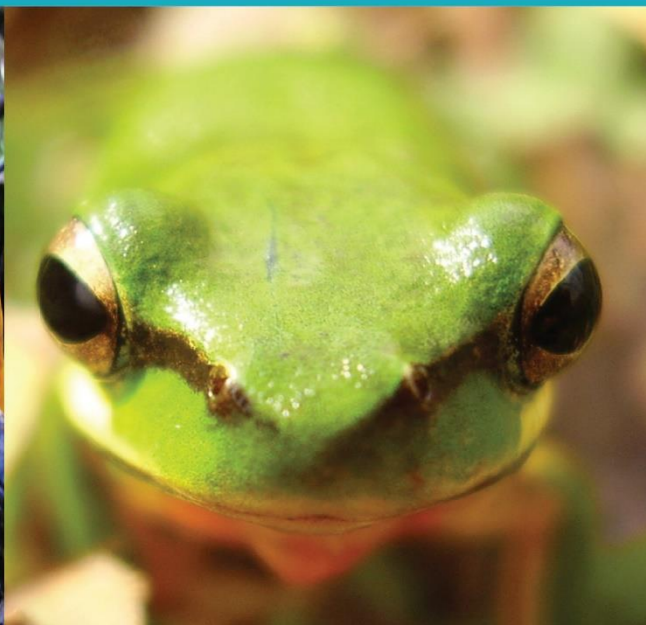




TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



BUSHFIRE PROTECTION ASSESSMENT

Proposed SFPP Development (Ecotourism)

Lot 157, 158, 181 DP 751276 & Lot 202 DP 861816

1551 Joadja Road

Joadja

Under Section 100B of the Rural Fires Act (1997)

19 April 2024

(REF: BREA02BF)



BUSHFIRE PROTECTION ASSESSMENT

Proposed Greenstead Valley Ecotourism Development (Stage 1)

1551 Joadja Road, Joadja

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Date:	19/04/24
File:	BREA02BF
Version:	1.0



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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

Travers bushfire & ecology (TBE) has been engaged by Breathe Architecture on behalf of Fresh Hope Communities to prepare a bushfire protection assessment for the proposed development of an eco-tourist facility, located at 1551 Joadja Road, Joadja. The proposal includes a variety of Community Villages, for both short term stay and day trips.

This includes:

- Arrival Village consisting of parking areas and arrival building
- Community 1 consisting of a refurbished homestead building and cabins
- Community 2 consisting of amenities building and glamping

The proposed development is identified by the NSW Rural Fire Service (NSW RFS) as being a special fire protection purpose (SFPP) development and, as a result, this classification requires the NSW RFS to issue a bushfire safety authority (BSA) in accordance with Section 100b of the *Rural Fires Act 1997 (RF Act)*.

This proposal has been assessed in accordance with *Planning for Bush Fire Protection 2019 (PBP)*. *PBP* dictates that the subsequent extent of bushfire attack that can potentially impact a SFPP building must not exceed a radiant heat flux of 10kW/m². This rating assists in determining the size of the asset protection zone (APZ) to provide the necessary defendable space between hazardous vegetation and a building.

This assessment has found that bushfire can potentially affect the proposed development from extensive category 1 vegetation surrounding the development in all directions, as well as vegetation within the Schott's Creek and Wingecarribee River riparian corridors and existing grassland within the site. This has the potential to result in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZ setbacks for the arrival village, as well as communities 1 and 2 in accordance with *PBP* and as indicated within section 2.4 and Schedule 1.
- Provision of access in accordance with the acceptable solutions outlined in *PBP* and section 3.3 of this report;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP* and sections 3.3-6 of this report;
- Future building construction in compliance with BAL-12.5 or greater construction standards as indicated within *AS3959-2018*, and *PBP*.
- Preparation of a Bushfire Emergency Evacuation Plan (BEEP).

GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2018</i>
BAL	<i>bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BFSA	Bush fire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	<i>National Construction Code</i>
OPA	outer protection area
PBP	<i>Planning for Bush Fire Protection 2019</i>
RF Act	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
TBE	<i>Travers bushfire & ecology</i>

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1. INTRODUCTION

Travers bushfire & ecology (TBE) has been engaged by Breathe Architecture (Breathe) on behalf of Fresh Hope Communities to undertake a bushfire protection assessment (BPA) for the proposed Greenstead Valley ecotourism development located at Lot 157, 158, 181 DP 751276 & Lot 202 DP 861816, Joadja. The development is considered Special Fire Protection Purpose (SFPP) development under s100B of the *Rural Fires Act (RF Act)* and is located on land identified as bushfire prone on the *Wingecarribee Shire Council* bushfire prone land (BFPL) map as shown in figure 1-1. This triggers a formal assessment by Council in respect to the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection 2019 (PBP)*.

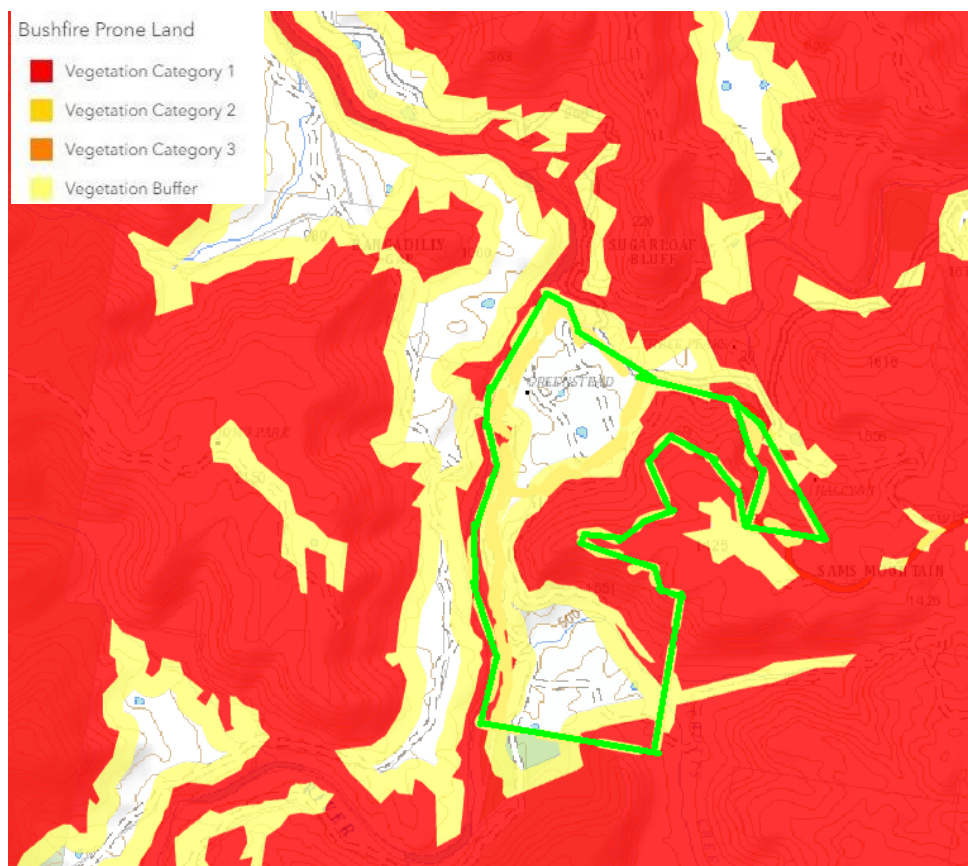


Figure 1-1 – Bushfire prone land map

(Source: NSW Planning Portal, edits by Luke Simpson 27/12/2023)

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the development;
- undertake a bushfire attack assessment in accordance with *PBP*;
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues; and
- review the potential to carry out hazard management over the landscape.

1.2 Information collation

The following documents, legislative instruments and public databases were reviewed in preparation for this report:

- Australian Standard 3959 Construction of buildings in bushfire-prone areas (2018)
- Breathe Architecture (2023) – Greenstead Joadja, Development Application DRAFT, no. 1938, rev. 01-WIP, dated: 3/10/2023
- TaylorBrammer (2024)- Greenstead Valley, Landscape Development Package, rev. C, dated: 7.3.24
- Mecone Mosaic
- NearMap aerial photography
- NSW Planning Portal
- NSW SEED Portal
- *Planning for Bush Fire Protection 2019 (PBP)*
- *Travers bushfire & ecology* (2022) - Biodiversity Constraints Assessment, no. 21BREA02, dated: 18 March 2022
- Wingecarribee Local Environmental Plan 2010 (Wingecarribee LEP).

An inspection of the proposed development site and surrounds was undertaken by Dr Grahame Douglas on 20 November 2023 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.3 Proposed development

The proposed development is an eco-tourist facility, located at 1551 Joadja Road, JOADJA NSW. The proposal includes a variety of Community Villages, for both short term stay and day trips.

This includes:

- Arrival Village consisting of parking areas and arrival building.
- Community 1 consisting of a refurbished homestead building and cabins.
- Community 2 consisting of amenities building and glamping.

This is a single DA lodgement for the master plan and stage 1 Eco-Tourist facility. The objectives of the development are to provide temporary accommodation for groups, couples and individuals, based on principles of sustainable living practices and education.

In addition, the development includes the construction of campsites as indicated in figure 1-2. According to the TaylorBrammer (2024) Greenstead Valley Landscape Development Package, these precincts will involve:

Table 1-1 – Greenstead Valley site plan

Precinct	Description
Arrival village	• Arrival centre & Parking • Kitchen/ Laundry/ BOH
Community 1	• Homestead refurbishment • Homestead extension • Cottages
Community 2	• Tent platforms • Glamping tents • Communal Spaces
Community 3 (not subject of current DA)	• Tent platforms • Glamping tents • Communal Spaces
Community 4 (not subject of current DA)	• Tent platforms • Glamping tents • Communal space

The project will be a staged development. Stage 1 will involve the construction of the arrival village, as well as Community 1 and Community 2 in the northern section of the site. Community 3 and 4, as well as the zipline will be constructed in stage 2. According to the *Wingecarribee Local Environmental Plan 2010 (Wingecarribee LEP)*, the site is zoned as C3-Environmental Management in which the LEP's land use table indicates that eco-tourism facilities are permitted with consent. Therefore, the Greenstead Valley eco-tourism development is consistent with the *Wingecarribee LEP*.

A property report for the development site from the NSW Planning Portal produced on 27 December 2023 indicates the site has riparian land and acts as a wildlife habitat corridor. These will be discussed in more detail within section 1.6.

The Landscape development Plan (TaylorBrammer, 2024) is also relevant in terms of landscaping, siting of buildings and roadways.

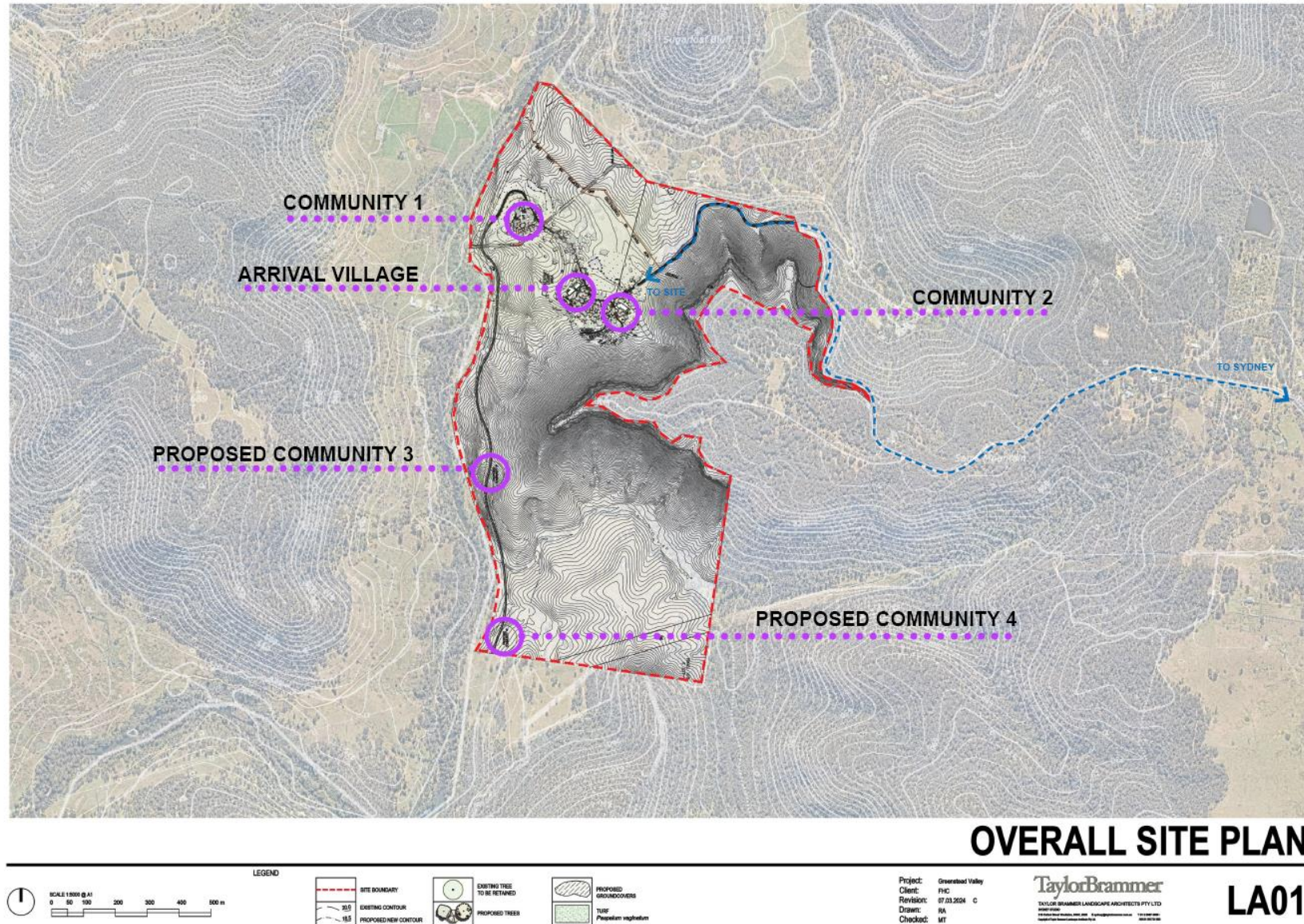


Figure 1-2 – Site plan

(Source: TaylorBrammer, Greenstead Valley- Overall Site Plan (LA01),rev. C, dated: 7.3.2024)

1.4 Site description

The development site covers approximately 800 acres (324ha) and is situated within the Southern Highlands which is less than 2 hours' drive from Sydney. It is bordered by Bangadilly National Park and the Wingecarribee River, with the main access to the site coming from Joadja Road and Jacks Valley Road to the north. Currently, the land is being used for rural residential purposes which is similar to the surrounding landscape, which is zoned as a mixture of C1- National Parks and Nature Reserves, C2- Environmental Protection and C3- Environmental Management. (Refer to figure 1-4).

The site itself is predominantly grassland, bordered by extensive forest to the east, south and west, while the Wingecarribee River skirting the western boundary. The topography of the site slopes downward from east to west. The areas around the site have significant upslope topography, as the site is situated within a valley surrounded by a mountainous landscape. (Refer to figure 1-3).

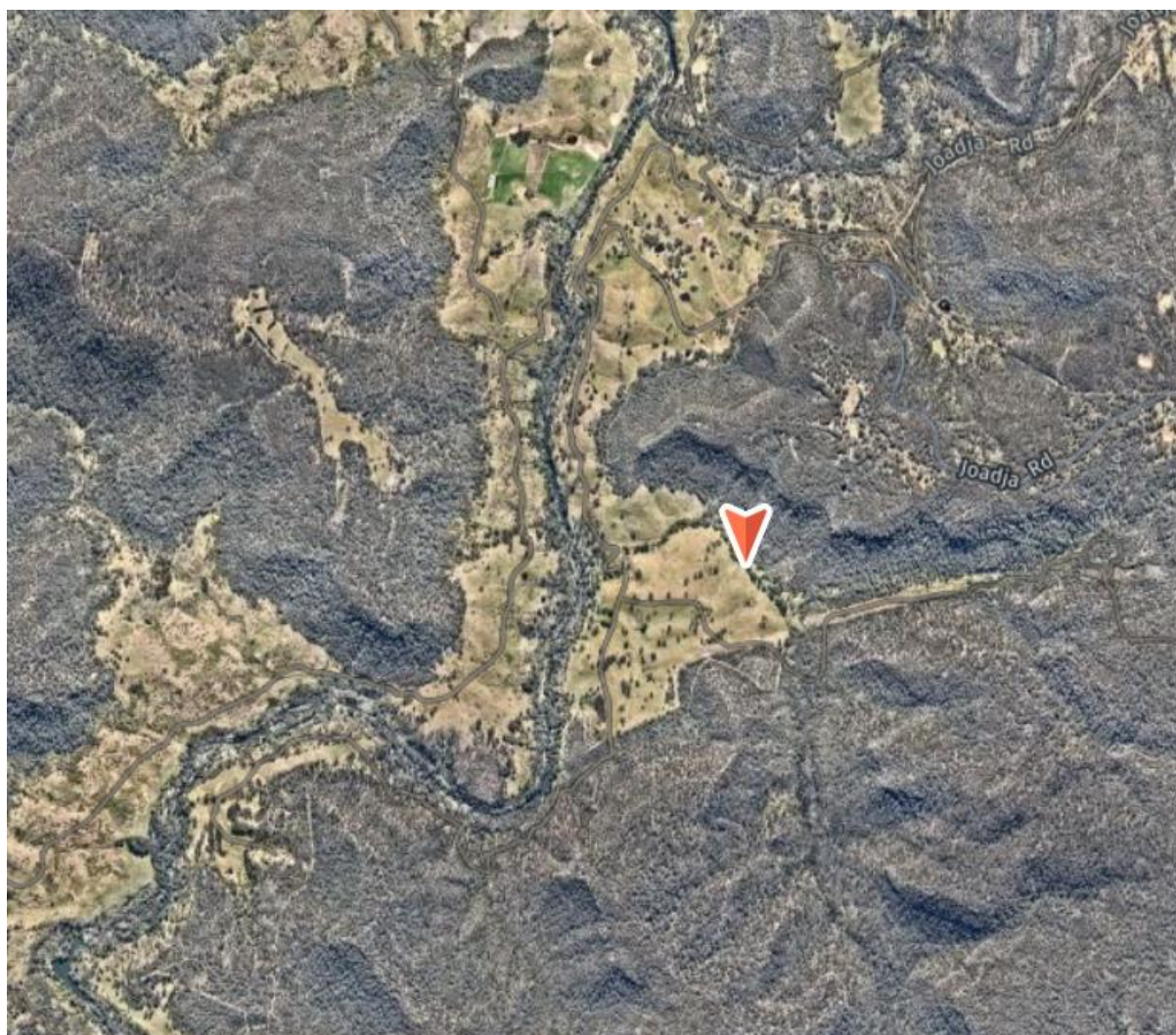


Figure 1-3 – Aerial appraisal

(Source: NearMap, 2023)

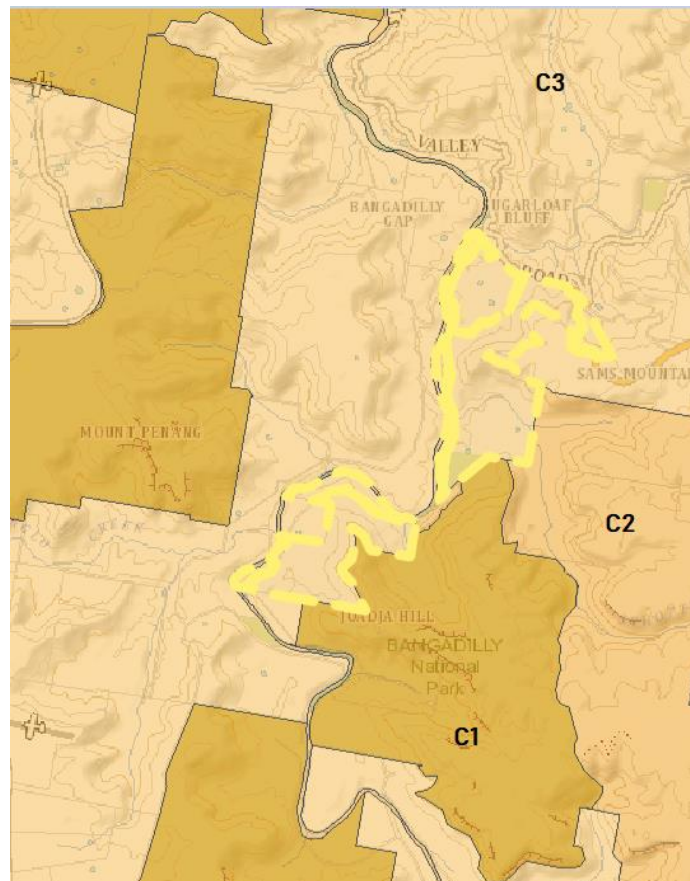


Figure 1-4 – Zoning

(Source: NSW Planning Portal, edits by Luke Simpson 27/12/2023)

1.5 Legislation and planning instruments

1.5.1 Planning for Bush Fire Protection 2019 (PBP)

All development on BFPL must satisfy the provisions stipulated within *PBP* which is designed to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment. According to *PBP*, eco-tourism is considered to be a Special Fire Purpose Protection (SFPP) development which under s100B of the *RF Act* requires consideration of a Bush Fire Safety Authority (BFSA) from the NSW RFS.

Eco-tourism is considered an SFPP development because it can be occupied by at-risk members of the community such as children, the elderly and those with a disability. Due to their vulnerable nature, occupants of SFPP developments are considered to be more at-risk during a bushfire attack for one or more of the following reasons:

- they may be less aware in relation to bushfire impacts;
- they may have reduced capacity to evaluate risk and respond adequately to the bushfire threat;
- they may present operational difficulties for evacuation and or management;
- they may be more vulnerable to stress and anxiety arising from bushfire threat and smoke;
- there may be significant communication barriers;
- supervision during a bushfire may be difficult; and
- they may be unfamiliar with the area.

As a result, SFPP developments involve more reliance on the provision of an APZ and emergency management. For ecotourism developments, there is often a conflict between implementing APZs and having a minimum impact on the environment. All parties are required to acknowledge that there is an increased risk of loss of structures because of these clashing interests. As a result, there is a strong emphasis placed on the following measures:

- emergency management such as leaving early and non-operational days on days of extreme or catastrophic fire weather; and
- At least one refuge building be provided on site that has an APZ that ensures a radiant heat exposure of $<10\text{kW/m}^2$, must be constructed to BAL-12.5 standards and cabins are within 100m walking distance of the building.

Variations in specific protection issues relating to eco-tourism developments will be discussed in section 3.

1.6 Environmental and Aboriginal heritage constraints

Submission requirements requires the following environmental and heritage considerations that have the potential to be a constraint for implementing APZs within the site and may require further assessments before construction proceeds within a site:

- identification of any significant environmental features on the property;
- the details of any threatened species, population or ecological community identified under the *Biodiversity Conservation Act 2016 (BC Act)* that is known to the Applicant to exist on the property;
- the details and location of any Aboriginal object (within the meaning of the National Parks and Wildlife Act 1974) or Aboriginal place (within the meaning of that Act) that is known to the Applicant to be situated on the property;

The following sources databases were reviewed to determine whether any environmental and Aboriginal heritage constraints were present within the proposed site:

Potential Constraint	Database
Aboriginal Heritage significant sites and places	Aboriginal Heritage Information Management System (AHIMS)
Threatened Ecological Communities (TECs)	Threaten Ecological Communities Greater Sydney Dataset (NSW SEED Portal)
Threatened Species (flora and fauna)	NSW BioNet Species Sightings Data Collection (NSW SEED Portal)
Watercourses	NSW Hydrography Dataset (NSW SEED portal)

A basic search of the AHIMS database was conducted on 27 December 2023. There were no-known Aboriginal heritage sites identified within a 50m buffered area of Lot 157 & 181 DP 751276. However, there were 3 known significant Aboriginal sites identified within Lot 158 DP 751276 and 6 within Lot 202 DP 861816. The results of the AHIMS report for these two lots is generally depicted in Schedule 1. Additional information on Aboriginal sites/areas has been subject to separate investigations and protection measures not included in this report.

No-known threatened ecological communities identified within a 50m buffered area of the site's boundaries. However, the following threatened species were identified within a 50m buffered area of the site and are listed 'vulnerable' status under the *BC Act*:

- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*);
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*); and
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*).

In addition, the biodiversity constraints assessment prepared by *TBE (2022)* identified the Dusky Woodswallow and Large Bent-wing on-site. Furthermore, there were a number of watercourses identified within the site, the most notable ones being the Wingecarribee River and Schott's Creek which are sixth order or higher and fourth order watercourses respectively.

None of these environmental assets are considered to constrain the implementation of bushfire protection measures for this development.

2. BUSHFIRE THREAT ASSESSMENT

To assess the bushfire threat and to determine the required width of an APZ for a development, an assessment of the vegetation and the effective slope within the vegetation is required. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Fire history

A fire history search of the development site and its surrounding areas was conducted using the NSW National Parks and Wildlife Services (NPWS) 'NPWS Fire History- Wildfires and Prescribed Burns' database within the NSW SEED Portal.

There have been no-known bushfires that have directly affected the site itself. However, between 1962-2023 a total of 117 fires were recorded to have occurred within a 25km radius from the site's boundaries. These included, forty-four (44) prescribed burns and seventy-three (73) wildfires. The majority of wildfire activity occurred within the areas north of the site such as Joadja Nature Reserve, Jellore State Forest and Nattai National Park. Wildfires were also recorded to have occurred south and east of the site. The wildfire extents ranged from less than 1 hectare to 108 hectares in size, with the closest coming within 1km of the site's eastern boundaries.

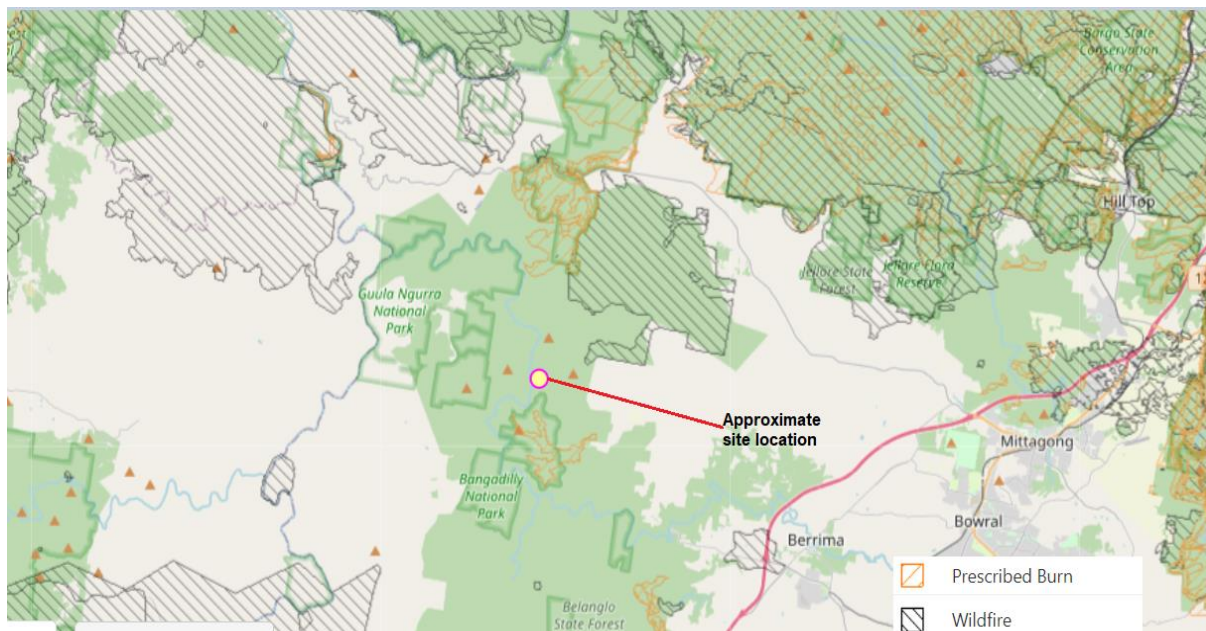


Figure 2-1 – Site fire history

(Source: NSW SEED Portal, edits by Luke Simpson 29/12/2023)

2.2 Vegetation

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) when using the simplified acceptable solutions in *PBP*. The vegetation is calculated for a distance of at least 140m from a proposed building envelope. The identified vegetation within 140m of the site was identified from the Geocortex viewer within the NSW SEED Portal which includes layers relating to NSW BioNet PCT sites and

NSW State Vegetation Mapping. The vegetation formations were then assessed in light of Appendix 1 of *PBP* and a site visit. The vegetation within 140m posing a bushfire threat to the proposed development includes:

Table 2-1 – Vegetation

Vegetation community	Vegetation formation	Vegetation classification	PBP classification
Central Gorges Box-Red Gum Grassy Forest (PCT 3483)	Dry Sclerophyll Forest (shrub-grassy)	Central Gorge Dry Sclerophyll Forests	Forest
Wingecaribee Gorges Stringybark-Grey Gum Forest (PCT 3498)	Dry Sclerophyll Forest (shrub-grassy)	Central Gorge Dry Sclerophyll Forests	Forest
Central and Southern Tableland River Oak Forest (PCT 4063)	Forested Wetland	Eastern Riverine Forests	Forested Wetland
Unmanaged Grassland	Grassland		

The predominant vegetation within the site is grassland with small, isolated trees scattered throughout. The vegetated area of the Wingecaribee river riparian corridor is a Forested Wetland and skirts the site's western boundary. This forested wetland is also a part of the Schott's Creek riparian corridor which branches off from the Wingecaribee River and encroaches into the site north of the future community 4.

On the adjoining land to the western side of the Wingecaribee river riparian corridor, the vegetation transitions from forest into Grassy Woodland which is a product of the land previously being disturbed. Moving towards the eastern and southern fringes of the site, there is forested vegetation that starts in within the site and extends further east and south beyond the site's boundaries over the mountainous terrain. The forested vegetation also wraps around the northern perimeter of the site and extends further northward over a mountainous terrain.

2.3 Effective slope

The site is situated within a valley and moderately slopes downward from east to west, from the base of the mountains to the east in the direction of the Wingecaribee River. There is a significant upslope trend to the north, east and south as the landscape ascends to the plateau peak of the surrounding mountainous terrain. The landscape to the west of the Wingecaribee River gradually slopes upwards before exhibiting significant upslope topography from the base of the mountainous terrain.

The effective slope has been assessed for up to 100m from the development site. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous vegetation is described in detail within Table 2-2 below.

2.4 Bushfire attack assessment

Table 2-2 provides a summary of the bushfire attack assessment based on an SFPP development and determined the minimum APZ setbacks using Table A1.12.1 of *PBP*.

The APZs are required to be wholly within the site's boundaries and should not rely on being on adjoining land. APZs can extend beyond a site's boundaries in cases where structures or features of a landscape are considered permanent and act as barriers against fire spread. Examples are road carriageways, urban landscapes or land with vegetation that is considered managed. The minimum APZ setback required for an SFPP development must ensure buildings are not exposed to a radiant heat flux exceeding 10kW/m^2 and be built to BAL-12.5 or greater construction standards.

Table 2-2 – Arrival Village bushfire attack assessment

Aspect	Vegetation formation	Effective slope	Minimum APZ required ($<10\text{kW/m}^2$)	APZ provided	Comments
North, east, south and west	Grassland	0-5° downslope	40m	40m	APZ provided between the arrival village refuge building and grassland vegetation.

Table 2-3 – Community 1 bushfire attack assessment

Aspect	Vegetation formation	Effective slope	Minimum APZ required ($>10\text{kW/m}^2$)	APZ provided	Comments
North, east, south and west	Grassland	0-5° downslope	40 m	40 m	APZ provided between the community 1 refuge building and grassland vegetation.

Table 2-4 – Community 2 bushfire attack assessment

Aspect	Vegetation formation	Effective slope	Minimum APZ required ($>10\text{kW/m}^2$)	APZ provided	Comments
East and south	Forest	Upslope	67m	67m	APZ provided between the arrival village refuge building and both the forest and grassland vegetation.
North and west	Grassland	0-5° downslope	40 m	40 m	

In summary, the area immediately around all buildings constitutes a largely grassland environment, however, forest vegetation can be found to the east and south upslope from the buildings. In all cases, buildings are able to obtain the necessary APZs for the main buildings although glamping sites and cabins, by their nature are not individually provided with APZs.

3. SPECIFIC PROTECTION ISSUES

3.1 Asset protection zones (APZs)

Ecotourism developments are required to provide a refuge building within 100m walking distance from accommodation and facilities. The refuge building must have a minimum APZ setback that ensures the radiant heat exposure does not exceed 10kW/m². In the context of the Greenstead Valley stage 1 development, a refuge building of this nature needs to be provided to the arrival village, as well as communities 1 and 2.

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs in regards to SFPP developments (ecotourism).

Table 3-1 – Standards for asset protection zones (PBP guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Radiant heat levels of greater than 10kW/m ² (1200K) are not experienced by emergency service personnel and occupants during firefighting and emergency management around a building on site that can be used as a refuge.	an APZ is provided in accordance with Table A1.12.1 in Appendix 1 of this document around the entire refuge building or structure.	☒	☐	Complies. Refuge buildings within the arrival village, as well as communities 1 and 2 will not be exposed to a radiant heat flux of greater than 10kW/ m ² (@1200K).
APZ maintenance is practical, soil stability is not compromised and potential for crown fires is minimised	The APZ is not located on lands with a slope exceeding 18°	☒	☐	Complies. All slopes are less than 18°.
APZs are managed and maintained to prevent the spread of a fire towards the building	The APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site	☒	☐	Complies. The APZs are wholly within the site boundaries. The APZs are managed in accordance with <i>Appendix 4 of PBP</i> which is discussed further in response to landscaping below. Landscaping has been designed to not increase the bushfire threat to buildings.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
	Other structures located within the APZ need to be located further than 6m from the refuge building	☒	☒	The plans prepared by Breathe Architecture (2023) show structures near to the refuge buildings for the arrival village, as well as communities 1 and 2. Glamping and cabin sites are >6m from main buildings.
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 in accordance with Appendix 4.	☒	☐	Complies. APZ areas are to be managed as an inner-protection area (IPA). <i>Dwg no. DA02</i> within the draft development application plans prepared by Breathe Architecture (2023) indicate that the arrival village is compliant. The landscaping for community 1 and 2 comply as a result of: • Canopy cover < 15%. • Proposed shrub vegetation to be planted near to the refuge buildings for communities 1 and 2 should not be continuous and separated from windows and doors by double the height of the vegetation. Refer to <i>Landscape Plans</i> for Community 1 and 2 respectively.

Note 1: Section 7.6 of *PBP* states that all fences in bushfire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only. Only minor fencing is retained.

In summary, APZs are compliant with landscaping requirements and readily maintained on-site. Some existing fencing exists at the Arrival village, with some previous landscaping which will not impact on main buildings, structures or refuges. APZs meet the acceptable solutions for SFPP developments at refuge buildings.

3.2 Construction standards

For ecotourism developments, occupants of facilities are required to be provided with appropriate shelter in the event of a bushfire. This involves:

- providing refuge building(s);
- a refuge building must have sufficient space for all occupants and comply with the occupancy levels permissible for that structure; and
- the refuge building must be constructed to BAL-12.5 or greater construction standards in accordance with AS 3959 or NASH Standard and section 7.5 of *PBP*.

Furthermore, the refuge building must be able to withstand bushfire attack in the form of embers, radiant heat and flame contact. The proposed Greenstead Valley development will have refuge buildings built to these standards within the arrival village, as well as communities 1 and 2. The existing building at the Arrivals Village will need to be upgraded to provide enhanced ember protection. Refuge buildings shall therefore incorporate non-combustible sarking in roofs and walls, as well as non-combustible gutter guards and valley guards to be installed and architecturally integrated to facilitate the flush of debris from the roof and gutters.

3.3 Access for firefighting operations

In general, the context of the site makes access challenging because of the site being located within a valley surrounded by extensive forest vegetation in every direction across mountainous terrain. Any potential access route into the site involves travelling through forested vegetation.

There are three existing access/ egress points from the public road system. Jack Valleys Road and Joadja Road provide access points from the site's northwestern and northeastern corners respectively. In addition, there is an access point in the southern section of the site from an unnamed road that routes back to the Joadja town east of the site. The main access/ egress point to the site will be from a future internal road from Joadja Road. This will provide direct access to the arrival village, as well as Communities 1 and 2 as generally depicted in Schedule 1. The entry point from Jack Valleys Road from the northwest provides access to the existing homestead and will link up to the proposed future road within the site.

Overall, the development will not contain perimeter roads, however buildings will be readily accessible from the road network. There will roads within each precinct that will link to the main road within the site. These are not be through roads and involve turning circles and dead-end roads within each precinct. The road network facilitates vehicles maintaining a forward direction. This will allow firefighters to keep moving in a forward direction in an emergency situation.

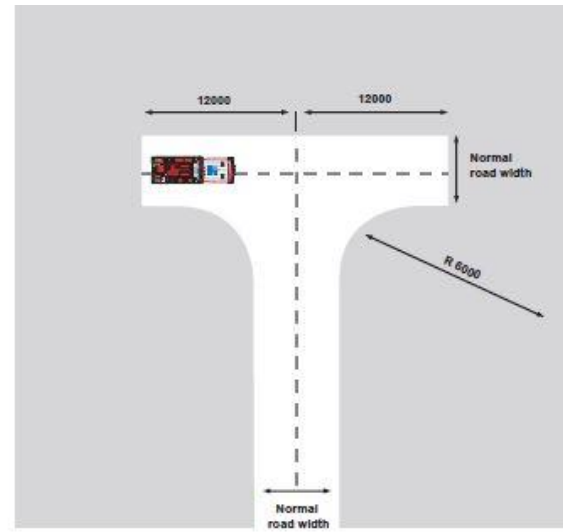
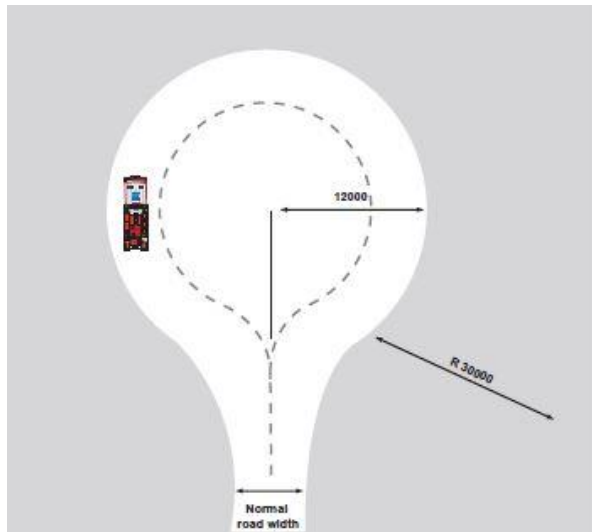
Furthermore, it is recommended a bushfire emergency evacuation plan (BEEP) is prepared and is discussed within section 3.7 below. The proposal's compliance with the acceptable solutions outlined in *PBP* is detailed within Table 3-2 below.

Table 3-2 – Standards for access within SFPP (Ecotourism) (PBP Guidelines)

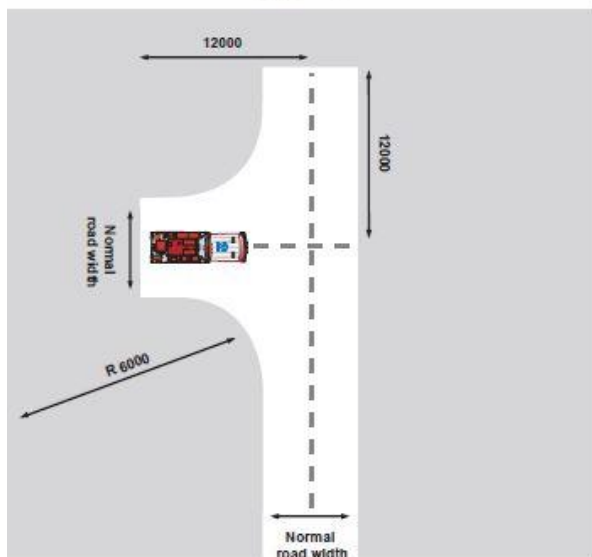
Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ACCESS	Firefighting vehicles are provided with safe, all-weather access to structures.	Vehicular access is provided to the refuge building(s) from a public road in accordance with property access requirements of table 5.3b. (see below)	☒	☐	Complies The proposed development's road layout provides access. 4m wide internal roads. Grassland for road access on-site.
		Accommodation is within 100 m of the refuge building(s).	☒	☐	Designed to comply. Less than 40 metres.
		Pedestrian paths from accommodation to the refuge building(s) are provided and clearly sign posted.	☒	☐	Complies. Paths provided. Will need to be signposted.
		Access roads must provide suitable turning areas in accordance with Appendix 3 of PBP.	☒	☐	Complies. See details of civil designs.
		Minimum vertical clearances of 4 m.	☒	☐	Complies. Grassland environment.
		Curves of roads have an inner radius of 6 m.	☒	☐	Complies. All roads meet inner radius requirements.
		There are through road, and these are linked to the internal road system at an interval of no more than 500m.	☒	☐	Complies. Each precinct is less than 500 m to the main internal access road. The access road provides for through access in an emergency but is not normally available.
		Where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system;	☒	☐	Complies. The site is a grassland environment although main access is through forested vegetation into the site.

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	☒	☐	Not applicable. Non reticulated area. No one way roads provided.
ACCESS	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	☒	☐	Complies. A future bridge will be required for the section of road that crosses Schott's Creek for stage 2 of the development.
	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	☒	☐	Not applicable. The development will not have access to reticulated water.
		Hydrants are provided in accordance with AS 2419.1:2021. .	☒	☐	
		There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	☒	☐	Comply. Tanks to be located within 4 m of the access road.

NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants are evacuating	Minimum 5.5m width kerb to kerb.	☐	☒	Internal roads have 4 m widths, with passing bays and parking is not required on roadsides. Non reticulated water.
		Parking is provided outside of the carriageway width.	☒	☐	
		Hydrants are located clear of parking areas.	☒	☐	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	☒	☐	Complies Access roads to each precinct is less than 500 m to main access and reliant on both dead-end roads and turning circles.
		Curves of roads have a minimum inner radius of 6m.	☒	☐	Complies. Roads meet specifications for inner radius, crossfalls and gradients (<10 degrees).
		The maximum grade road is 15° and average grade is 10°.	☒	☐	
		The road crossfall does not exceed 3°.	☒	☐	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	☒	☐	Complies. The access road to the arrival village and community 1 do not have any overhanging obstructions. Access road to Community 2 has existing tree branches within the draft plans for the precinct as indicated in Landscape plans prepared by Breathe Architecture (2023). These can be trimmed.
		Minimum 4m carriageway width.	☒	☐	Complies with 4m width plus passing bays.



type C



type D

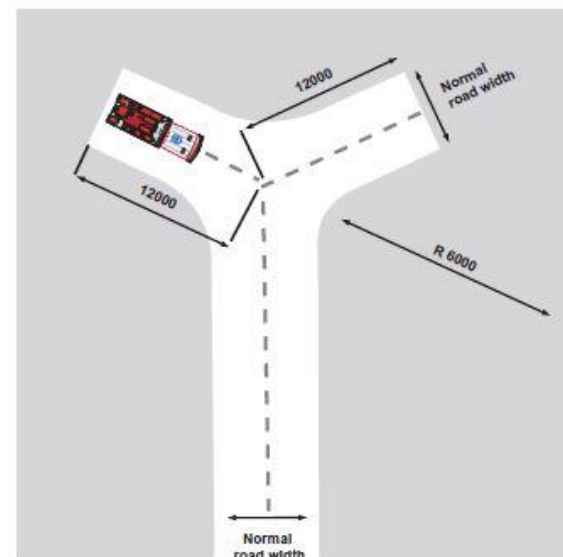


Figure 3-1 – Turning head dimensions

3.4 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire. Table 3-3 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

Table 3-3 – Standards for water supplies (PBP Guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Adequate water supplies are provided for firefighting purposes is installed and maintained.	Reticulated water is to be provided to the development, where available.	☒	☐	Not applicable. Reticulated water will be unavailable to the development due to its remote location.
	A 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.	☒	☐	Complies. Water has been specifically provided to ensure access and suitable quantities are available.
Water supplies are located at regular intervals.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2021.	☒	☐	Complies for non-reticulated areas. Subject to further detailed design post approval.
The water supply is accessible and reliable for firefighting operations.	Hydrants are not located within any road carriageway.	☒	☐	
	Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.	☒	☐	
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2021.	☒	☐	
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	☒	☐	
Water supplies are adequate in areas where reticulated water is not available.	A connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; a 65mm Storz outlet with a ball valve is fitted to the outlet.	☒	☐	
	Ball valve and pipes are adequate for water flow and are metal.	☒	☐	

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
	Supply pipes from tank to ball valve have the same bore size to ensure flow volume.	☒	☐	Complies for non-reticulated areas. Subject to further detailed design post approval.
	Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank.	☒	☐	
	A hardened ground surface for truck access is supplied within 4m of the access hole.	☒	☐	
	Above-ground tanks are manufactured from concrete or metal.	☒	☐	
	Raised tanks have their stands constructed from non-combustible material or bushfire-resisting timber (see Appendix F AS 3959).	☒	☐	
	Unobstructed access is provided at all times.	☒	☐	
	Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; and.	☒	☐	
	Underground tanks are clearly marked.	☒	☐	
	All exposed water pipes external to the building are metal, including any fittings.	☒	☐	
	Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bushfire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and.	☒	☐	
	Fire hose reels are constructed in accordance with AS/NZS 1221:1997 Fire hose reels, and installed in accordance with the relevant clauses of AS 2441:2005 Installation of fire hose reels.	☒	☐	

3.5 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-4 outlines the required acceptable solutions for gas supply.

Table 3-4 – Standards for gas supplies (PBP Guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS/NZS 1596 (2014), the requirements of relevant authorities and metal piping is to be used.	☒	☐	Gas supply is not recommended or proposed.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side.	☒	☐	
	Connections to and from gas cylinders are metal.	☒	☐	
	If gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion.	☒	☐	
	Polymer sheathed flexible gas supply lines are not used.	☒	☐	
	Above ground gas service pipes are metal, including and up to any outlets.	☒	☐	

3.6 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-5 outlines the required acceptable solutions for the subdivision's electricity supply.

Table 3-5 – Standards for electricity services (PBP Guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	☒	☐	Pre-existing power to the site. Underground electrical transmission lines are recommended to connect to new buildings.
	Where overhead electrical transmission lines are proposed: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in <i>ISSC3 Guideline for Managing Vegetation Near Power Lines</i> .	☒	☐	Must comply if it is not possible to locate electrical transmission lines underground.

3.7 Emergency and evacuation planning

The site's remote location, coupled with being situated in a valley surrounded by forested vegetation in all directions, makes access and egress to the site difficult. All external routes into the site involves travelling a considerable distance through forested vegetation. In such a context, a higher emphasis is placed on emergency management, leaving early and non-operation on days of extreme or catastrophic fire weather. Therefore, it is recommended a Bushfire Emergency and Evacuation Management Plan is prepared for the site.

Table 3.6 outlines the required standards for the proposal's emergency procedures

Table 3.6 – Standards for emergency and evacuation planning (PBP Guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
A bushfire emergency and evacuation management plan is prepared.	A Bushfire Emergency Management and Evacuation Plan is prepared consistent with the NSW RFS document: A Guide to Developing a Bushfire Emergency Management and Evacuation Plan, and AS 3745:2010.	☒	☐	A Bushfire Emergency Evacuation Plan (BEEP) will need to be prepared for the site. This will require regular updating and training of staff. Annual site inspection in conjunction with annual review and staff training.
	For proposals in isolated or remote areas which involve large travel distances through bushfire prone vegetation, the following issues should be determined and addressed: - the amount of travel likely to be generated during an emergency evacuation; - the capacity of the broader road network to facilitate safe emergency evacuation; - limitations/constraints inherent in the road system; and - management of potential traffic conflicts (such as emergency vehicles versus evacuating members of the public).	☒	☐	
	The Bushfire Emergency Management and Evacuation Plan must consider a mechanism for the early relocation of occupants on days when adverse fire weather is notified or adverse fire activity occurs in the local government area in which the development operates.	☒	☐	

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Note: a copy of the Bushfire Emergency Management and Evacuation Plan shall be provided to the Local Emergency Management Committee for its information prior to occupation of the development.				
Appropriate and adequate management arrangements are established for consultation and implementation of the Bushfire Emergency Management and Evacuation Plan.	An Emergency Planning Committee is established to consult (with management and staff) in developing and implementing an Emergency Procedures Manual;	☒	☐	Refer to the above discussion.
	Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as stated in AS 3745 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.			

In summary, a bushfire emergency evacuation plan will be required as a condition of consent. This will need to include regular (annual updating) prior to the fire season and training of staff, as well as guidance materials for staff and visitors. It is also recommended that a site inspection be undertaken annually prior to the commencement of the bushfire danger period to ensure maintenance of landscaping and buildings.

4. CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

The development proposed is an eco-tourist facility, located at 1551 Joadja Road, Joadja. The proposal includes a variety of Community Villages, for both short term stay and day trips, including cabins and camping sites. The proposal is mapped as being bushfire prone land and is subject to section 100B of the *Rural Fires Act* and a bushfire safety authority is to be sought for the proposed development.

This includes:

- Arrival Village consisting of parking areas and arrival building.
- Community 1 consisting of a refurbished homestead building and cabins.
- Community 2 consisting of amenities building and glamping.

This bushfire assessment has found that bushfire can potentially affect the proposed development from the extensive bushland vegetation surrounding the development site, as well as within the site. This has the potential to result in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZ setbacks for the arrival village, as well as Communities 1 and 2 in accordance with *PBP* and as indicated within section 2.4 and Schedule 1.
- Provision of access in accordance with the acceptable solutions outlined in *PBP* and section 3.3 of this report;
- Water and electricity supply in compliance with the acceptable solutions outlined in *PBP* and sections 3.6 of this report;
- Future building construction of village building to be in compliance with BAL-12.5 or greater construction standards as indicated within *AS3959-2018*, and section 7.5.2 of *PBP*.
- Upgrade the existing building to meet ember protection as described in section 3.6 of *AS3959-2018* and 7.5.2 of *PBP*.
- Preparation of a Bushfire Emergency Evacuation Plan (BEEP), regular updates and ongoing training of staff.

The refuge building must be able to withstand bushfire attack in the form of embers, radiant heat and flame contact. The proposed Greenstead Valley development will have refuge buildings built to these standards within the arrival village, as well as communities 1 and 2.

The existing building at the Arrivals Village will need to be upgraded to provide enhanced ember protection. Refuge buildings shall therefore incorporate non-combustible sarking in roofs and walls, as well as non-combustible gutter guards and valley guards to be installed and architecturally integrated to facilitate the flush of debris from the roof and gutters.

Refuge buildings need to be within 100m of camping sites and/or cabins. Pedestrian pathways from cabins and/or camping sites are to be provided and are to be signposted. Vehicular access is to be provided to refuge buildings via the internal roads and connect to the public road system to the north, and the emergency access to the south of the site.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP*.

4.2 Recommendations

Recommendation 1 – The proposed development is undertaken as generally indicated on the attached SCHEDULE 1 - Plan of Bushfire Protection Measures .

Recommendation 2 – APZs are to be maintained in perpetuity as outlined in Table 2-2 and as generally depicted within SCHEDULE 1 and managed as outlined in Appendix 4 of *Planning for Bush Fire Protection 2019* and the NSW RFS document ‘*Standards for asset protection zones*’ and Schedule 2 of this report. For Community 1 APZs are to be 40 metres for grasslands to the north, south, east and west, and for Community 2 shall be 40 metres for the grasslands to the west and north and 67 metres to the forest to the east and south.

Recommendation 3 – Building construction standards (BAL 12.5) for the proposed future buildings located within 100m of forest / woodland vegetation or within 50m of grassland are to be applied in accordance with Chapters 3 and 5 of *AS3959 Construction of buildings in bushfire prone areas (2018)* or NASH Standard. Section 7.5.2 of *PBP* and section 3.6 of *AS3959-2018* shall apply to all buildings (including existing), as well as sarking to the roof space and walls shall be non-combustible, and gutter guards and valley guards are to be non-combustible and to be architecturally integrated so as to flush all debris from the roof

Recommendation 4 – A Bushfire Emergency Management and Evacuation Plan is to be prepared to comply with Section 6.8.4 of *PBP*. The Plan is to be updated annually, and all staff are to undertake training (and drills) in conjunction with site inspection/reporting of landscaping and building maintenance prior to the commencement of the bushfire danger period.

Recommendation 5 – Internal property access is to comply with the acceptable solutions outlined in Section 3.3 of this report and the development application. Vehicular access is to be provided to all refuge buildings via the internal road network and connect to the public road system to the north and via the emergency access to the south.

Recommendation 6 – Water and electricity supply is to comply with Section 6.8.3 of *Planning for Bush Fire Protection 2019*. Gas is not to be provided.

Recommendation 7 – Pedestrian paths from cabins and/or camping sites to refuge buildings shall not exceed 100m and provided with clear signposting to the refuge buildings.

5. BIBLIOGRAPHY

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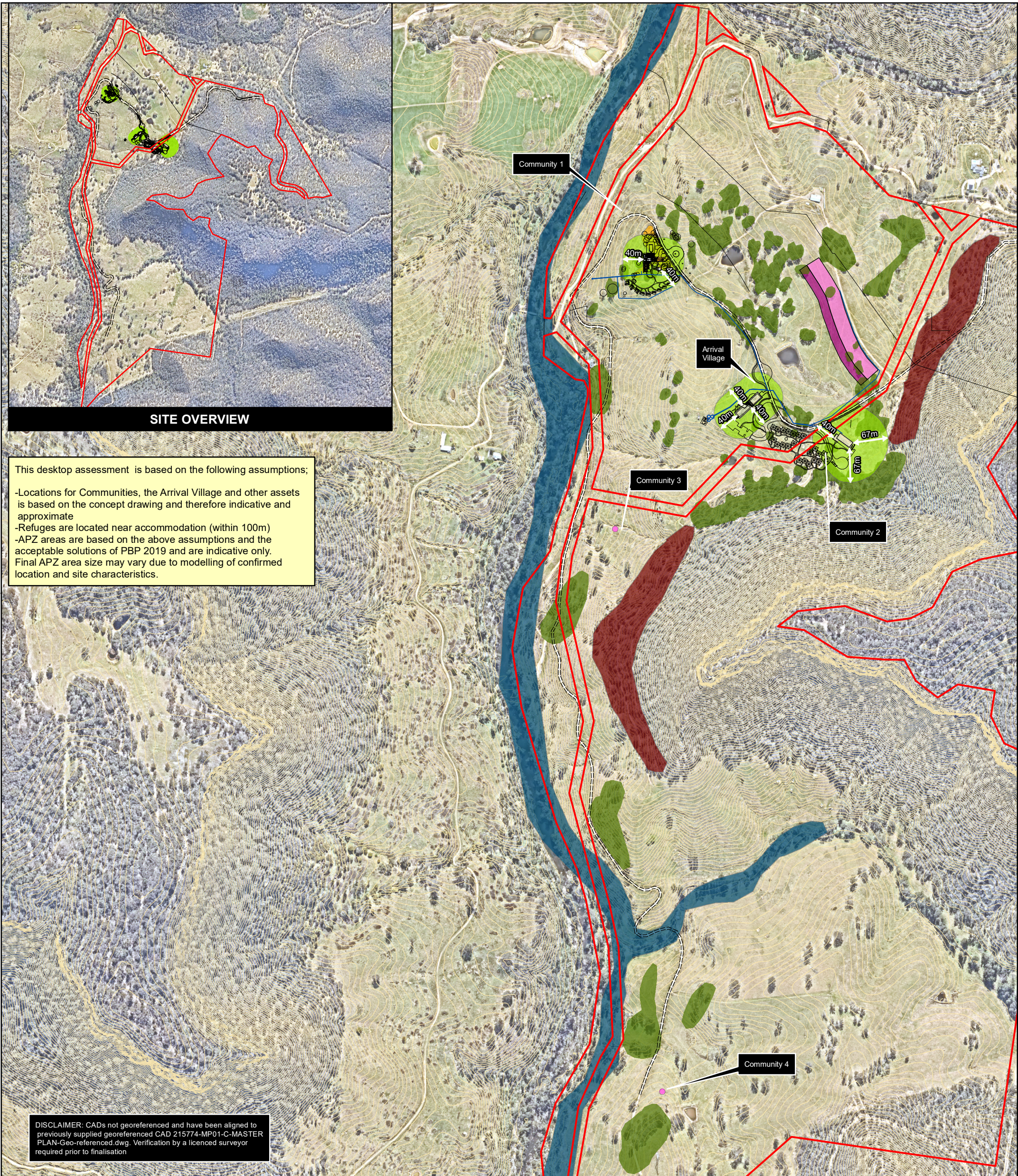
Councils of Standards Australia AS3959 (2018) – *Australian Standard Construction of buildings in bush fire-prone areas.*

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT.* The Department of Environment and Climate Change.

Rural Fire Service (2019) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers.* NSW Rural Fire Service.

Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service.

SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES



SITE OVERVIEW

This desktop assessment is based on the following assumptions;

- Locations for Communities, the Arrival Village and other assets is based on the concept drawing and therefore indicative and approximate
- Refuges are located near accommodation (within 100m)
- APZ areas are based on the above assumptions and the acceptable solutions of PBP 2019 and are indicative only. Final APZ area size may vary due to modelling of confirmed location and site characteristics.

DISCLAIMER: CADs not georeferenced and have been aligned to previously supplied georeferenced CAD 215774-MP01-C-MASTER PLAN-Geo-referenced.dwg. Verification by a licenced surveyor required prior to finalisation

Legend

- | | |
|--|---|
|  Site boundary (source:CAD) |  Future development area (approx location) |
|  Contour 2m (source:LIDAR) |  Proposed Effluent management area |
|  Creekline (source:LPI) |  Proposed nutrient assimilation area |
|  Access road |  Concept Wastewater Management |
|  Asset Protection Zone (APZ) | |

Plant Community Types (PCTs)

- | |
|--|
|  PCT3483 - Central Gorges Box-Red Gum Grassy Forest – (poor/moderate) |
|  PCT 3498 - Wingecarribee Gorges Stringybark-Grey Gum Forest |
|  PCT 4063 - Central and Southern Tableland River Oak Forest |
|  Exotic planted vegetation |



PROJECT & MXD REFERENCE
1551 Joadja Rd JOADJA
21BREA02_BF001

DATE & ISSUE NUMBER
17/04/2024
Issue 1

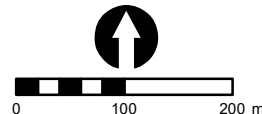
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Schedule 1 - Bushfire Protection Measures

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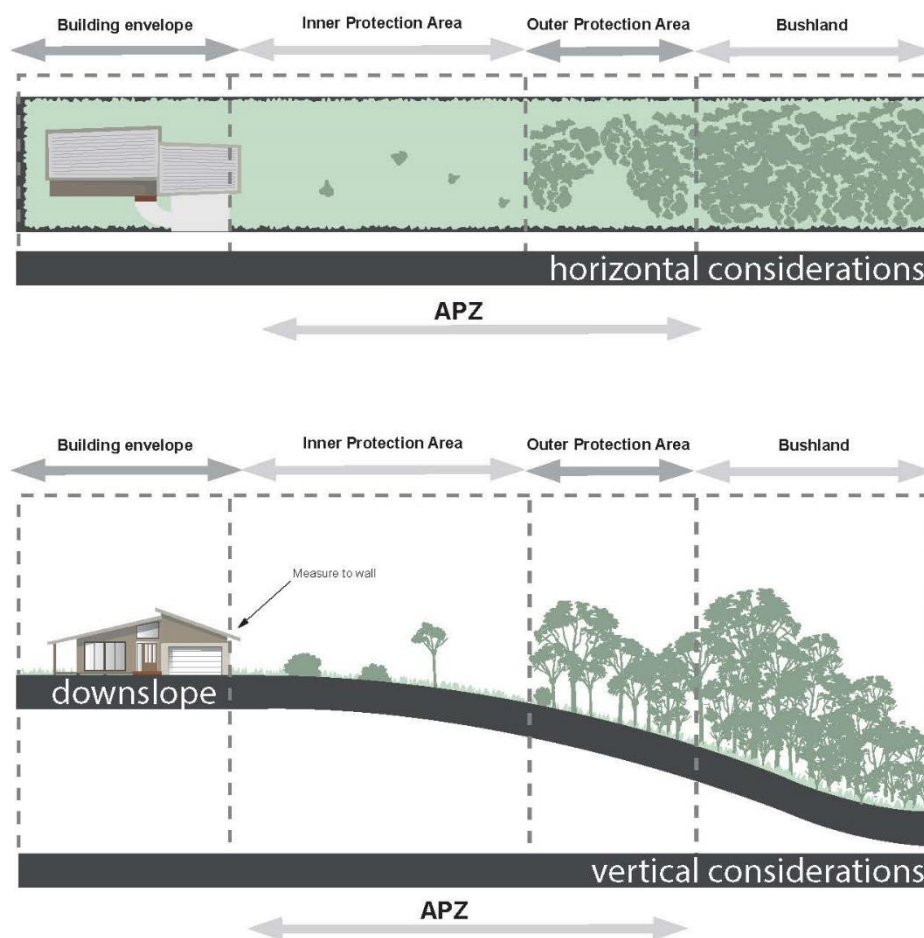


Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

SCHEDULE 2. MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 4 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the buildings. The property is to be managed to IPA standards only. A typical APZ is graphically represented below.



APZs and progressive reduction in fuel loads

(Source: *PBP*)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *PBP* provides maintenance advice for vegetation within the IPA and OPA. The APZ is to be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season

	Inner Protection Area	Outer Protection Area
Trees	➤ 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 retaining smooth barked and evergreen trees.	➤ Tree canopy cover should be less than 30%; and ➤ Canopies should be separated by 2 to 5m.
Shrubs	➤ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings; ➤ Shrubs should not be located under trees; ➤ Shrubs should form less 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.	➤ Shrubs should not form a continuous canopy; and ➤ Shrubs should form less than 20% of ground cover.
Grass and Leaf Litter	➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaves and other debris should be removed	➤ Grass should be kept mown to a height of less than 100mm; and ➤ Leaf and other debris should be removed.
	All Management Zones	
Weeds	➤ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread	
Landscaping	➤ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways; ➤ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building; ➤ When considering landscape species consideration needs to be given to estimated size of the plant at maturity; ➤ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies; ➤ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown; ➤ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e. leaf litter); ➤ Avoid climbing species to walls and pergolas; ➤ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building; ➤ Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and ➤ Use of low flammability vegetation species.	

