Bushfire Assessment Report

Proposed:
Alterations and Additions

At:
The Scots College, Glengarry Campus, Kangaroo Valley

Reference Number: 240583

25th October 2024

Prepared By:
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Contents

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Section 4.14 applications (under the Environmental Planning and Assessment Act 1979) and all infill development applications *may be* referred by Council to the NSW Rural Fire Service for review and concurrence during the DA process. S100B applications under the Rural Fires Act 1997 (subdivisions and Special Fire Protection Purpose Developments), Flame Zone determinations and Alternate Solutions *must be* referred by Council to the NSW Rural Fire Service for review and receipt of a Bushfire Safety Authority (BSA) or other such recommended conditions from the NSW Rural Fire Service before the consent can be granted.

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Version Control				
Version	Date	Author	Reviewed by	Details
1	17/10/2024	Ian Tyerman		Draft Report
2	25/10/2024	Ian Tyerman	Stuart McMonnies	Final Report

List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2018 as amended
BAL	Bushfire Attack Level
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Shoalhaven Council
DA	Development Application
ELVIS	Elevation and Depth Foundation Spatial Data
EP&A Act	*Environmental Planning and Assessment Act* - 1979
ESD	Ecologically Sustainable Development
FRNSW	Fire and Rescue NSW
IPA	Inner Protection Area
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
NP	National Park
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP	*Planning for Bush Fire Protection* – 2019 as amended
ROW	Right of Way
RF Act	*Rural Fires Act* - 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

Executive Summary:

Building Code and Bushfire Hazard Solution P/L has been commissioned by The Scots College to prepare an independent Bushfire Assessment Report for the proposed alterations to an existing Outdoor Educational establishment as part of an overall Masterplan upgrade for the existing facility known as The Scots College, Glengarry Campus, located at 369 Jacks Corner Road, Kangaroo Valley, herein referred to as the subject site.

The proposed works are located within the existing area of development with and comprise of the construction of new general learning areas (GLAs), with dormitories above. The new buildings will replace existing student accommodation pre-dating bushfire requirements.

The proposal also includes an upgrade of existing internal and main access to the site, relocation of maintenance / storage sheds, a new canoe store building (Class 10a building), upgraded parking and relocation of staff accommodation, a chapel, multipurpose room, music class, linen store, administration building and kitchen & dining.

It is proposed that the works are to be conducted over two (2) stages with Stage one (1) being:

- Three new dormitories (D1, D2 & D3)
- Outdoor Education (OE)
- Maintenance and Storage (M1)
- Canoe Store (C3)
- Upgrade and relocation of the existing internal loop road
- Upgraded Parking

The proposed new dormitories and GLAs have been located to provide compliant setbacks to achieve a Radiant Heat Exposure of not more than 10kW/m² and provides a compliant design to maintain a safe bush fire distance from the identified hazards.

There will be **no** increase in student or staff numbers as part of this proposal.

The new works will provide a better bush fire safety outcome by replacing existing non-compliant buildings, with little bush fire resilience, with buildings that comply with the construction requirements under S43C10 NCC 2022 (being BAL 19) and located in a compliant location in accordance with the required setbacks under Planning for Bush Fire Protection – 2019 (PBP). In addition, the proposal will provide upgraded / improved access and water supplies.

Shoalhaven Council's Bushfire Prone Land Map identifies the subject property as containing Category 1 Vegetation and Vegetation Buffer therefore the subject site is considered 'bushfire prone'.

Schools are listed Special Fire Protection Purpose (SFPP) development under section 100b of the *Rural Fires Act 1997*.

As the proposal involves a listed SFPP development on bushfire prone land it is classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The Development Application subsequently requires a Bushfire Safety Authority from the NSW Rural Fire Service.

SFPP development is assessed under Chapter 6 'Special Fire Protection Purpose Developments' of *Planning for Bush Fire Protection 2019* (PBP).

The vegetation identified as being a possible bushfire impact to the proposed building works is located to the north, west and east within the subject site.

The minimum required APZs were determined from the Table A1.12.1 of PBP to be 67 metres to the north and east, 100 metres to the southwest in accordance with Table A1.12.1 of PBP and 142 metres to the west by bushfire design modelling (attached).

The proposed building works will provide an Asset Protection Zones (APZs) of >84 metres to the north, >88 metres to the east, >107 metres to the southwest and ≥142 metres to the west. The APZs consist of maintained grounds and hard surfaced areas within the subject property.

The proposal therefore exceeds the minimum required APZs for new SFPP development to all aspects.

A site meeting was held with Bryan Netzler from RFS Batemans Bay office on 24th May 2024 with email advice received regarding the proposed works.

The proposal has subsequently been modified considering the advice provided.

The proposal satisfies the relevant specifications and requirements of *Planning for Bush Fire Protection 2019* and the addendum to *Planning for Bush Fire Protection*.

1.0 Introduction

The development proposal relates to alterations and additions within an existing Outdoor Educational establishment known as The Scots College, Glengarry Campus, located at 369 Jacks Corner Road, Kangaroo Valley.

The proposed works are located within the existing area of development with and comprise of the construction of new general learning areas (GLAs), with dormitories above. The new buildings will replace existing student accommodation pre-dating bushfire requirements.

The proposal also includes an upgrade of existing internal and main access to the site, relocation of maintenance / storage sheds, a new canoe store building (Class 10a building), upgraded parking and relocation of staff accommodation, a chapel, multipurpose room, music class, linen store, administration building and kitchen & dining.

It is proposed that the works are to be conducted over two (2) stages with Stage one (1) being:

- The proposed works include Three new dormitories (D1, D2 & D3)
- Outdoor Education (OE)
- Maintenance and Storage (M1)
- Canoe Store (C3)
- Upgrade and relocation of the existing internal loop road
- Upgraded Parking
- Provision of a 'Place of Refuge', (Existing Gym).

The proposal has been designed to provide for compliant Asset Protection Zones and to be located within the existing developed portion of the site.

The new works will provide a better bush fire safety outcome by replacing existing buildings, which have little bush fire resilience, with buildings that are within a BAL 12.5 area and comply with the construction requirements under s43 of the NCC 2022 (being BAL 19).

Shoalhaven Council's Bushfire Prone Land Map identifies the subject property as containing Category 1 Vegetation and the Vegetation Buffer therefore the subject site is considered 'bushfire prone'.

Schools are listed Special Fire Protection Purpose (SFPP) development under section 100b of the *Rural Fires Act 1997*.

As the proposal involves a listed SFPP development on bushfire prone land it is classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The Development Application subsequently requires a Bushfire Safety Authority from the NSW Rural Fire Service.

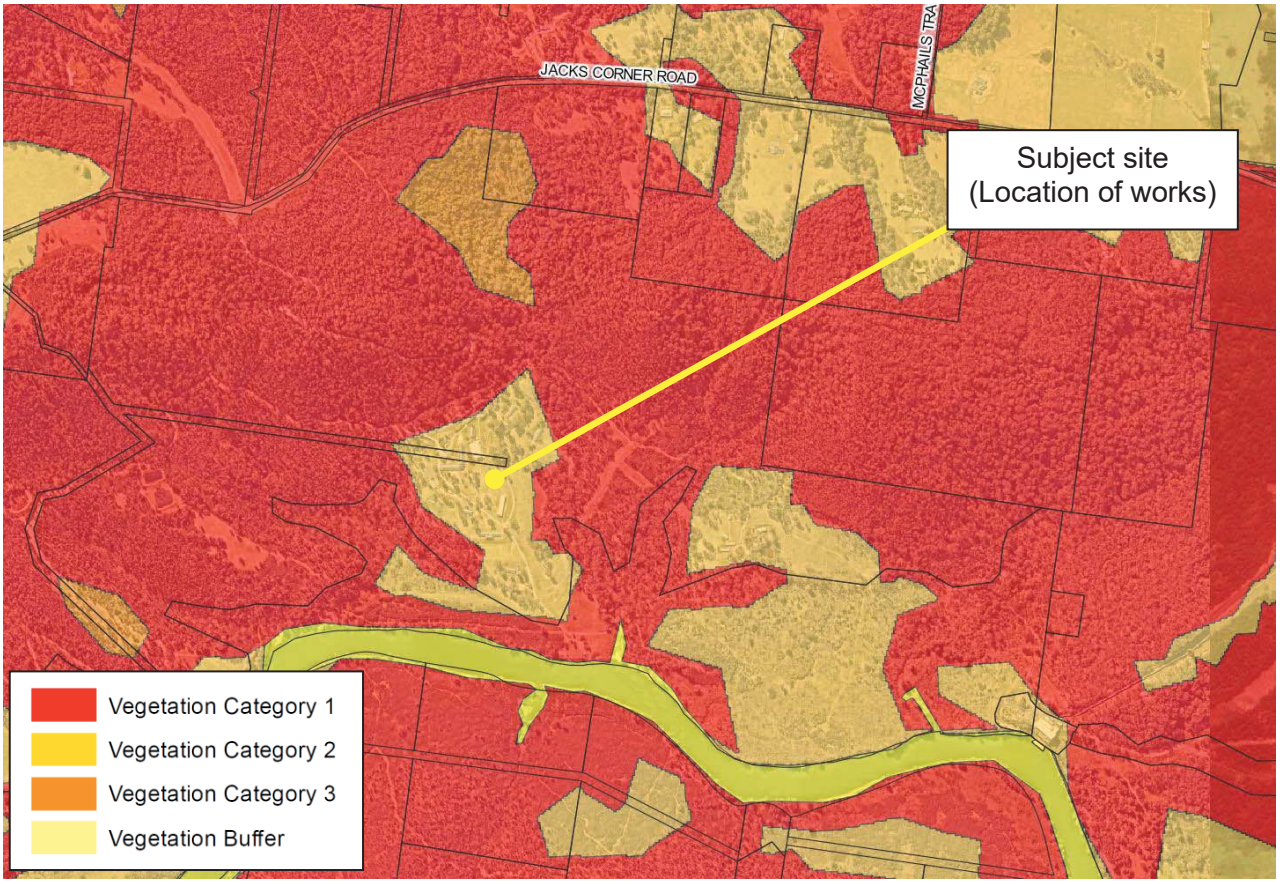


Figure 01: Extract from Shoalhaven Council's Bushfire Prone Land Map

2.0 Legislative Requirements

The site is subject to the following legislative provisions as it relates to bushfire planning and protection:

- *Environmental Planning & Assessment Act* 1979
- *Rural Fires Act* 1997
- *Rural Fires Regulation* 2022
- *Planning for Bush Fire Protection*

2.1 *Rural Fires Act* 1997

Schools are a listed Special Fire Protection Purpose (SFPP) under section 100b (6a) of the *Rural Fires Act* 1997.

The development must obtain a Bush Fire Safety Authority from the Commissioner of the NSW Rural Fire Service (RFS).

2.2 *Environmental Planning & Assessment Act* 1979

Section 10.3 requires councils, where a Bush Fire Risk Management Plan applies, to record a bush fire prone land map after consulting with the Commissioner of the NSW Rural Fire Service (NSW RFS). The Commissioner will designate lands to be bush fire prone within an area and, when satisfied that the lands have been recorded on a map, certify the map as the Bush Fire Prone Land map.

As the proposal relates to a special fire protection purpose it is subject to s.100B of the *Rural Fires Act* 1997, it is therefore considered to be integrated development in accordance with s.4.46 of the *Environmental Planning and Assessment Act* 1979. This means that the proposed development requires authorisation in respect of bush fire safety because of the Special Fire Protection Purpose use.

2.3 *Rural Fires Regulation* 2022

Section 45 sets out the relevant matters that must be considered when assessing a bushfire safety authority and includes an assessment of the proposal against Planning for Bush Fire Protection.

2.4 *Planning for Bush Fire Protection*

As the subject site is identified as being bushfire prone and the proposed development involves a school, the proposal is subject to the application of the relevant specifications and requirements of Planning for Bush Fire Protection.

The proposal is required to demonstrate that it achieves compliance with the following elements of PBP:

- Chapter 1 - Aim and Objectives
- Chapter 6 - Special Fire Protection Purpose Developments

3.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide The Scots College, the Rural Fire Service and Council with an independent bushfire assessment together with appropriate recommendations for both new building construction and bushfire mitigation measures considered necessary having regard to construction within a designated 'bushfire prone' area.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that Council and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject Development Application.

4.0 Scope of this Report

The scope of this report is limited to providing a bushfire assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

5.0 Compliance Tables & Notes

The following table sets out the projects compliance with *Planning for Bush Fire Protection – 2019*.

	North & East	Southeast	Southwest	West
Vegetation Structure	Forest	Forest	Forest	Forest
Effective Slope	0 degrees & up	5 - 10 degrees down	10 – 15 degrees down	24 degrees down
Required Asset Protection Zone (New SFPP)*	67 metres	93 metres	100 metres	142 metres**
Available Asset Protection Zone	>84 metres	>100 metres	>107 metres	≥142 metres
Significant Landscape Features	Existing retained vegetation	Existing retained vegetation	Existing retained vegetation	Neighbouring allotment
Threatened Species	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Aboriginal Relics	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Bushfire Attack Level***	BAL 12.5	BAL 12.5	BAL 12.5	BAL 12.5**
Required Construction Level****	BAL 19	BAL 19	BAL 19	BAL 19

* Determined from Table A1.12.1 of PBP
** Determined from Bushfire Design Modelling
*** Determined from Table A1.12.5 of PBP
**** In accordance with Table 2 of the addendum to PBP (and S43C10 NCC 2022)

Compliance Summary of Bushfire Protection Measures			
Bushfire Protection Measure	**Acceptable Solution**	**Performance Solution**	**Report Section**
Asset Protection Zones	☐	☒	8.03
Construction Standard	☒	☐	8.03
Access	☐	☒	8.03
Water Supply	☒	☐	8.03
Gas and Electrical Supplies	☒	☐	8.03

Asset Protection Zones Compliance

One of the objectives underpinning Planning for Bush Fire Protection is to provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.

The proposed building will provide Asset Protection Zones (APZs) of >84 metres to the north, >88 metres to the east, >100 metres to the southwest and ≥142 metres to the west. The APZs consist of maintained grounds and hard surfaced areas within the subject property.

The APZs will be maintained in accordance with an Inner Protection Area as detailed in Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service publication 'Standards for Asset Protection Zones'. It is noted that the APZs are primarily existing with only a small area to the west needing to be modified to implement the reported APZs.

Construction Level Compliance

The highest Bushfire Attack Level to the proposed buildings was determined from Table A1.12.5 of PBP to be 'BAL 12.5'.

In accordance with Table 2 of the addendum to PBP (and S43C10 NCC 2022) the buildings identified as Class 9a buildings must comply with BAL 19 and subsequently comply with sections 3 and 6 of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2018 and the additional construction requirements detailed in section 7.5 of PBP.

It is noted that it is proposed that all new buildings will be constructed to a minimum of BAL 19 for all Class 9 buildings (Which are all located in a BAL 12.5 area (10kW/m²)) in accordance with S43C10 NCC 2022.

The future stage 2 works will be assessed at that time, however as shown on the attached overlay they will be constructed to the relevant Bushfire Attack Level.

6.0 Aerial view of the subject allotment

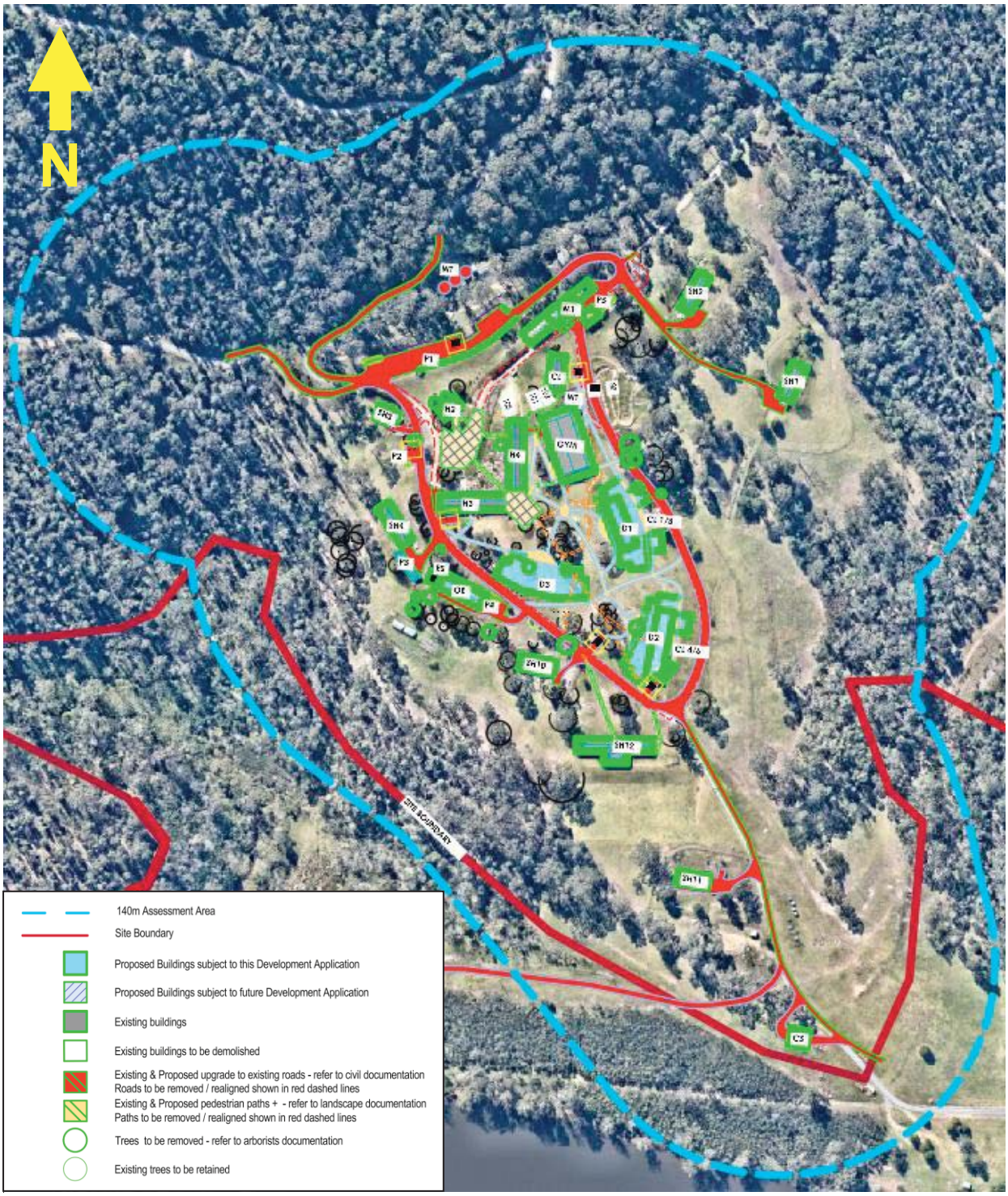


Figure 02: Aerial view of the subject area with masterplan overlayed. Courtesy Nearmap (September 2023)

7.0 Bushfire Assessment

A detailed site inspection has been undertaken of the subject site by a representative of Building Code & Bushfire Hazard Solutions P/L on 29th January 2024, and an onsite meeting with Bryan Netzler from the NSWRFS on 24th May 2024. In addition to the collected site data this assessment has relied on:

- Aerial imagery of the subject area (NSW Spatial Services & Nearmap);
- 1 metre contour mapping of the subject area (Elevation and Depth Foundation Spatial Data – Geoscience Australia)
- NSW Planning Portal Spatial Viewer
- Vegetation Mapping (Vegetation NSW)
- Onsite meeting response from the NSW Rural Fire Services (31 May 2024).

7.01 Location

The subject site contains an existing outdoor educational establishment known as The Scots College, Glengarry Campus, located at 369 Jacks Corner Road, Kangaroo Valley.

The subject site is zoned 'C2: Environmental Conservation', 'C3: Environmental Management' and 'RU2: Rural Landscape' and located within Shoalhaven Council's Local Government Area. The proposed works are primarily located with the C3 area of the site.

The subject property has street access to Jacks Corner Road to the north and abuts similar large lot rural allotments to the east and west and Kangaroo River to the south.

Figure 03: Extract from street-directory.com.au

7.03 Vegetation

In accordance with Appendix 1 'Site Assessment Methodology' of PBP we have undertaken an assessment of all vegetation formations within 140 metres of the development site for each aspect as per Keith (2004).

The vegetation identified as posing a bushfire hazard to the proposed building is located within subject property to the north, east and west aspects.

The vegetation posing a hazard to the north, east and west was found to consist of trees 10 – 20 metres high with a canopy cover of 30 - 70% with an understorey of shrubs and native grasses.

The predominant vegetation to the south was found to consist of mown grass to a height of <100mm and therefore has been assessed as 'managed land'.

NARLA Environmental conducted an Ecological Constraints Assessment of the site in August 2024 where the vegetation within the subject site was assessed as being:

- *Shoalhaven Foothills Spotted Gum Forest*
- *Nattai-Morton Sandstone Peppermint Gully Forest*
- *Exotic Dominated Vegetation*

Figure 6.Narla Field-validated Vegetation Zones within the Subject Site.

Figure 04: Excerpt from the NARLA Environmental Ecological Constraints Assessment

In accordance with A1.2 of PBP, we have determined the vegetation to the north, east and west to be Forest.

Photograph 01: View west of the vegetation within the subject property.

Photograph 02: View east into the vegetation within the subject property.

Photograph 03: Photograph of the Forest to the southwest

Photograph 04: Photograph of the forest to the northeast

7.04 Slope and Topography

The slope of the land under the classified vegetation has a direct influence on the forward rate of spread, fire intensity and radiant heat exposure. The effective slope is considered to be the slope under the classified vegetation which will most significantly influence bushfire behaviour toward the development site.

In accordance with A1.4 'Determine slope' of PBP the slope assessment is to be derived from the most detailed contour data available.

The slope that would most significantly influence bushfire behaviour was determined from topographic imagery (1 metre contours) in conjunction with site observations.

The slope that would **most significantly** influence bushfire impact was determined onsite using an inclinometer and verified from topographic imagery to be:

- 0 degrees & upslope within the hazard to the north, northwest and northeast
- 5 – 10 degrees downslope to the southeast
- 10 – 15 degrees to the southwest
- 24 degrees to the west

Figure 05: Extract from ELVIS – Geoscience Australia (1m contours); Maroon Line – Site Boundary; Green Line – Existing vegetation extent; Blue dotted line: 140m assessment area

It is noted that the 24 degrees downslope to the west is less than 50m in length although as this slope is located to the western aspect which is the direction of the traditional higher fire weather (high temperatures and low humidity), we have adopted this slope as the slope most affecting fire behaviour to this aspect.

7.04 Fire Weather

All development which attracts an Asset Protection Zone under PBP requires the identification of the relevant Fire Danger Index (FDI). The FDI required to be used for development assessment purposes is based on the local government boundaries, being Shoalhaven Council in this instance.

In accordance with the NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017) Shoalhaven Council forms part of the Illawarra / Shoalhaven Fire Weather District and attracts an FFDI of 100.

7.05 Fire History

There are areas within NSW which have significant fire history and are recognised as known fire paths. While the fire history is more commonly considered as part of strategic planning (to ensure future development is not exposed to an unacceptable risk), it is useful to consider at a Development Application phase to ensure the land is suitable for development in the context of bushfire risk.

In this instance the subject site was severely impacted by the Currowan 2 fire in the 2019-2020 fire season (source NPWS Fire History dataset) which resulted in the loss of 3 residential houses within the main campus with and the additional loss of 2 x staff cabins further to the east.

The site is also identified as being impacted by a wildfire in 1982-83.

No other fires have been recorded to have impacted the site, although fires have occurred further to the northwest beyond Jacks Corner Road in 1964-65 and 1980-81 fire seasons.

As a result, the site would not be considered to be located within a traditional fire path, although would be considered to be impacted by a 1:50 year fire event.

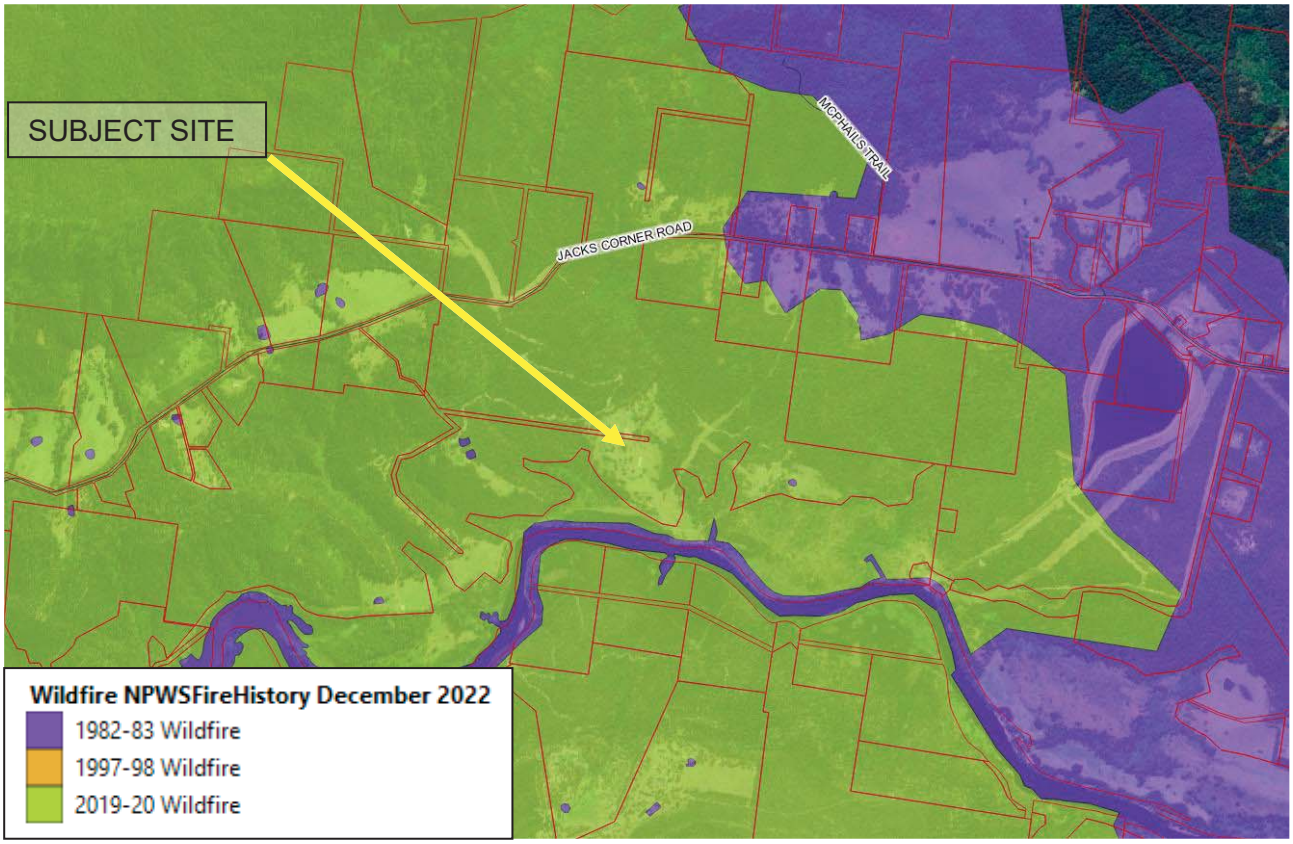


Figure 06: Extract from NPWS Fire Mapping December 2022

8.0 Bushfire Protection Measures

8.01 Planning for Bush Fire Protection - 2019

Planning for Bush Fire Protection – 2019 (PBP) is applicable to development located on land determined as being 'bushfire prone' in accordance with the local Bushfire Prone Land Map.

Bushfire prone land are defined as those areas;

- *containing or within 100m of Category 1 Vegetation; or*
- *containing or within 30m of Category 2 or 3 Vegetation.*

Shoalhaven Council's Bushfire Prone Land Map identifies the subject property as containing Category 1 Vegetation and the Vegetation Buffer, therefore the application of PBP must apply in this instance.

Schools are listed Special Fire Protection Purpose (SFPP) development under section 100b of the *Rural Fires Act 1997*.

As the proposal involves a listed SFPP development on bushfire prone land it is classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The Development Application subsequently requires a Bushfire Safety Authority from the NSW Rural Fire Service.

SFPP development is usual assessed under Chapter 6 'Special Fire Protection Purpose Developments' of *Planning for Bush Fire Protection 2019* (PBP).

In this instance the proposal must satisfy the aim and objectives detailed in Chapter 1 'Introduction' and specific objectives and bushfire protection measures detailed in Chapter 6 'Special Fire Protection Purpose Developments' of PBP. The additional provisions outlined in the addendum to PBP (2022) have also been addressed.

8.02 Specific Objectives

The following table outlines the objectives that apply to existing SFPP development under section 6.4 'Development of existing SFPP facilities' of PBP and our comments on the proposals compliance or otherwise.

Objective	Comment
provide an appropriate defendable space;	The proposed dormitories and GLAs are within the BAL 12.5 area and provide a greater defendable space with than the existing student accommodation buildings.

Objective	Comment
site the building in a location which ensures appropriate separation from the hazard to minimise potential for material ignition;	The proposed works will be situated in a BAL 12.5 area and constructed to BAL 19. The available APZs in conjunction with the application of BAL 19 construction to the new works will minimise potential for material ignition.
provide a better bush fire protection outcome for existing buildings;	The proposed development provides a better outcome with the relocation of students into buildings which have larger setbacks and will be constructed to a higher Bushfire Attack Level. The Bushfire Emergency Management and Evacuation Plan will also be updated as part of this application.
new buildings should be located as far from the hazard as possible and should not be extended towards or situated closer to the hazard than the existing buildings (unless they can comply with section 6.8);	The proposed building does not extend closer to the hazard than the existing buildings on site and provide compliant 10kW/m² APZs.
ensure there is no increase in bush fire management and maintenance responsibility on adjoining land owners without their written confirmation;	There is no increase in bush fire management and maintenance responsibilities on adjoining land owners as a result of the proposal.
ensure building design and construction enhances the chances of occupant and building survival; and	The new works will comply with sections 3 and 6 (BAL 19) of Australian Standard 3959 'Construction in bushfire-prone areas' 2018 and the additional construction requirements detailed in section 7.5 of *Planning for Bush Fire Protection* 2019.
provide for safe emergency evacuation procedures including capacity of existing infrastructure (such as roads).	It has been recommended that the Bushfire Emergency and Evacuation Management Plan be updated as part of this application. The subject site has street frontage and access to Jacks Corner Road.

8.03 Bushfire Protection Measures

Section 6.8 'Bush fire protection measures' of PBP outlines the specific Bushfire Protection Measures (BPMs) applicable to Special Fire Protection Purpose development, including APZs, Landscaping, Construction, Access, Services & Emergency Management Plan.

The following section addresses each BMP and the proposals compliance or otherwise.

Asset Protection Zones

Asset Protection Zones for new Special Fire Protection Purpose (SFPP) development are determined from Table A1.12.1 of PBP or bushfire design modelling achieving a radiant heat impact of no more than 10kW/m^2 at the closest point of the available building footprint.

The minimum required APZs were determined from the Table A1.12.1 of PBP to be 67 metres to the north and northeast, 93 metres to the southeast, 100 metres to the southwest and was determined from bushfire design modelling to be 142 metres to the west.

The new dormitory / GLA buildings meet the 10kW/m² minimum setback in accordance with A1.12.1 and Bushfire Design Modelling of *Planning for Bush Fire Protection.*

Regardless, as the proposed works relate to the redevelopment of an existing SFPP facility and section 6.4 'Development of existing SFPP facilities' of PBP can be applied. The provisions outlined in the section can allow for a reduction in the minimum required APZ, noting the following:

> *The intention for any building work occurring within an existing SFPP development is to achieve a better bush fire outcome than if the development did not proceed. Achieving this may require a combination of measures including improved construction standards, APZs and evacuation management. This may result in a level of retrofitting of existing buildings and managing other portions of the site (i.e. APZs) to ensure an improved level of bush fire protection.*

In acknowledging the isolated nature of the site, the minimum setbacks for new SFPP development have been applied to provide for a '*Better Bush Fire Safety Outcome'* than that which currently exists within the site.

The overall master Plan provides the majority of the new buildings achieving the required setbacks for SFPP development and the existing structures (Permanent teacher / staff accommodation) and the future ancillary buildings providing a maximum of BAL 29 setbacks.

The proposed dormitory buildings will provide Asset Protection Zones (APZs) of >84 metres to the north, >88 metres to the east, >100 metres to the southeast, >100 metres to the southwest and ≥142 metres to the west. The APZs consist of maintained grounds and hard surfaced areas within the subject property.

The proposed development provides a better outcome with the relocation of students into buildings which have larger (compliant) setbacks and will be constructed to a higher Bushfire Attack Level.

All existing managed grounds and for a minimum distance of 88 metres to the north, 84 metres to the east, 100 metres to the southwest (existing management) and for a minimum distance of 142 metres to the west of the proposed dormitories not built upon will be maintained in accordance with an Inner Protection Area as detailed in Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service publication 'Standards for Asset Protection Zones'.

Due to the existing access restrictions and in an effort to minimise the environmental impact to the site, the proposed buildings have been positioned to provide for the largest separation distances from the hazard. Therefore, the proposed works satisfy the separation in accordance with NSW S43C2 NCC 2022 and section 6.4 'Development of existing SFPP facilities' of Planning for Bush Fire Protection.

Building construction, siting & design

Australian Standard 3959 – 2018 'Construction of buildings in bushfire-prone areas' (AS3959) specifies construction standards for buildings within various Bushfire Attack Levels as determined by Planning for Bush Fire Protection – 2019.

AS3959 provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ.

Correlation between bushfire impact and AS3959

Bushfire Attack Level	Maximum radiant heat impact (kW/m^2)	Level of construction under AS3959-2018
Low		No special construction requirements
12.5	≤12.5	BAL - 12.5
19	12.6 to 19.0	BAL - 19
29	19.1 to 29.0	BAL - 29
40	29.1 to 40.0	BAL - 40
Flame Zone	>40.0	BAL FZ No deemed to satisfy provisions

The highest Bushfire Attack Level to the proposed dormitory buildings was determined from table A1.12.5 of PBP to be 'BAL 12.5'.

In accordance with Table 2 of the addendum to PBP (and S43C10 NCC 2022) the proposed works must comply with BAL 19 and subsequently comply with sections 3 and 6 of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2018 and the additional construction requirements detailed in section 7.5 of PBP.

All new buildings will be located within the central existing development area which provides the largest separation distance possible and minimises the ecological impact to the site.

In addition, the replacement of most of the existing buildings onsite with little bush fire resilience will result in a greatly improved Bush Fire Safety Outcome than that which currently exists.

Where already not provided, all existing buildings onsite will be upgraded to provide for ember protection.

Property Access

The existing access to the site is from Jacks Corner Road.

In this instance, the site is located approximately 7km from Kangaroo Valley with Jacks Corner Road traversing through areas of Forest Vegetation.

The existing access to the site consists of a gravel all-weather access road which provides a carriageway of 4-6m variable width.

There is no formal secondary egress from the site, although there is a track traversing from the site to the Bendeela Hydroelectric pumping station to the east. This is not an authorised secondary access to the site and does traverse through forest vegetation, although emergency services could utilise this access in an emergency if required.

As part of the Master Plan proposal, work will be undertaken to improve the main access road from Jacks Corner Road to provide passing bays at various locations along the access road.

Topographical (Civil) and ecological constraints restrict the ability of the access road being brought up to full compliance.

The upgrade of the internal road system to a 6m wide all weather surface that provides a full loop access around the site will provide firefighting and emergency service access to the buildings and perimeter access to the hazards. The upgraded loop access will be located no greater than 18 metres from the perimeter buildings partially satisfying the provisions of *S43C14 Vehicular access* of NCC 2022 for certain Class 9 buildings that are SFPP.

The upgraded access road and existing access roads ensure that there is access within 70 metres of the most distant external point of the proposed buildings with full loop access effectively providing a through road for an emergency vehicle in accordance with Appendix 3 of PBP.

Although in accordance with PBP, this proposal generally does not trigger the need to apply access requirements. As the upgraded internal road network provides a full loop around the site and direct access to the hazards, the upgraded access in our opinion satisfies the performance criteria of Table 3 of the addendum to PBP, being:

> *Firefighting vehicles are provided with safe, all-weather access to structures and hazardous vegetation.*

We request that the NSW RFS specifically acknowledge this modification in the issued Bush Fire Safety Authority in accordance with NSW G5D3 NCC 2022.

Photograph 05: View of the existing access to be upgraded adjacent to the proposed Building D2 (Existing building to be demolished)

Photograph 06: View north of the existing internal access road to be upgraded

Water Supply & Utilities

There is no reticulated town water supply connected to the site.

The site is serviced by 3 x 100,000L concrete tanks which are fed from the Kangaroo River providing a continuous water supply.

The site contains a large back-up diesel generator.

The subject site contains a comprehensive hydrant system with pillar hydrants and hose reels located at regular intervals throughout the subject site. This hydrant system is connected to water mains within the site which utilises the backup generator if required.

The existing water supply provides pillar hydrants within 70 metres to the most distant internal point of the existing works and will be upgraded to provide coverage for the new buildings.

The existing and proposed water supply is considered adequate for the replenishment of attending fire services and will satisfy Table 4 of the addendum to PBP.

The proposed buildings will have a new connection to the existing electrical network.

Photograph 05: Existing Pillar Hydrant and Fire Hose

Photograph 06: Existing 3 x 100,000L Concrete water tanks

Photograph 07: Typical Fire hydrant and Hose reels

Photograph 04: Existing Pump located at Kangaroo River

Photograph 08: Existing backup Generator

Emergency management arrangements

The intent of the Emergency Management Plan measure is to provide suitable emergency and evacuation arrangements for occupants of SFPP developments.

This assessment includes a recommendation that the existing Bushfire Emergency Management Plan (BEMP) for the School be updated to capture the new building.

In recognition of the high bushfire risk to the site, the possible evacuation of the site is considered to be possible.

The existing gym onsite is located within a compliant 10kW/m² area and is considered to be the logical 'Place of Refuge' for the site. The gym is also currently the subject of an approved Development Application which has received a Bush Fire Safety Authority from the RFS (DA20240306000914-Original-1) and the construction of the new building works will provide for a suitable place of refuge onsite in the event that a remain in place notice is issued by emergency services.

It is acknowledged that the site is not occupied during the school holidays which correlates with the traditional high fire danger period, being December and January.

There are no school holiday activities conducted on this site and it is recommended that this is formalised in the BEMP if not already done so.

It is recommended that the updated BEMP include a leave early policy and non- operation on days of Extreme and Catastrophic Fire Weather, or as directed by emergency services.

The timing of the leave early policy should be discussed with the local Shoalhaven RFS Fire Control Centre to ascertain the timing of notifications form emergency services or the '*Fires Near Me*' App in regard to the time required to relocate the students and staff onsite.

8.04 Aim & Objectives of PBP

The following table details the aim and objectives of Planning for Bush Fire Protection 2019 and the proposals ability to comply.

Aim / Objective	Comment
The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.	With the inclusion of the recommendations made herein it is of our opinion that the aim of PBP has been satisfied.
(i) afford buildings and their occupants protection from exposure to a bush fire;	The proposed works will be constructed to BAL 19 or the relevant BAL for the non-class 9 buildings in accordance with the addendum to PBP. In conjunction with the corresponding APZs recommended herein the building and its occupants will be afforded protection from the exposure to bushfires.
(ii) provide for a defendable space to be located around buildings;	The existing / proposed APZs provide a defendable space around the buildings.
(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;	The Asset Protection Zones to the proposed buildings, coupled with the construction requirements and the location of the proposed works, provides for appropriate setbacks and minimises potential material ignition.
(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;	The existing and upgraded access arrangements have been reviewed and are considered adequate for fire-fighter access and occupant evacuation.
(v) provide for ongoing management and maintenance of bush fire protection measures, (BPMs); and	All APZs within the subject site will be maintained in accordance with an Inner Protection Area as detailed in Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service publication 'Standards for Asset Protection Zones'. Any future Landscaping is to comply with the provisions of Appendix 4 of PBP.

Objective	Comment
(vi) ensure that utility services are adequate to meet the needs of firefighters.	The subject site contains a comprehensive hydrant system with pillar hydrants and hose reels located at regular intervals throughout the subject site. Existing and upgraded water supply is adequate to meet the needs of attending fire services.

It is therefore of our opinion that the proposal can satisfactorily comply with the aim and objectives of *Planning for Bush Fire Protection 2019*.

8.05 Submission Detail

Section 45 of the *Rural Fires Regulation* 2022 identifies various items which must be addressed and included within an application for a Bush Fire Safety Authority. The following table outlines these items and includes a corresponding response.

Submission Detail	Response
(a) a description (including the address) of the property on which the development the subject of the application is proposed to be carried out,	See section 7.01
(b) a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in Planning for Bush Fire Protection*,*	See section 7.02
(c) an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property),	See section 7.03
(d) identification of any significant environmental features on the property,	Part of the site is mapped as Biodiversity values however this is within the proposed retained vegetation.
(e) the details of any threatened species or threatened ecological community under the Biodiversity Conservation Act 2016 *that is known to the applicant to exist on the property,*	Part of the site is mapped as Biodiversity values however this is within the proposed retained vegetation.
(f) 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,*	No known sites
(g) a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters—	See section 8.0
(i) the extent to which the development is to provide for setbacks, including asset protection zones,	See section 8.03
(ii) the siting and adequacy of water supplies for fire fighting,	See section 8.03
(iii) the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency,	In consideration of there being only one access to the site, the upgraded internal roads and place of refuge, coupled with a leave early and non-operation on high risk days as part of the BEMP, the roads are considered adequate to accommodate a timely evacuation from the site.

Submission Detail	Response
(iv) whether or not public roads in the vicinity that link with the fire trail network have two-way access,	There are no registered fire trails within the local area.
(v) the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response,	See section 8.03
(vi) the adequacy of bush fire maintenance plans and fire emergency procedures for the development site,	See section 8.03
(vii) the construction standards to be used for building elements in the development,	See section 8.03
(viii) the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development,	There is no existing bushfire sprinkler system, nor is one proposed. See section 8.03 for all bushfire protection measures
(ix) any registered fire trails on the property,	There are no classified fire trails within the subject site.

9.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with Planning for Bush Fire Protection – 2019 and Australian Standard 3959 'Construction of buildings in bushfire-prone areas - 2018. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

Asset Protection Zones

1. At the commencement of building works and in perpetuity all existing managed grounds and for a minimum distance of 88 metres to the north, 84 metres to the east, 100 metres to the southwest (existing management) and for a minimum distance of 142 metres to the west of the proposed Dormitory buildings within the subject property shall be managed as an inner protection area (IPA) as outlined within Appendix 4 of 'Planning for Bush Fire Protection 2019' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.

Construction

2. That the proposed new building works shall comply with sections 3 and 6 (BAL 19) of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' – 2018.

3. That all new construction shall comply section 7.5 of *Planning for Bushfire Protection 2019*.

4. The demountable buildings along the northern portion of the site are to be removed at the completion of the building works.

5. Where not currently completed the existing buildings shall be ember upgraded. This is to be achieved by enclosing all openings or covering openings with a non-corrosive metal mesh screen (steel, bronze or aluminium) with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves. External hinged doors are to be fitted with draft excluders and garage doors are to be fitted with 'Brush Seals'.

6. Class 10a structures located >10 metres for any habitable buildings have no bushfire construction requirements

Emergency Management

7. That the bushfire emergency management plan be updated to capture the new building works and include a leave early policy and non- operation on days of Total Fire Ban, Extreme and Catastrophic Fire Weather, or as directed by emergency services and to be consistent with the NSW Rural Fire Service guidelines.

Services (where applicable)

Electricity:

8. Any new electrical services must comply with the following:

    - where practicable, electrical transmission lines are underground.
    - where overhead electrical transmission lines are proposed:
        - lines are installed with short pole spacing (30 metres), 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 ISSC3 *Guideline for Management Vegetation Near Power Lines*.

Gas:

9. Any new gas services must comply with the following:

    - reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - *The storage and handling of LP Gas*, the requirements of relevant authorities, and metal piping is used;
    - all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
    - connections to and from gas cylinders are metal;
    - 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 to gas meters adjacent to buildings are not to be used; and
    - above-ground gas service pipes external to the building are metal, including and up to any outlets.

Upgraded Access

That the fire truck access shall comply with the Access requirements as detailed in Table 6.8b of PBP, specifically:

- traffic management devices are constructed to not prohibit access by emergency services 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.
- minimum 6m carriageway width;
- curves of roads have a minimum inner radius of 6m;
- the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
- the road crossfall does not exceed 3 degrees; and
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
- access road must provide suitable turning areas in accordance with Appendix 3.

The upgraded internal access is also to comply with the requirements of Appendix B; Table 3 of the Addendum to PBP as amended below and in accordance with the attached BUSHFIRE SFPP CONSTRAINTS OVERLAY MANAGEMENT FROM PROPOSED SFPP FOOTPRINTS REV: H; Dated: 16/10/20-24.

- Vehicular access must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the site; and
- Must have a minimum unobstructed width of 6m and in no part of the 6m width be built upon or used for any purpose other than vehicular or pedestrian movement; and
- Must provide reasonable pedestrian access from the vehicular access to the building; and
- Must have a load bearing capacity and unobstructed height to permit the operation and passage of fire fighting vehicles; and
- Must be wholly within the allotment except that a public road complying with above may serve as the vehicular access or part thereof.

NCC – Specification 43

- **We request that the NSW RFS specifically acknowledge that the specific access provisions at S43C14 are not applicable in the issued Bush Fire Safety Authority in accordance with NSW G5D4 NCC 2022.**

10.0 Conclusion

Shoalhaven Council's Bushfire Prone Land Map identifies the subject property as containing Category 1 Vegetation and the Vegetation Buffer therefore the subject site is considered 'bushfire prone'.

Schools are listed Special Fire Protection Purpose (SFPP) development under section 100b of the *Rural Fires Act 1997*.

As the subject site is considered 'bushfire prone' and involves a listed SFPP (school) the proposal is considered integrated development under section 4.46 of the *Environmental Planning and Assessment Act 1979* and requires a Bushfire Safety Authority from the NSW Rural Fire Service.

In accordance with the submission requirements for a Bush Fire Safety Authority detailed in section 45 of the *Rural Fires Regulation* 2022 an assessment of the extent to which the proposed development conforms with or deviates from *Planning for Bush Fire Protection* (PBP) is required.

In accordance with the bushfire safety measures contained in this report, and consideration of the site-specific bushfire risk assessment and Pre-DA Advice received from the RFS, it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development.

It is of our opinion that the proposal can satisfy all relevant specifications and requirements of PBP.

We are therefore in support of the development application.

Should you have any enquiries regarding this project please contact our office.

Site assessment and report prepared by
Building Code & Bushfire Hazard Solutions

Ian Tyerman
Senior Bushfire Consultant
Graduate Certificate in Bushfire Protection
Planning for Bushfire Prone Areas - UTS Sydney
FPA Australia BPAD Level 2 Accredited Practitioner
BPAD Accreditation No. BPAD30356

Reviewed by
Building Code & Bushfire Hazard Solutions

Stuart McMonnies
Director
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
FPA Australia BPAD Level 3 Accredited Practitioner
BPAD Accreditation No. BPAD9400

11.0 Annexure 01

List of Referenced Documents

Australian Building Codes Board (2022). *National Construction Code Volume One - Building Code of Australia*. ABCB

ELVIS -Elevation -*Foundation Spatial Data*. Elevation.fsdf.org.au. Available at: http://elevation.fsdf.org.au/

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

NSW Department of Planning and Environment (2019). *Planning Portal*. Accessed at: https://www.planningportal.nsw.gov.au/

NSW Rural Fire Service (2019). *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities and Developers*.

Plans prepared by: Baxter & Jacobson Architects; 433.02 TSC GG MP SET ISSUE 3; Dated: 11/10/24

Rural Fire Service NSW (2005). *Standards for Asset Protection Zones*

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

Standards Australia (2014). *AS/NZS 1596 The storage and handling of LP Gas*

Acknowledgements to:

Geoscience Australia
Nearmap
Street-directory.com.au

Attachments

Attachment 01:	240583_BUSHFIRE SFPP CONSTRAINTS OVERLAY MANAGEMENT FROM PROPOSED SFPP FOOTPRINTS REV: H; Dated: 16/10/20-24
Attachment 02:	240583_BUSHFIRE SFPP ACCESS & PASSING OPPORTUNITIES REV: H; Dated: 16/10/20-24

Attachment 03: Bushfire design modelling

NOTES

STAGE 1 WORKS

LEGEND

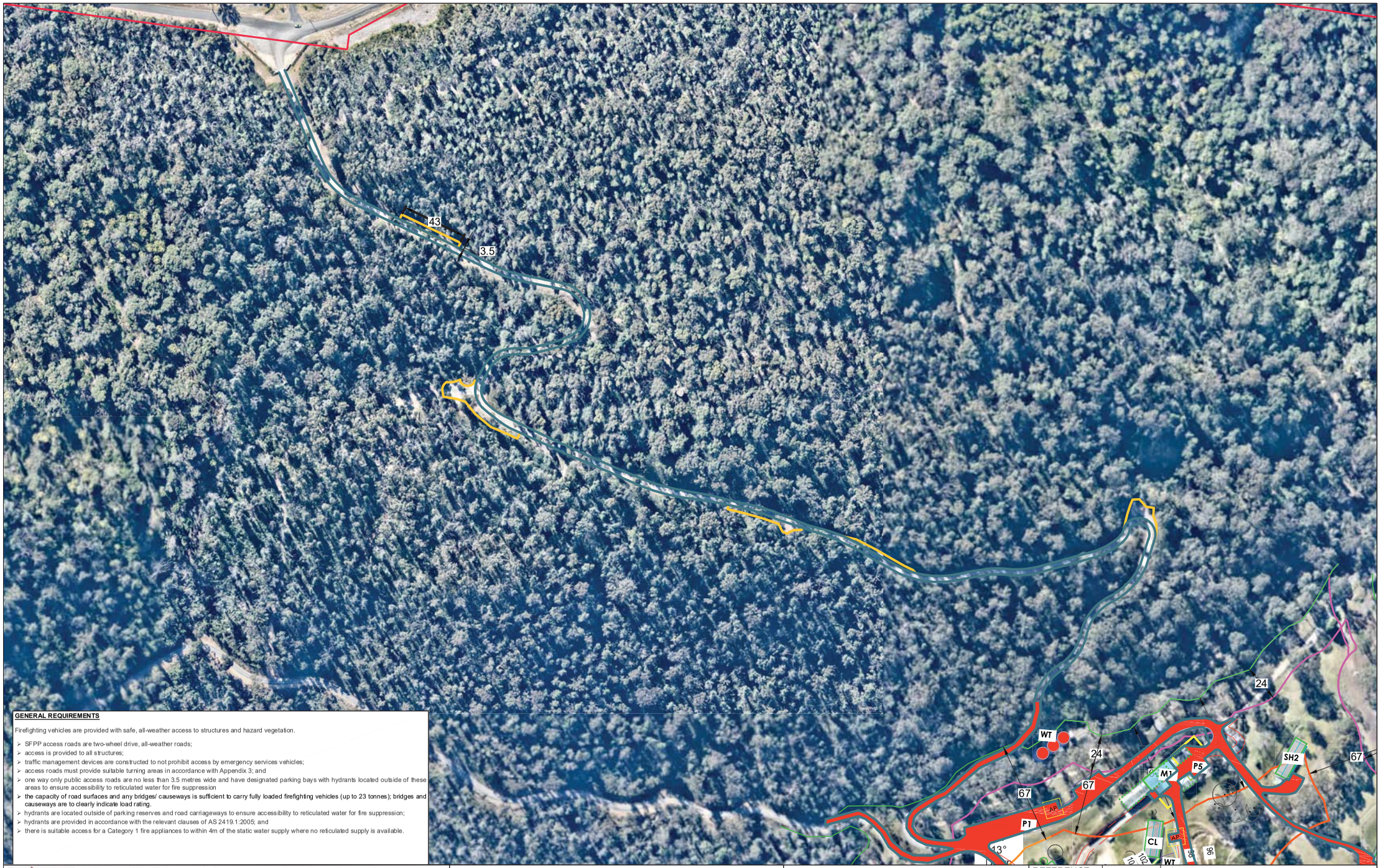
- SFPP SETBACK EXISTING MANAGEMENT DEEMED TO SATISFY
- EXISTING VEGETATION EXTENT
- APZ FROM PROPOSED SFPP FOOTPRINT
- ADDITIONAL MANAGEMENT

BUSHFIRE SFPP CONSTRAINTS OVERLAY MANAGEMENT FROM PROPOSED SFPP FOOTPRINTS

REFERENCE NO.	240583	SCOTS COLLEGE, GLENGARRY CAMPUS			
ADDRESS	369 JACKS CORNER ROAD, KANGAROO VALLEY				
DATE.	02/02/2024	DRAWN BY	IT	SCALE: NTS	MGA20C/56
REVISION	REVISION H	PLOT DATE	16/10/2024		
CLIENT	THE SCOTS COLLEGE				

Bushfire Hazard Solutions
(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au

SILVER MEMBER



GENERAL REQUIREMENTS

Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.

- SFPP access roads are two-wheel drive, all-weather roads;
- access is provided to all structures;
- traffic management devices are constructed to not prohibit access by emergency services vehicles;
- access roads must provide suitable turning areas in accordance with Appendix 3; and
- 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
- **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.**
- hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;
- hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and
- there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.

Bushfire Hazard Solutions
(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au

SILVER MEMBER
FPA AUSTRALIA Fire Protection Association Australia

LEGEND

5.5m **EXISTING GRAVEL ACCESS ROAD**

20m x 2.5m **POSSIBLE PASSING BAY 20m x 2.5m**

BUSHFIRE SFPP ACCESS & PASSING OPPORTUNITIES

REFERENCE NO.	240583	THE SCOTS COLLEGE, GLENGARRY			
ADDRESS	369 JACKS CORNER ROAD, KANGAROO VALLEY				
DATE.	02/02/2024	DRAWN BY	IT	SCALE: NTS	
REVISION	H	PLOT DATE	16/10/2024	MGA20C/56	
CLIENT	THE SCOTS COLLEGE				

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 28/02/2024 **Assessment Date:** 28/02/2024

Site Street Address: 369 Jacks Corner Road, Kangaroo Valley

Assessor: Stuart McMonnies; Bushfire Hazard Solutions

Local Government Area: Shoalhaven **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: West

Vegetation Information

Vegetation Type: Southern Lowlands WSF (Grassy)

Vegetation Group: Wet Sclerophyll Forests (Grassy)

Vegetation Slope: 24 Degrees **Vegetation Slope Type:** Downslope

Surface Fuel Load(t/ha): 20 **Overall Fuel Load(t/ha):** 32.8

Vegetation Height(m): 0.9 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 13 Degrees **Site Slope Type:** Downslope

Elevation of Receiver(m) Default **APZ/Separation(m):** 142

Fire Inputs

Veg./Flame Width(m): 100 **Flame Temp(K):** 1200

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25

Heat of Combustion(kJ/kg 18600 **Ambient Temp(K):** 308

Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL LOW **Peak Elevation of Receiver(m):** 7.94

Radiant Heat(kW/m2): 10 **Flame Angle (degrees):** 72

Flame Length(m): 85.64 **Maximum View Factor:** 0.125

Rate Of Spread (km/h): 12.57 **Inner Protection Area(m):** 0

Transmissivity: 0.716 **Outer Protection Area(m):** 0

Fire Intensity(kW/m): 213053