shed. It is intended that the report will accompany a Development Application to Mid-Western City Council to assist with the consent authority review.

IMPORTANT NOTE: This assessment applies the NSW Government's bushfire protection assessment methods and guidelines as set out in Planning for Bush Fire Protection 2019. The final conditions of development approval will be imposed by Council and may differ from those outlined in this report. Due to the unpredictable nature of weather and fire behaviour, there can be no guarantee that any building on the site will remain unimpacted by bushfire under all circumstances, even if the measures described in this report and/or the conditions imposed by Council are implemented.

1.2 Information sources

The following information and data sources were used to inform this assessment.

- Site Plan and building design prepared by Todd Berryman, dated 4/7/24.
- Site photogrpahs provided by the property owner Rob Coppolino to inform the assessment regarding the landscape setting and hazard vegetation types.
- Mid-Western Local Environment Plan 2012 (the LEP) (https://legislation.nsw.gov.au/view/whole/html/inforce/current/epi-2012-0374)
- *Planning for Bush Fire Protection 2019* (RFS 2019) (accessible online at www.rfs.nsw.gov.au).
- NSW Government Planning Portal (https://www.planningportal.nsw.gov.au/ and spatial data including cadastre layers obtained from SIXMaps (www.maps.six.nsw.gov.au) (accessed 5/9/2024).
- Keith (2004) Ocean Shores to Desert Dunes – The Vegetation of New South Wales and the ACT, Department of Environment and Conservation (NSW) July 2004.

Figure 1-1. Property location, and the development site.

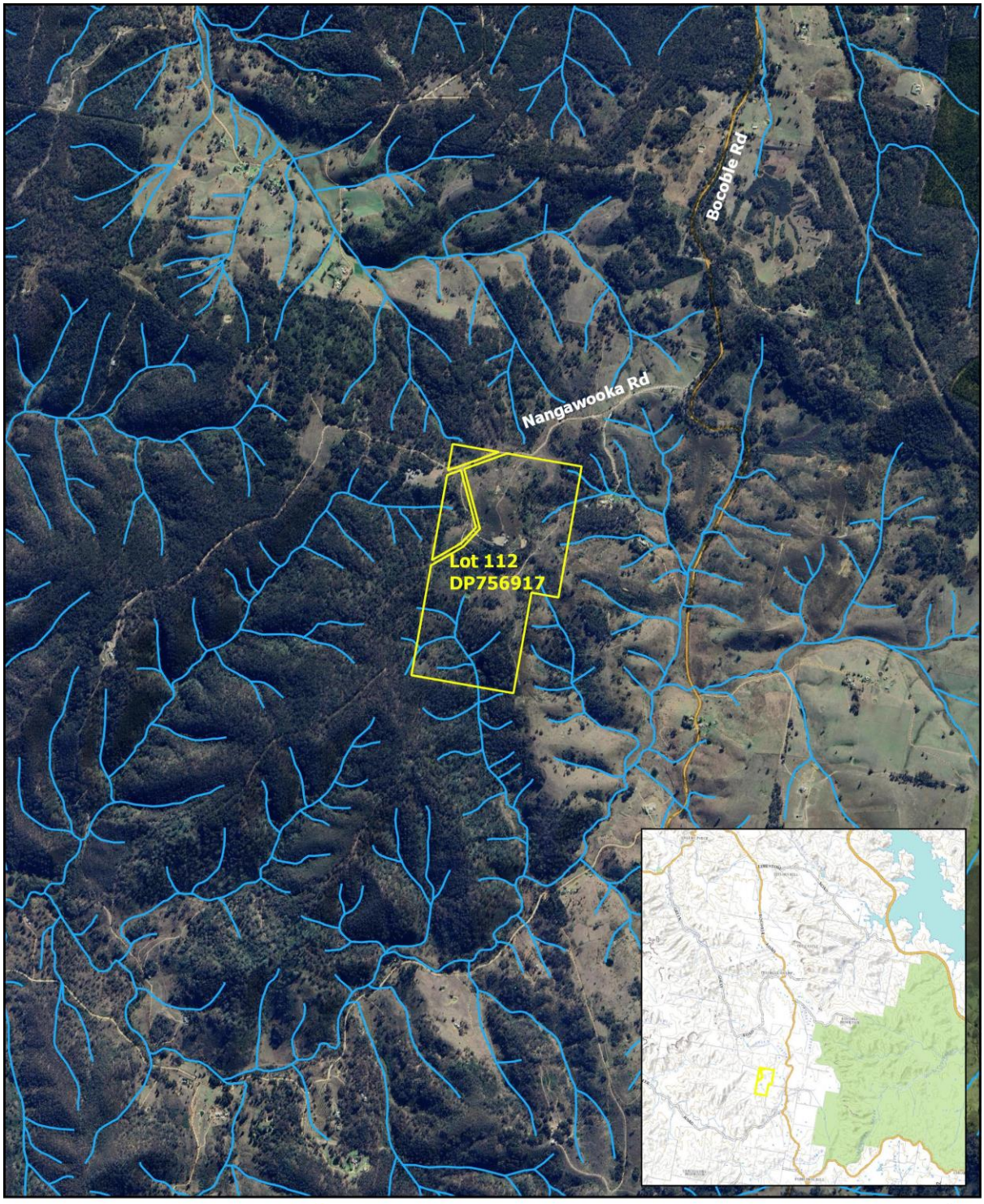
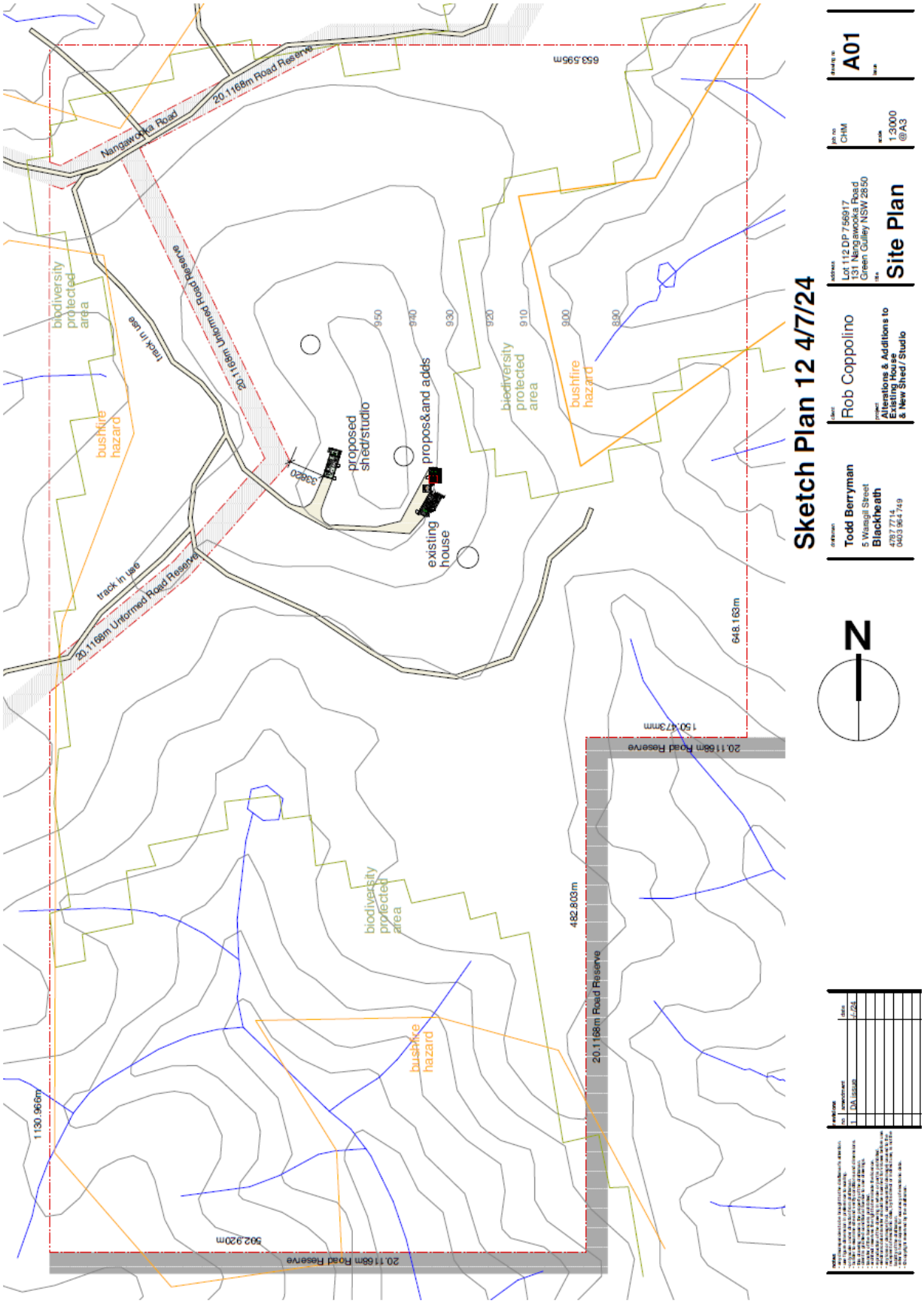


Figure 1-2. Site plan (prepared by Todd Berryman, dated 4/07/2024).



1.3 Property details

The property is identified on the NSW Planning Portal, as below.

- Address: 131 NANGAWOOKA ROAD GREEN GULLY 2850
- Lot/Section/Plan: 112/-/DP756917
- Council: MID-WESTERN REGIONAL COUNCIL
- Land zoning: RU1- Primary Production
- Bush Fire Prone Land
- Minimum lot size: 100 ha
- Medium and High Terrestrial Biodiversity over part of the lot.

The property is approximately 63.67 hectares (ha) in size.

1.4 Land zoning

The property is zoned RU1- Primary Production (**Figure 1-3**). The RU1 zone objectives under the Mid-Western LEP are as follows.

> *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
> *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
> *To minimise the fragmentation and alienation of resource lands.*
> *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
> *To maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values.*
> *To promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.*

A dwelling house is permitted in the zone with consent.

The property is located on bush fire prone land (**Figure 1-4**). Under section 4.14 of the *Environmental Planning and Assessment Act* 1979, all developments on bush fire prone land are required to satisfy the requirements of *Planning for Bush Fire Protection* (PBP) (NSW RFS 2019), as applicable to the location and type of development.

The proposal is a private residential development on an existing lot; the bushfire protection requirements relevant to the proposal are set out in PBP Chapter 7 *Residential Infill Development*. The measures relevant to the site and proposed development are set out in this report, to achieve compliance with PBP.

The property has LEP Terrestrial Biodiversity mapped land (**Figure 1-5**). The proposed dwelling is not located on Terrestrial Biodiversity land.

Figure 1-3. LEP zoning, RU1 Primary Production (NSW Planning Portal, accessed 6/9/2024)

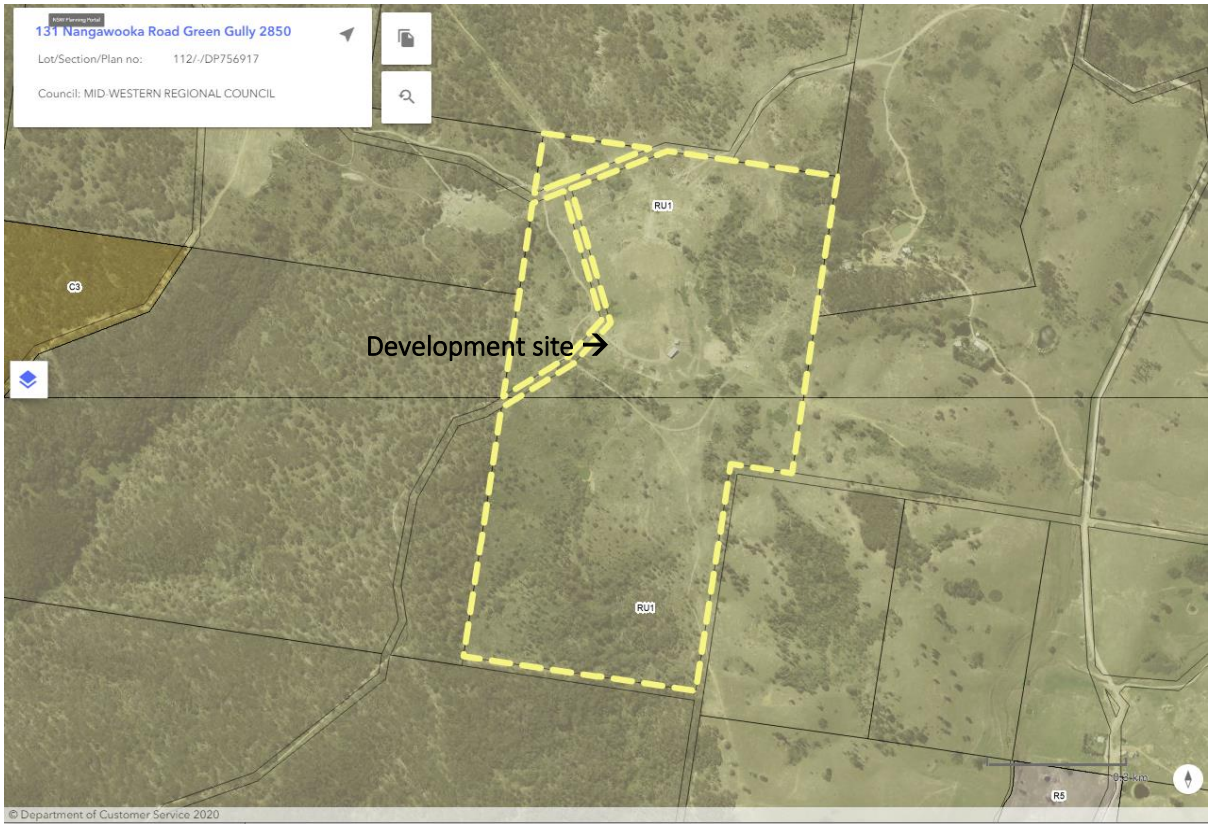


Figure 1-4. Bush Fire Prone Land mapping (Planning Portal, accessed 6/9/2024)

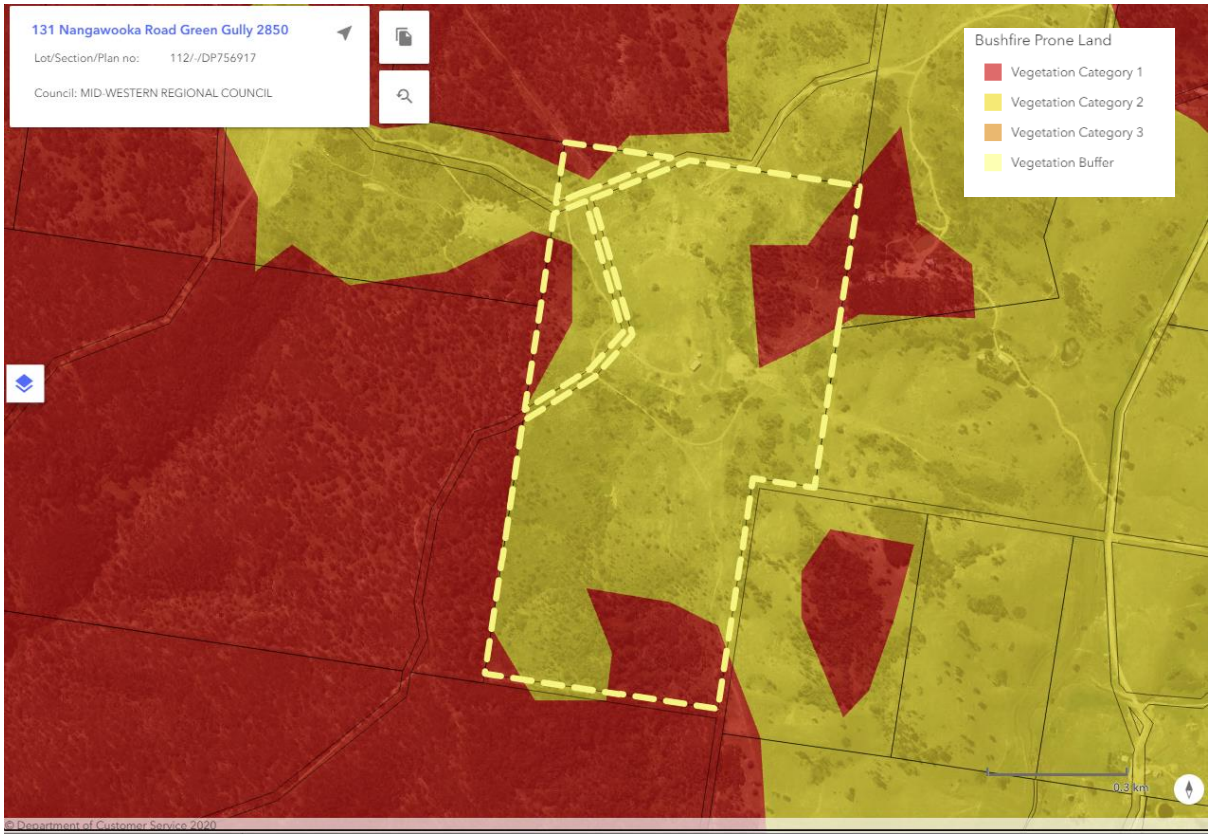


Figure 1-5. Terrestrial Biodiversity (Planning Portal, accessed 6/9/2024)

1.5 Description of the proposal

The proposed development will comprise the following components.

- Alterations to the existing residential dwelling by additions to the existing bed 1 sleepout.
- New shed with one bay constructed as a habitable studio.
- Use of an existing internal gravel driveway providing access to the proposed new shed/studio site and the dwelling, approximate length of 500m from Nangawooka Road.
- An Asset Protection Zone (APZ) around the main dwelling and habitable studio to mitigate bushfire risk, as detailed in this assessment.

The proposed shed and dwelling site is located on undulating to hilly terrain with native grassland / shrubland and scattered trees (refer to section 2 site assessment). The proposed is located ~90m to the west of the dwelling, part way along the entry driveway.

1.6 Consultation

This report has been prepared in consultation with Todd Berryman, building designer, regarding the site and proposed buildings. The property owner, Robert Coppolino, provided photographs of the main dwelling site on 10/08/2024 and additional photographs of the proposed shed site on 8/09/2024.

1.7 Objectives

The report outlines how the proposal addresses the objectives of PBP, Chapter 7 *Residential Infill Development*, which are as follows:

- *provide a defendable space for firefighting around the building;*
- *provide better bush fire outcomes on a redevelopment site than currently exists, commensurate with the scale of works proposed;*
- *design and construct buildings commensurate with the bush fire risk;*
- *provide access, services and landscaping to aid firefighting operations;*
- *not impose an increased bush fire management and maintenance responsibility on adjoining land owners; and*
- *increase the level of bush fire protection to existing dwellings based on the scale of the proposed work and level of bush fire risk.*

1.8 Consultant qualifications

This assessment has been prepared concurrently with tree identification and a Koala Assessment Report, prepared by Dr Kate Hammill who is both a BPAD accredited practitioner (BPAD 29655). The consultant qualifications are summarised in Table 1-1.

Table 1-1: Consultant qualifications and experience

Name / Position	Qualifications / experience
Dr Kate Hammill, Principal, KHS Ecology & Bushfire	Biodiversity Assessment Methodology (BAM) Accredited Assessor (BAAS18022). Bushfire Planning and Design (BPAD) NSW level 2 Accredited Practitioner (BPAD 29655) Practicing member of the NSW Ecological Consultants Association (NSW ECA). 22 years ecological research and consulting experience, in the Greater Blue Mountain, Central Tablelands, Central West, Far West, North West Slopes and Sydney regions NSW. PhD native vegetation restoration (University of Sydney). Bachelor of Science majoring in Botany / Zoology / Microbiology (University of Sydney). Graduate Diploma in Bushfire Protection (University of Western Sydney).

2 Site assessment

2.1 Method and approach

The assessment follows the site assessment methodology of PBP 2019 Appendix 1 *Site Assessment Methodology* The bushfire protection measures aim to achieve compliance with PBP by addressing Acceptable Solutions set out in PBP,as relevant to the location and type of development.

The site analysis relies on desktop landscape GIS layers and photographs of the site taken by the property owner, Robert Coppolino, showing site vegetation and terrain, access and existing development relevant to the bushfire assessment. The site information is integrated into the desktop mapping analysis in GIS to determine the BAL and APZ for the proposed development. Other features of the site including access were also assessed in relation to the requirements of PBP for residential infill development.

The assessment takes a balanced approach between bushfire protection and environmental protection, including any terrain limitations (e.g. steep slopes or rocky areas not suitable for mowing/slashing) and minimising impacts to native vegetation and trees, where this is warranted.

2.2 Landscape context

The property is located in the southern part of Mid-Western LGA, approximately 40km south of Mudgee. The landscape context is rural landscape with predominatly cleared grazing land and native woodlands and forests on the steeper hills.

The subject property has undulating terrain with derived native grassland, scattered large eucalypt trees. Denser woodland areas occur to the west and south of the property. Access to the property is via Queens Pinch Road, Bocoble Road and then a 1.3 km unsealed section of of Nangawooka Road.

2.3 Fire weather

The Mid-Western Regional LGA is within the Central Ranges fire weather district. The Bush Fire Danger Period generally runs from October to March, inclusive, however this can commence earlier in September or extend later into April under drier or higher fire risk seaons (Cudgegong Bush Fire Management Committee 2020).

Adverse fire weather and elevated bush fire risk in the Mudgee region occur in association with north-westerly to south-westerly winds, moderate to high temperatures and low humidity. Dangerous bushfire situations can arise when these conditions occur over several days and, in the event of a fire ignition, lead to potentially dangerous fire behaviour (Cudgegong Bush Fire Management Committee 2020).

The Fire Danger Index (FDI) relevant to the Mudgee region for calculation of the Bushfire Attack Level (BAL) for developments is FFDI 80.

2.4 Vegetation type

PBP requires hazard vegetation to be classified in accordance with the classification of Keith (2004), which is based on a classification hierachy of Plant Community Type (PCT), Vegetation Class and Vegetation Formation. PCTs across NSW are mapped in the NSW State Vegetation Type Map

published in December 2023 (Release C2.0M2.0) and described on BioNet Vegetation Information Systems database (DPE 2023).

Based on the site photographs provided and a review of published PCT mapping, the vegetation on the property is identified as a woodland and derived grassland/shrubland of the following vegetation community:

> *PCT 3734 Central Tableland Dry Slopes Stringybark-Box Forest* — this PCT is part of the 'Dry Sclerophyll Forest (shrubby subformation)' and 'Southern Tableland Dry Sclerophyll Forest' vegetation class of Keith (2004).

The vegetation surrounding the development contains only scattered trees of *Eucalyptus* and *Acacia* with native groundcover with *Cassinia arcuata* (Biddy bush) (Photograph 2-1). There are areas of woodland to the south of the dwelling site. The hazard vegetation is classified in accordance with PBP as:

- 'Short Heath'
- 'Woodland'.

Where different vegetation occurs in a direction from the development, the greatest hazard vegetation type is used to determine the BAL. The

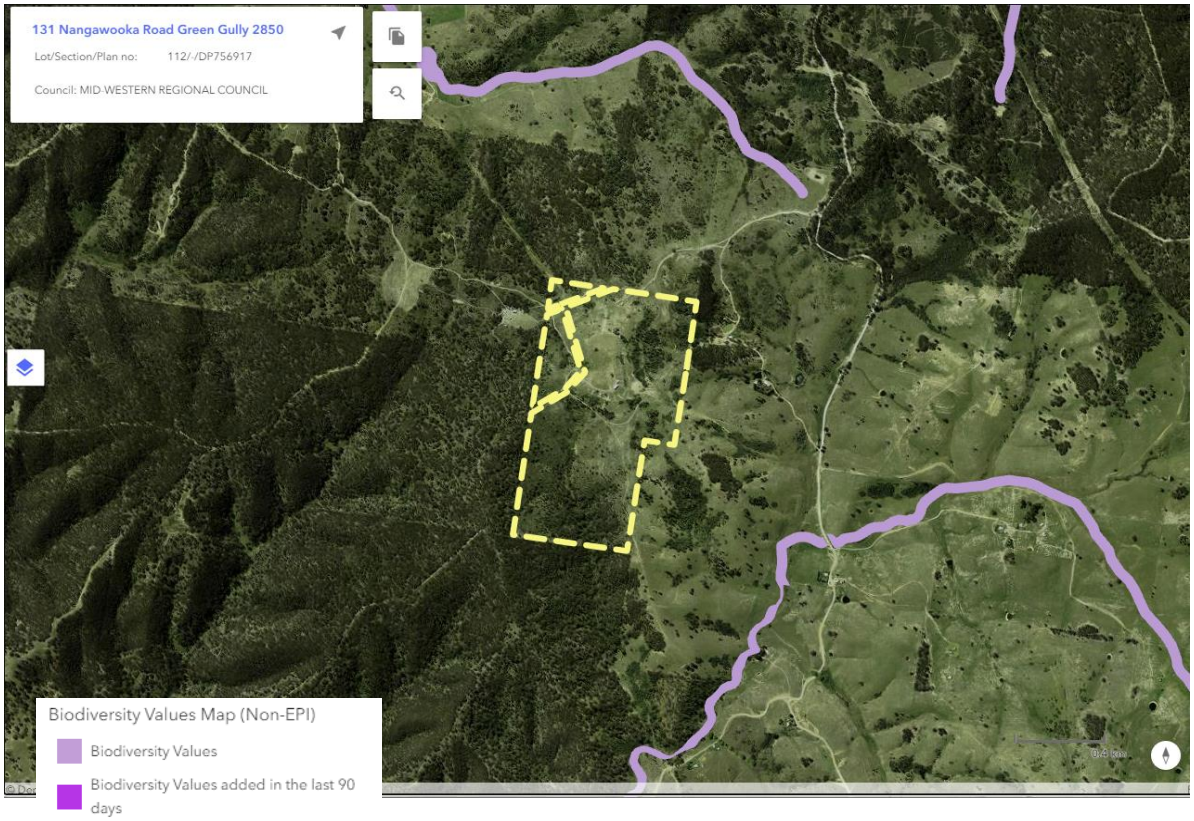
Photograph 2-1. View of the development site (looking west) showing the occassional trees of Eualyptus and Acacia and native groundcover with Cassinia arcuata (Biddy bush). Woodland vegetatio occurs to the south (left of this view).

2.5 Biodiversity considerations

The Green Gully creek to the north and Campbells Creek to the southeast are mapped on the Biodiversity Values Map, as shown in **Figure 2-1**. The proposed development will not impact any land on the BV Map.

The proposal is of a small scale and does not require any clearing of trees. Impacts of the development to native vegetation will be minor and non-significant in the landscape context.

Figure 2-1. Biodiversity Values Map (Planning Portal, accessed 6/9/2024)



2.6 BAL assessment

The BAL assessment in accordance with PBP Appendix 1 *Site Assessment Methodology* requires vegetation to be assessed out to 140 m and slope out to 100 m of the proposed dwelling.

The bushfire hazard affecting the site comprises:

- NORTH: Short Heath, downslope >5-10deg
- EAST: Short Heath, downslope >10-15deg
- SOUTH: Short Heath then Woodland, downslope >5-10deg,
- WEST: Short Heath, downslope >5-10deg (over crest of the hill).

The BAL distances relevant to the site based on PBP Table A1.12.6 for FFDI 80 are shown in **Table 2-1** (main dwelling) and **Table 2-2** (habitable studio in the shed). The bushfire hazard at the site is described in **Table 2-3**.

Considering the site location, hazard vegetation and slope, the recommended BAL for both the new dwelling building and habitable shed studio is BAL 29.

The bushfire site analysis and APZ required to achieve BAL 29 at each building is mapped in Figure 2-2 and Figure 2-3.

The APZ to the shed is measured from the habitable portion of the shed, not the entire shed building. A fire rated wall fitted up to the underside of the metal roof will be needed to separate the habitable portion of the shed and the remainder of the shed.

Table 2-1. BAL distances relevant to the site, based on PBP Table A1.12.6 (FFDI 80), applicable to the main dwelling.

Hazard vegetation & Slope (Main dwelling)	BAL distance (m)					Recommended APZ & BAL
	BAL FZ	BAL 40	BAL 29	BAL 19	BAL 12.5	
NORTH Short Heath, downslope >5-10 deg	<9	9-<12	12-<18	18-<25	25-<100	BAL 29 is achievable. APZ established to 12m from dwelling.
EAST Short Heath, downslope >10-15deg	<10	10-<13	13-<20	20-<29	29-<50	BAL 29 is achievable. APZ established to 13m from dwelling.
SOUTH Short Heath then Woodland, downslope >5-10deg	<12	12-<17	17-<24	24-<34	34-<100	BAL 29 is achievable. APZ established to 17m from dwelling(for Woodland hazard).
WEST Short Heath, Upslope to crest of the hill then downslope >5-10 deg	<9	9-<12	12-<18	18-<25	25-<100	BAL 29 is achievable. APZ established to 12m from dwelling.

Table 2-2. BAL distances relevant to the site, based on PBP Table A1.12.6 (FFDI 80), applicable to the studio part of the shed.

Hazard vegetation & Slope (Shed studio)	BAL distance (m)					Recommended APZ & BAL
	BAL FZ	BAL 40	BAL 29	BAL 19	BAL 12.5	
NORTH Short Heath, flat	<7	7-<9	9-<14	14-<20	20-<100	BAL 29 is achievable. APZ established to 9m from habitable studio.
EAST Short Heath, flat/upslope	<7	7-<9	9-<14	14-<20	20-<100	BAL 29 is achievable. APZ established to 9m from habitable studio.
SOUTH Short Heath then Woodland, downslope >5-10deg	<12	12-<17	17-<24	24-<34	34-<100	BAL 29 is achievable. APZ established to 17m from habitable studio (for Woodland hazard).
WEST Short Heath, downslope >5-10 deg	<9	9-<12	12-<18	18-<25	25-<100	BAL 29 is achievable. APZ established to 12 m from habitable studio .

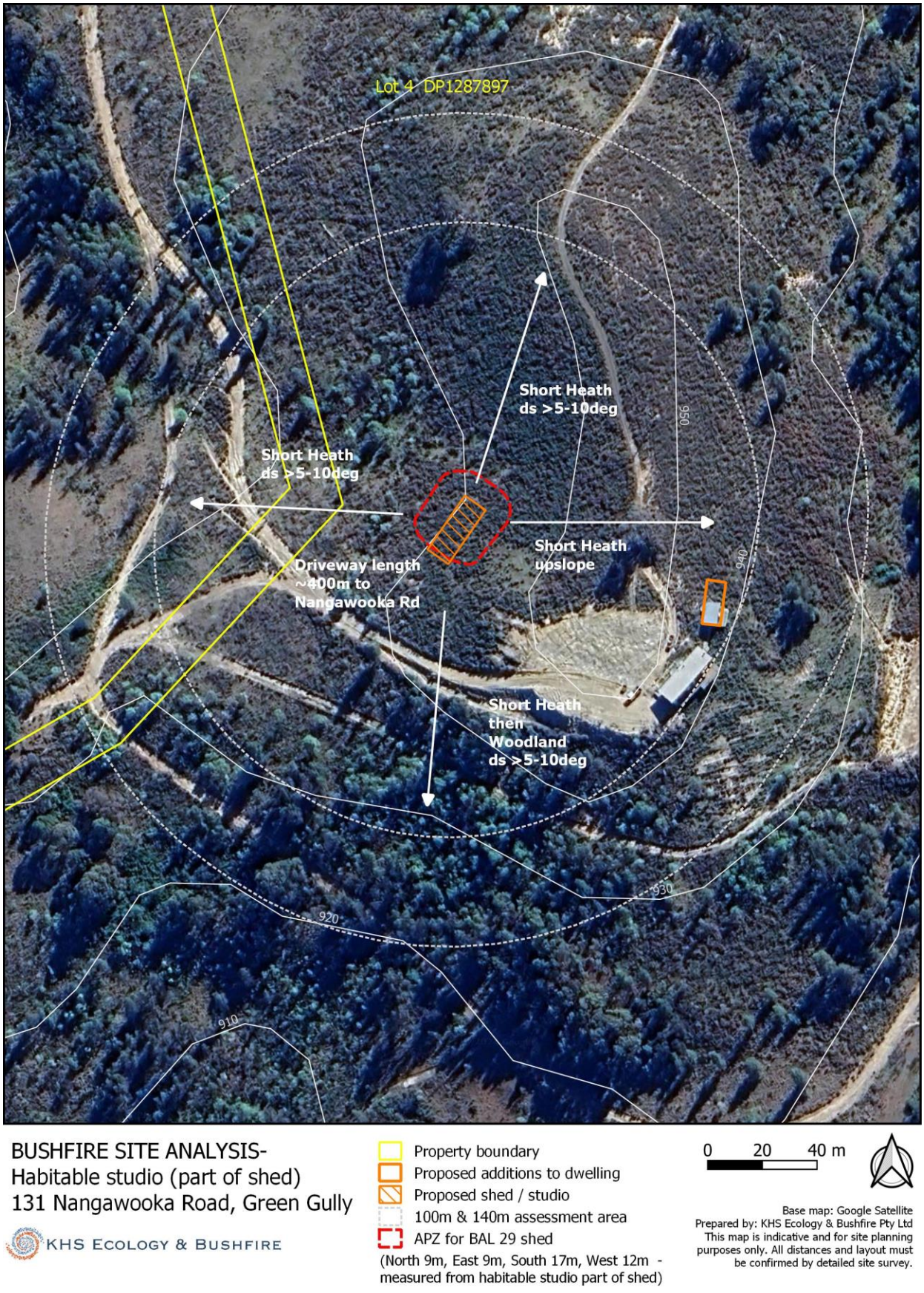
Table 2-3. Site bushfire hazard description with indicative APZ to the main dwelling shown (red dashed line).

Hazard description and proposed APZ	Site photograph & proposed APZ extent
NORTH Short Heath Downslope >5-10 deg APZ of 12m maintained as <15% woody cover and mown/ slashed groundcover. Existing well-spaced paddock trees should be retained - no tree clearing is required.	
EAST (view looking west) Short Heath Downslope >10-15 deg APZ of 13m maintained as <15% woody cover and mown/ slashed groundcover. Existing well-spaced paddock trees should be retained - no tree clearing is required.	

Hazard description and proposed APZ	Site photograph & proposed APZ extent
SOUTH Short Heath then Woodland, Downslope >5-10 deg APZ of 17m maintained as <15% woody cover and mown/ slashed groundcover. Existing well-spaced paddock trees should be retained - no tree clearing is required.	
WEST side (view looking east) Short Heath, Upslope to crest of the hill then Downslope >5-10 deg APZ of 12m maintained as <15% woody cover and mown/ slashed groundcover. No tree clearing is required.	

Figure 2-2. Site bushfire analysis –existing dwelling and proposed additions.

Figure 2-3. Site bushfire analysis –habitable studio portion of proposed new shed



3 Bushfire protection measures

The PBP Bushfire Protection Measures (BPMs) for residential infill development include provisions for:

- Asset protection zone
- Building construction standard
- Access
- Fire-fighting water supply
- Electricity and gas services
- Landscaping
- Emergency evacuation.

The intent of the BPMs is to minimise the risk of bush fire attack and provide protection for emergency services personnel, residents and others assisting firefighting activities. The design solutions being proposed for the current development aim to achieve the requirements for each BPM following a compliance approach (as set out in the 'Acceptable Solutions' in PBP Table 7.4a).

3.1 Asset Protection Zone

Both the main dwelling and the habitable studio in the proposed new shed are affected by bushfire hazard vegetation comprising 'Short Heath' and 'Woodland', as described in section 2. To mitigate bushfire risk to the residential / habitable buildings, the development proposes a BAL 29 rating to both buildings and an APZ commensurate with the BAL.

The APZ distances for BAL 29 to the main dwelling are determined as:

- NORTH to 12m
- EAST to 13m
- SOUTH to 17m
- WEST to 12m (measured as horizontal distances from the external walls of the building).

The APZ distances for BAL 29 to the habitable portion of the shed are determined as:

- NORTH to 9m
- EAST to 9m
- SOUTH to 17m
- WEST to 12m (measured as horizontal distances from the external walls of the building).

The proposed APZs are mapped in Figure 2-2 and Figure 2-3.

The native grassland / shrubland vegetation around each building will need to be managed to achieve low fuel loads consistent with RFS requirements as described in section 3.6 (i.e. shrubs removed and grasses mown or slashed). Also see details in Appendix A of this report. The entire APZ should be managed to Inner Protection Area (IPA) standards. No trees will need to be cleared to establish the APZ to either of the buildings.

The APZ vegetation management requirements must be understood by the property owner and be applied at the site within the approved APZ for the life of the development.

3.2 Construction

Construction requirements utlined below are based on the assumption that the APZ specified in section 3.1 are approved by Council.

Construction of the additions to the main dwelling will need to be in accordance with BAL 29 bushfire standards, as per section 3 (General Construction Requirements) and section 7 (Construction Requirements for BAL–29) of Australian Standard AS3959: 2018 *Construction of buildings in bushfire-prone areas* (Standards Australia Limited 2018).

The existing dwelling building has steel piers, framing and cladding and the windows are aluminium (as advised by Todd Berryman, building designer). This construction using non-combustible materials is consistent with bushfire building for BAL 29. Additional measures to improve bushfire resilience of the existing building, if not already provided, should consist of:

- metal mesh screens fitted to all openable windows and roof penerations,
- draft excluders fitted to external doors and
- gaps made to not more than 2mm for ember protection.

The habitable part of the shed will need to be constructed to BAL 29 bushfire standards, as per section 3 (General Construction Requirements) and section 7 (Construction Requirements for BAL–29) of AS3959: 2018. The remainder of the shed should be non-flammable materials (e.g. steel) so as to not increase risk of bushfire to the studio part of the shed.

3.3 Access

Access to the property from Bocoble Road is via a 1.3km unsealed section of Nangawooka Road. The proposed shed/studio is located approximately 400m from the front gate and the dwelling is located 500m from the front gate, as shown in Figure 1-2.

The driveway for residential development on bushfire prone land needs to provide all-weather, two-wheel-drive access, with a 4m carriageway width and passing bays 6m wide x 20m long at intervals no greater than 200m (when through woodland or forest). Due to the driveway being on cleared land there is no need for passing bays, since vehicles can pass without impediment of adjacent vegetation.

The existing driveway provides suitable access to the proposed shed and dwelling additions, as shown in Photograph 3-1 to 3-4. There are no watercourse crossings along the driveway.

A vehicle stand area and turning space must be provided near the dwelling and the fire-fighting water tank. The vehicle turning area needs to be consistent with one of the options in PBP Appendix 3, as per Figure 3-1 below.

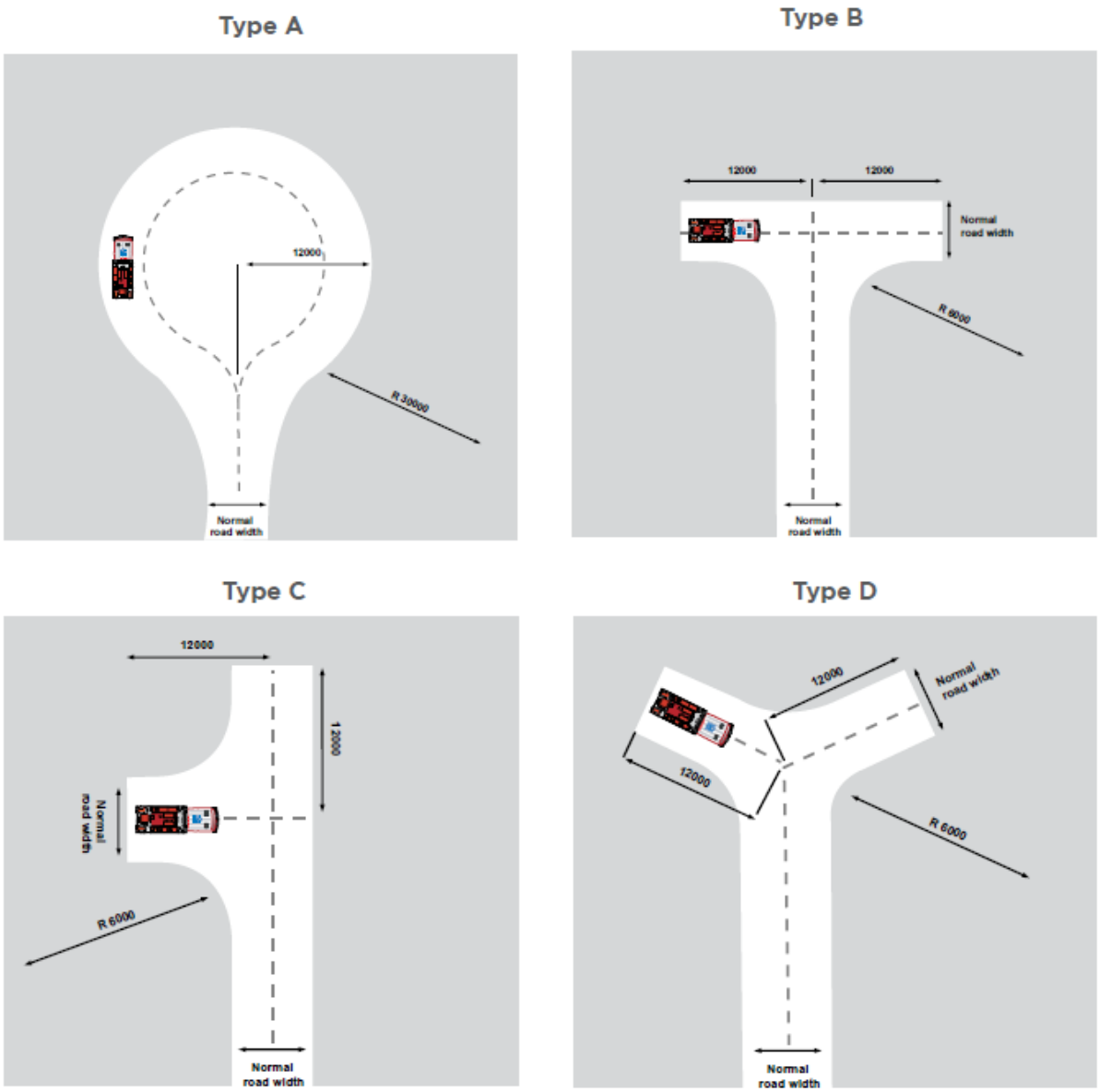
Photograph 3-1. Entry to the property from Nangawooka Road.

Photograph 3-2. View of the public road at Nangawooka Road, both directions.

Photograph 3-3. Existing internal driveway to the dwelling viewed at various points.

Photograph 3-4. Existing driveway providing access to the proposed shed/ studio site and the dwelling.

Figure 3-1. Multipoint vehicle turning options as per PBP 2019, one of these configurations must be provided at the proposed building site and near the fire fighting water supply.



3.4 Water supply

The property is not on mains water supply. The requirement for residential development on rural lots (>1 ha) without reticulated supply is to provide 20 000L bush fire fighting water supply. This is in addition to any domestic water supply capacity.

A 20 000L bush fire fighting water supply is to be provided at both the main dwelling and the habitable shed.

The fire-fighting supply must be in either a concrete or metal tank with a metal 65 mm metal Storz fitting. The tank is to be positioned so as to provide adequate access and hardstand area for fully laden fire vehicles and personnel.

An example static water supply (SWS) tank configuration is shown in **Figure 3-2**, if one tank is to be provided. Otherwise a dedicated fire-fighting static water supply (SWS) can be provided in separate tank.

Any dams on the property may provide bushfire fighting water, however are not located close to the dwelling, hence a dedicated fire-fighting SWS tank is still required.

Figure 3-2. Option for fire-fighting water supply configuration within a domestic supply tank.

3.5 Electricity and gas supply

The intent of bushfire protection measures for electricity and gas supply is to locate and install electricity and gas services so as to limit the possibility of ignition of surrounding bushland or the fabric of buildings. The specific configuration of the electricity supply to the house will need to be specified with the architectural plans.

Where possible, electricity supply will be provided via underground power lines from mains to the house. Vegetation around any aerial supply lines needs to be managed to limit the possibility of trees and branches falling on the power lines and thereby limit the possibility of ignition of surrounding bush land or the fabric of buildings.

Gas cylinders, if proposed for the dwelling, need to be kept clear of all flammable material to a distance of 10 m, installed so as to be shielded from main hazard vegetation, and away from the most

likely run of fire towards the building. All above-ground gas service pipes, connections and fittings are metal.

3.6 Landscaping and vegetation management

Landscaped areas immediately around the house, if designed and maintained appropriately, can minimise bushfire risk to buildings and provide a space for active defence of the property. A defendable space provides a relative safe area to move around the house to extinguish spot fires and burning embers before the fire (during ember attack) and after the fire front has passed (when residual fire hotspots can lead to building ignition).

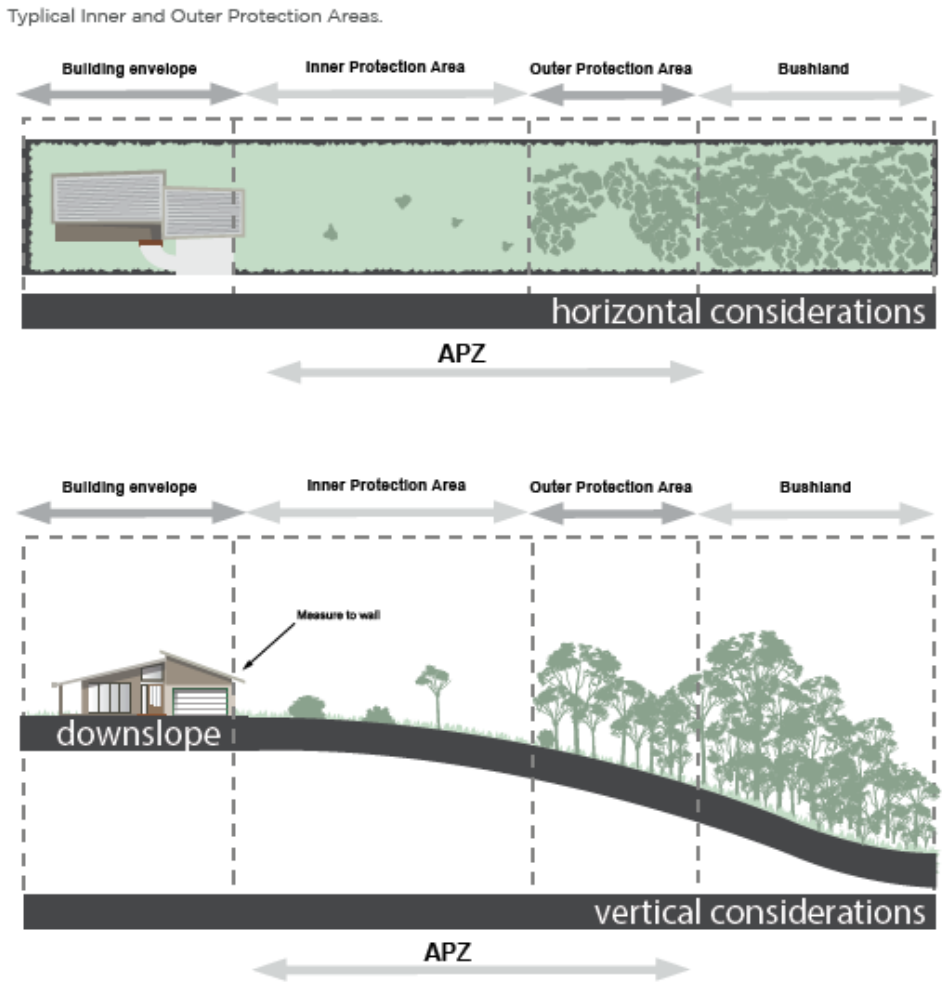
Guidelines and specifications for landscaping for bushfire protection are provided in PBP Appendix 4. A schematic of the general appearance of the APZ is shown in Figure 3-3 below. Further details for vegetation management in the APZ are provided in Appendix A for reference.

Vegetation management within the APZ, as approved by Council, will need to provide for:

- trees thinned to achieve the required canopy cover of <15%, with a crown separation of at least 2 to 5 m between tree canopies
- removal of shrub layer
- removal of sticks and fallen timber, and mowing/slashing of groundcover.

For the current proposal, the vegetation is grassland with scattered trees only. Vegetation management in the APZ will require slashing/ mowing of grassW. No tree clearing is required.

Figure 3-3. Schematic illustration of the APZ, including IPA and OPA (PBP 2019, Appendix 4).



3.7 Emergency management

An emergency management plan is not mandatory for private residential development, however it is recommended that the occupants / owners develop a personal/property Bush Fire Survival Plan, based on the recommendations of the Rural Fire Service. Refer to https://www.rfs.nsw.gov.au/resources/bush-fire-survival-plan.

If the property is to be used for short-term rental an Emergency Management and Evacuation Plan is to be prepared consistent with: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* (RFS 2014).

The building, when built to bushfire standards and maintained as such, can provide shelter for the occupants as a fire approaches and passes through the site. Low-flammability plantings, gravel areas, stone walls, etc that are maintained to be free of fine fuels, will reduce the spread of fire to the building. This is a consideration for the current development due to the fire-exposed bushland setting.

NOTE: The safest option is always is to relocate well before the approach of a bushfire.

3.8 BMPs summary table

Table 3-1 below provides a summary of the performance requirements of PBP and BPMs proposed for the development to achieve compliance with PBP.

Table 3-1. Summary of Bushfire Protection Measures and compliance as per PBP 2019.

PBP Performance Requirement for residential single dwelling	Design measures proposed for the development	Compliance with PBP?
ASSET PROTECTION ZONE *The intent may be achieved where:* *APZs are provided commensurate with the construction of the building* *a defendable space is provided* *APZs are managed and maintained to prevent the spread of a fire to the building.* *the APZ is provided in perpetuity (APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimized).* *Home-based child care: the building must not be exposed to radiant heat levels exceeding 29kW/m² (1090K).*	The APZ for BAL29 is proposed to the following extent, to be managed in perpetuity for the life of development. • NORTH to 12 m • EAST to 13 m • SOUTH to 17 m • WEST to 12 m. Vegetation to be managed in accordance with the guidelines and specifications for landscaping for bushfire protection provided in PBP Appendix 4.	Yes, can be compliant subject to Council approval of the proposed APZ extent.
CONSTRUCTION STANDARD *The intent may be achieved where:* *the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.* *proposed fences and gates are designed to minimise the spread of bush fire.* *Proposed Class 10a buildings are designed to minimise the spread of bush fire.* *Home-based child care: the proposed building can withstand bush fire attack in the form of wind, localised smoke, embers and expected levels of radiant heat.*	• The additions to the dwelling and studio part of the shed are to be constructed in accordance with the *Building Code of Australia*, and section 3 and section 7 of AS3959 for BAL–29 standard. • The NSW variation to the BCA required in section 7.5 of PBP 2019 is to be applied for construction, as relevant. • There are to be no flammable (e.g. brush) fences or gates. • The studio shall be separated from the Class 10a building (shed) is proposed to be separated by a fire-rated wall.	Yes, can be compliant subject to required building construction standards being achieved.

PBP Performance Requirement for residential single dwelling	Design measures proposed for the development	Compliance with PBP?
ACCESS *The intent may be achieved where:* *firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation* *the capacity of access roads is adequate for firefighting vehicles* *there is appropriate access to water supply* *firefighting vehicles can access the dwelling and exit the property safely.*	Vehicle access is to be provided as follows: • All-weather gravel road to the house site of ~500m length from the public road with 4m carriageway width. • Alternative access provided via the other farm track leading back to Nangawooka Road. • Vehicle turning area provided adjacent to the dwelling and the SWS fire-fighting tank, consistent with one of the options shown in **Figure 3-1**.	Existing internal access driveway is compliant. Alternative access is also provided via a separate farm track to Nangawooka Rd.
WATER SUPPLIES *The intent may be achieved where:* *an adequate water supply is provided for firefighting purposes.* *water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.* *flows and pressure are appropriate.* *the integrity of the water supply is maintained.* *a static water supply is provided for firefighting purposes in areas where reticulated water is not available.*	Water supply to be provided as follows to both the main dwelling and habitable shed: • 20,000 L SWS is required as a dedicated fire-fighting water supply, with a 65 mmm Storz valve. • The tank and all external pipes and fittings will be metal. • Diesel fire-fighting pump with 60m fire hose is provided at the water supply tank.	Yes, can be compliant. SWS tank to be detailed in the building and construction specifications / plans.
ELECTRICITY SERVICES *The intent may be achieved where:* *location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.*	Where possible, electricity supply will be provided via underground power lines from mains to the house. Vegetation around any aerial supply lines needs to be managed to limit the possibility of trees and branches falling on the power lines and thereby limit the possibility of ignition of surrounding bush land or the fabric of buildings.	Yes, can be compliant. Electricity supply to be detailed in the building and construction specifications / plans.

PBP Performance Requirement for residential single dwelling	Design measures proposed for the development	Compliance with PBP?
GAS SERVICES *The intent may be achieved where:* *location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.*	Gas cylinders need to be kept clear of all flammable material to a distance of 10 m and shielded from hazard vegetation. All above-ground gas service pipes, connections and fittings are metal.	Yes, can be compliant. Gas supply to be detailed in the building and construction specifications / plans.
LANDSCAPING *The intent may be achieved where:* *landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.*	Landscaping is to be consistent with the RFS *Asset protection zone standards* in Appendix 4 of PBP 2019. A clear area of low-cut grass or paving or gravel is maintained adjacent the dwelling building, to provide defendable space. Ornamental grasses, grass-like plants and other fine fuels are not to be used for landscaping near the house, as these contribute to the bushfire fuels. Succulent plants and/or pebbles as mulch are non-flammable and are recommended for landscaped areas including near the dwelling. Woodchip mulch should be used only where necessary and to a very limited extent near the dwelling. Trees and shrubs are to be maintained to have no over-hanging branches over the roof, and a non-continuous canopy.	Yes, subject to ongoing maintenance by the land owner/ occupier.
EMERGENCY MANAGEMENT *The intent may be achieved where:* *Home-based child care: a bush fire emergency and evacuation management plan is prepared.*	While not mandatory for single residential development, it is recommended that the occupants / owners develop their own Bush Fire Survival Plan, based on the recommendations of the Rural Fire Service, refer to https://www.rfs.nsw.gov.au/resources/bush-fire-survival-plan. If the property is to be used for short-term rental accommodation all of the above bushfire protection provisions apply and in addition an Emergency Management and Evacuation Plan is to be prepared consistent with: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* (RFS 2014).	Not mandatory, although recommended to be prepared by the property owners.

4 Summary and conclusion

This report outlines how the proposed development, at 131 Nangawooka Road green Gully, can achieve the bushfire protection requirements of PBP, set out in Chapter 7 'Residential infill development'. The development comprises additions to the existing main dwelling and a new shed with habitable studio. Bushfire measures are required for the additions to the existing house and the new habitable studio in the shed.

The recommended BAL for the main dwelling and habitable part of the shed is BAL 29.

BAL 29 requires an APZ to be established to the following distances, as mapped in **Figure 2-2** and **Figure 2-3**.

The APZ distances for BAL 29 to the main dwelling:

- NORTH to 12m
- EAST to 13m
- SOUTH to 17m
- WEST to 12m (measured as horizontal distances from the external walls of the building).

The APZ distances for BAL 29 to the habitable portion of the shed:

- NORTH to 9m
- EAST to 9m
- SOUTH to 17m
- WEST to 12m (measured as horizontal distances from the external walls of the building).

These distances are practical and achievable for the site and terrain.

Management of the APZ requires vegetation to be maintained to low fuel standards in accordance with PBP 2019 Appendix 4 (also described in **Appendix A** of this report, for ease of reference). For the current site, removal of shrubs and mowing or slashing of groundcover will be required; there are no trees required to be cleared.

The builder in conjunction with the property owner will be responsible for ensuring the building/s are constructed in accordance with AS3959:2018 as relevant to the BAL 29, as approved by Council.

Site access is provided by the existing driveway and does not require any upgrades to comply with PBP, unless specified by Council, as outlined in **section 3.3**.

There is no reticulated water supply at the site. A minimum volume of 20,000 L dedicated fire-fighting water supply is to be provided at both the main dwelling and habitable shed.

Other bushfire protection measures relating to electricity and gas and landscaping are outlined in **section 3** of this report.

Due to the relatively remote location of the property along an unsealed road, it is recommended that the occupants / owners develop a Bush Fire Survival Plan, based on the recommendations of the Rural Fire Service, at https://www.rfs.nsw.gov.au/resources/bush-fire-survival-plan

5 References

Cudgegon Bush Fire Management Committee (2020) *Cudgegong Bush Fire Risk Management Plan 2020* (accessed at https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0015/2364/Cudgegong-BFRMP.pdf)

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NSW RFS (2021) *Rural Boundary Clearing Code for New South Wales (NSW Rural Fire Service Boundary Clearing Code of Practice Version 1)*, published by the State of New South Wales through the NSW Rural Fire Service, August 2021, Granville NSW.

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NSW RFS (2014) A guide to developing a Bush Fire Emergency Management and Evacuation Plan, published by the NSW Rural Fire Service, Granville (assessed at https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/29271/DPP1079-Emergency-management-and-evacuation-plan-FORM.pdf)

NSW Threatened Species Scientific Committee (2020) Final Determination to list White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY, published by the Department of Planning, Industry and Environment, NSW Government, July 17, 2020.

Standards Australia Limited (2018) Australian Standard *Construction of buildings in bushfire-prone areas, AS 3959—2018*, Standards Australia, Sydney.

6 Appendix A – APZ requirements

The following vegetation management guidelines are contained in Appendix 4 of *Planning for Bush Fire Protection 2019*, the legislated document prepared by the NSW Rural Fire Service, which outlines the vegetation management guidelines for APZs. The full document is accessible at https://www.rfs.nsw.gov.au/plan-and-prepare/building-in-a-bush-fire-area/planning-for-bush-fire-protection).

Bush fire risk can be reduced by implementing vegetation management actions to reduce vegetation and fuel levels in and around buildings to provide separation with the unmanaged vegetation, which is the 'bushfire hazard'. This is done by designing and managing landscaping within a defined Asset Protection Zone (APZ) around buildings and/or the property. Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the APZ should be undertaken regularly, particularly in advance of the bush fire season.

The following standards are recommended to be met within an APZ.

6.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard. For a complete guide to APZs and landscaping, download the NSW RFS document Standards for Asset Protection Zones at the NSW RFS Website www.rfs.nsw.gov.au.

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

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, 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 building;
- damage to the building asset from intense radiant heat; and
- ember attack.

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 and bush fire threat and is typically define in a bushfire assessment report, prepared by an accredited bushfire consultant.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

6.2 Inner Protection Area

The Inner Protection Area (IPA) is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable 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 building, consisting of a mown lawn and well-maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

Tree 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 the ground; tree canopies should be separated by 2 to 5m; and preference should be given to smooth barked and evergreen trees.

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

Grass and other groundcover 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.

6.3 Outer Protection Area

An Outer Protection Area (OPA) is located between the IPA and the unmanaged vegetation which is the bushfire hazard. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; 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.

When establishing and maintaining an OPA the following requirements apply:

Trees canopy cover should be less than 30%; and canopies should be separated by 2 to 5m.

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

Grass should be kept mown to a height of less than 100mm and leaf and other debris should be removed. Other groundcover can be used such as prostrate native plants, forbs or herbaceous species.