BUSHFIRE CONSULTING SERVICES PTY LTD
Designing Bushfire Protection Measures

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Bush Fire Assessment Report

in relation to the proposed

classroom building and upgrade to vehicular access

at:

Lot 7 DP 1227293

St Columba's Catholic College

168 Hawkesbury Road Springwood

(subject site)

Contents

Document Tracking

Item	Detail
Project Name	Bush Fire Assessment Report, proposed classroom building and upgrade to vehicular access
Project Address	Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood
Client Name	Catholic Education Office Diocese of Parramatta care of Chester Group Pty Ltd
Project Number	J22/0334
Plan Reference	Plans by Alleanza Architecture numbered 18128 issue A dated 16/08/2021
Prepared by	Laura Richards
Approved by	Catherine Gorrie
BAL under AS3959-2018	BAL 40 to the north, east and west and BAL 29 to the south and the relevant additional construction requirements of PBP section 7.5

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Document Control

Version	Primary Author	Description	Date Completed
1	Laura Richards	Draft	23/05/2022
2	Catherine Gorrie	Final	25/05/2022
3	Catherine Gorrie	Minor Amendment	6/06/2022

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Any recommendation or advice expressed in this report is made in good faith and in accordance with the relevant legislation for bushfire prone development in New South Wales. Bushfire Consulting Services Pty Ltd has endeavoured to ensure that the information in this document is correct. However, many factors outside our current knowledge or control affect the recipient's needs and project plans. Bushfire Consulting Services Pty Ltd does not warrant or represent that the document is free from error or omissions and does not accept liability for any errors or omissions. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information. To the fullest extent possible Bushfire Consulting Services Pty Ltd excludes any express or implied warranty as to condition, fitness, merchantability or suitability of this document and limits its liability for direct or consequential loss at Bushfire Consulting Services Pty Ltd option to re-supplying the document or the cost of correcting the document. In no event shall Bushfire Consulting Services Pty Ltd responses to questions or any other information in this document be deemed to be incorporated into any legally binding agreement without the express written consent of an officer of Bushfire Consulting Services Pty Ltd.

It should be borne in mind that the measures recommended in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is due to the degree of vegetation management, the unpredictable behaviour of bushfires and extreme weather conditions. As such, the author is not liable to any person for any damage or loss whatsoever which has occurred or may occur in relation to the person taking action or not taking action based on the recommendations of this report.

NOTE: This bush fire assessment shall remain valid for 12 months from the date of issue.

Executive Summary

Bushfire Consulting Services was commissioned by Catholic Education Office Diocese of Parramatta care of Chester Group Pty Ltd to provide a bush fire assessment for the proposed classroom building and upgrade to vehicular access at Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood. The subject site is mapped as designated bush fire prone land by Blue Mountains City Council and is located within 100 metres of bush fire prone (hazardous) vegetation. The bush fire attack level (BAL) associated with the development of the subject building has been assessed as BAL 40 to the north, east and west and BAL 29 to the south.

The proposal is a form of Special Fire Protection Purpose, which is a development that is occupied by people who are considered to be at-risk members of the community. In a bush fire event, these occupants may be more susceptible to the impacts of bush fire. Under the *Rural Fires (RF) Act* section 100B (s.100B), a Bush Fire Safety Authority (BFSA) from the NSW RFS is required for SFPP development. As such, an Integrated Development approval may be required under the *EP&A Act s.4.46*.

The maximum radiant heat level of 10kW/m^2 has not been demonstrated, and a bush fire attack level (BAL) associated with the development of the subject building is recommended to be BAL 40 to the north, east and west and BAL 29 to the south. It should be noted that all options were explored to best locate the proposal on the land to minimise bushfire risk, and the proposal provides enhanced resilience to bushfire attack.

This report makes recommendations in accordance with the aim, specific objectives, the intent and performance criteria of Chapter 6 of the NSW RFS document 'Planning for Bush Fire Protection' (PBP) (NSWRFS 2019). The recommendations address these, including:

- minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting
- provide an appropriate operational environment for emergency service personnel during firefighting and emergency management

- ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development
- ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants

Where all recommendations are implemented, the report concludes that the proposal can substantially comply with the aim, specific objectives, the intent and performance criteria of Chapter 6 of the NSW RFS document '*Planning for Bush Fire Protection*'.

Compliance Summary

This Assessment has been Certified by: Catherine Gorrie BPAD-Level 3 Accredited Practitioner FPAA Cert No: BPAD20751	
For the development of existing SFPP facilities – has a better outcome been achieved?	Yes
What is the recommended level of compliance with AS3959-2018?	BAL 40 to the north, east and west and BAL 29 to the south
Can this proposal comply with AS 3959-2018?	Yes
Does this development comply with the aim and objectives of PBP?	Yes
Is referral to the NSW Rural Fire Service (RFS) required?	Yes, a BFSA is required

List of Abbreviations

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2018, *Construction of Buildings in Bushfire Prone Areas*
BAL	Bushfire Attack Level
BPAD	Bushfire Planning and Design (Accreditation Scheme)
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Blue Mountains City Council
DA	Development Application
DEM	Digital Elevation Model
EP&A Act	*Environmental Planning and Assessment Act – 1979*
FDI	Fire Danger Index
FPAA	Fire Protection Association of Australia
IPA	Inner Protection Area
kW/m^2	Kilowatts per metre squared
LiDAR	Light Detection and Ranging
LPMA	Land & Property Management Authority
NCC	National Construction Code
OPA	Outer Protection Area
PBP	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act – 1997*
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SIX	Spatial Information Exchange
SWS	Static Water Supply

1. Introduction

This report has been commissioned by Catholic Education Office Diocese of Parramatta care of Chester Group Pty Ltd to provide a bush fire assessment for the proposed classroom building and upgrade to vehicular access at Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood.

The subject property is "bushfire prone land" as per the local Council bushfire prone land map as defined by section 10.3 (s10.3) of the *Environmental Planning & Assessment Act (EP&A) 1979* and therefore the requirements stipulated by legislation apply to any new development on the site.

Planning for Bush Fire Protection 2019 (Chapter 6) describes this type of development as "SFPP development" and therefore the requirements of s100B of the *RF Act* are applicable, and a BFSA is required to be issued by the NSW RFS. As such, an Integrated Development approval is required under the *EP&A Act s.4.46*.

It should be noted that all options were explored to best locate the proposal on the land to minimise bushfire risk, and the proposal provides enhanced resilience to bushfire attack when compared to the current situation.

The bush fire assessment and recommendations are derived from the *RF Act*, the Rural Fire Service document *Planning for Bush Fire Protection 2019* and Australian Standard 3959-2018 '*Construction of Buildings in Bushfire Prone Areas*'.

2. Purpose of this Report

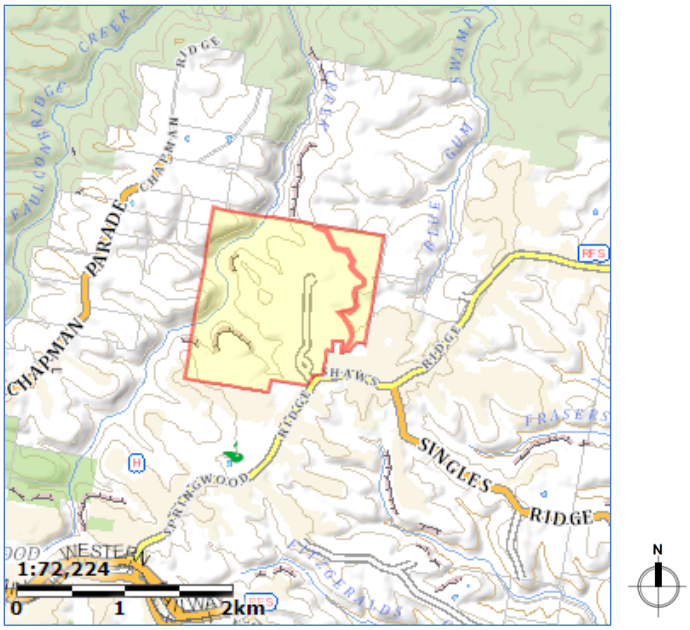
The purpose of this report is to provide the owners, the Consent Authority, the RFS and the Certifier with a description of the proposed development as well as the vegetation type, slope and any other factors influencing the likely bushfire behaviour, sufficient to show that the development will be protected from the likely bushfire threat as outlined in current legislation.

This assessment includes an analysis of the hazard, threat and subsequent risk to the development and provides recommendations that satisfy the aim and objectives of Planning for Bush Fire Protection.

3. Location

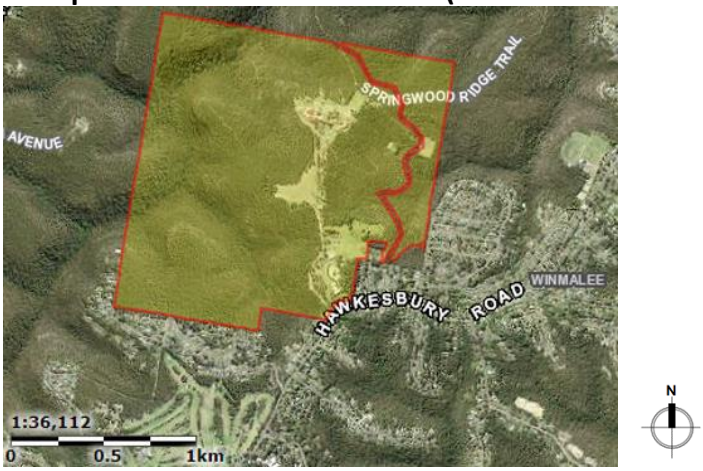
The site is located and known as Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood. The property is part of the Blue Mountains City local government area.

Figure 1. Location Map. Source: LPMA SIX Viewer (NSW Government 2022a)



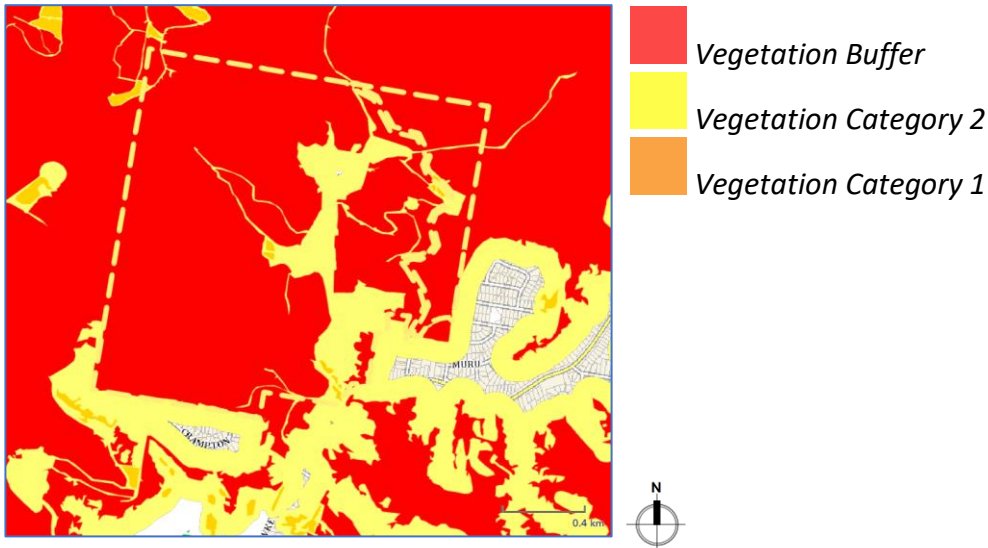
Site location outlined in red

Figure 2. Aerial Map. Source: LPMA SIX Viewer (NSW Government 2022a)



Site location outlined in red

Figure 3. Bushfire Prone Land Map: Source: NSW Planning Portal (NSW Government 2022a)



Site location denoted by pin

4. Property Description

The site comprises five (5) allotments which includes Lot 7 DP 1227290, Lots 1 and 2 DP 133438 Por. 56 and 57 DP 751635. St Columba's Catholic College is located on Lot 7 DP 1227290 which has an area of approximately 236.5 hectares (Figure 2). It is bounded by Hawkesbury Road to the approximate southeast, private allotments to the east, south and west and National Parks Land to the north.

The campus contains a Chapel, library, science laboratories, commercial kitchen, various school buildings including woodwork and metalwork workshops, music rooms, agriculture labs, produce gardens, playing fields, sports courts, parking areas and access driveways. The school is located at the culmination of an existing roadway of approximately 1.1km in length.

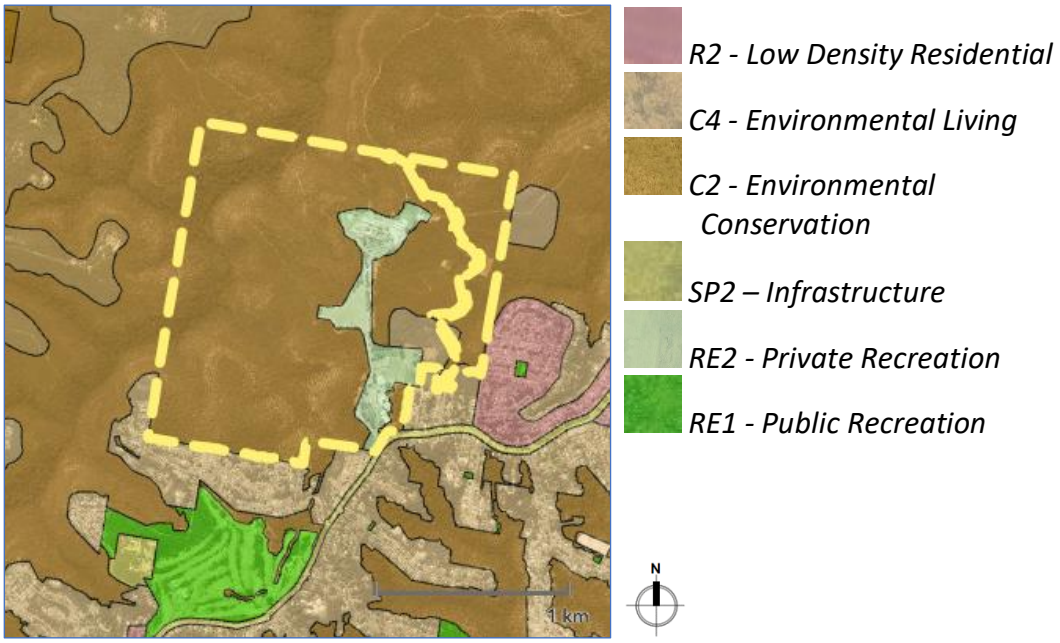
4.1 Zoning

The land is zoned C2: Environmental Conservation, C4: Environmental Living, RE2: Private Recreation, and SP2: Infrastructure under Blue Mountains Local Environmental Plan 2015. Adjacent lands are similarly zoned (Figure 4).

The lot is affected by a LEP 2015 Heritage (100%) WL001 - St Columba's College (buildings and interiors, grounds, gates and remains of Elmhurst), Protected Area - Riparian Land (0.07%), Protected Area – Watercourse (0%), Protected Area - Slope Constraint Area (0.39%),

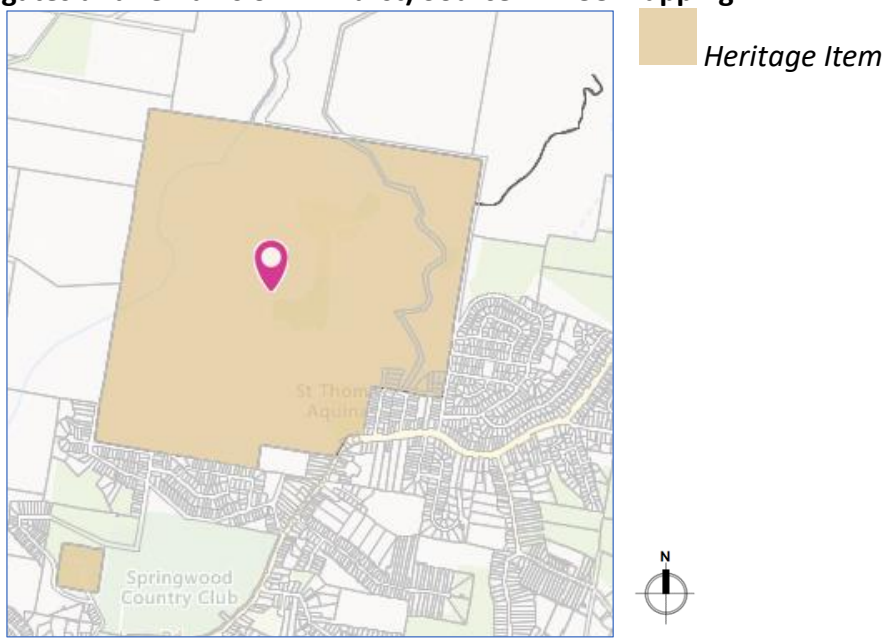
Protected Area – Ecological Buffer Area (4.52%), and Protected Area – Vegetation Constraint Area (0.29%) (Figures 5 - 8).

Figure 4. Zoning Map. Source: NSW Government Planning Viewer (NSW Government 2022b)



Site location outlined in yellow

Figure 5: LEP 2015 Heritage WL001 - St Columba's College (buildings and interiors, grounds, gates and remains of Elmhurst) Source: BMCC Mapping



Site location denoted by pin

Figure 6: Protected Area - Riparian Land and Watercourse Source: BMCC Mapping

Site location denoted by pin

Figure 7: Protected Area – Slope Constraint Source: BMCC Mapping

Site location denoted by pin

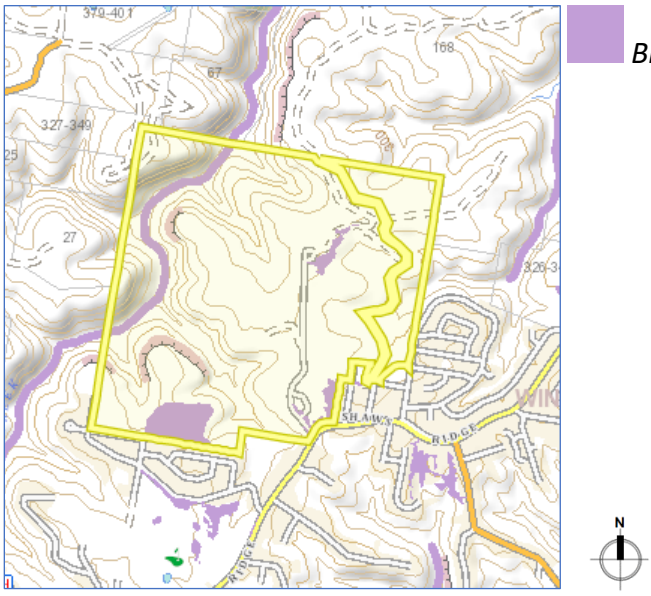
Figure 8: Protected Area – Ecological Buffer and Vegetation Constraint
Source: BMCC Mapping

Site location denoted by pin

4.2 Biodiversity Values

A search of the NSW Office of Environment and Heritage's Biodiversity Values Map (NSW Government 2022c) has been carried out which indicates land with high biodiversity value, as defined by the *Biodiversity Conservation Regulation 2017*. The development, including the required APZs and access are wholly located outside the mapped area.

Figure 9: Biodiversity Values Map: NSW Office of Environment and Heritage
https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap



Site location outlined in yellow

4.3 The Proposal

The proposal is for a new school building to replace the existing demountable buildings. The proposed building comprises two storeys, a covered outdoor learning area, seating area, specialist art and technology facilities, storages rooms and amenities on the ground floor and general learning areas, enclosed circulation and break out spaces on the first floor. The development also includes an upgrade to the vehicular access. In terms of the NCC, the classification of the building is Class 9b.

5. Site Assessment

Bushfire Consulting Services Pty Ltd attended the site on 2 May 2022. The assessment relates to the new development shown in the site plans (reference Appendix 1 below). The NSW Spatial Services mapping website has also been used as a reference (NSW Government 2022a), and 'Ocean Shores to Desert Dunes' by David Keith (Keith 2004), in determining the vegetation type.

6. Bush Fire Attack Assessment

6.1 Determine Vegetation Formations

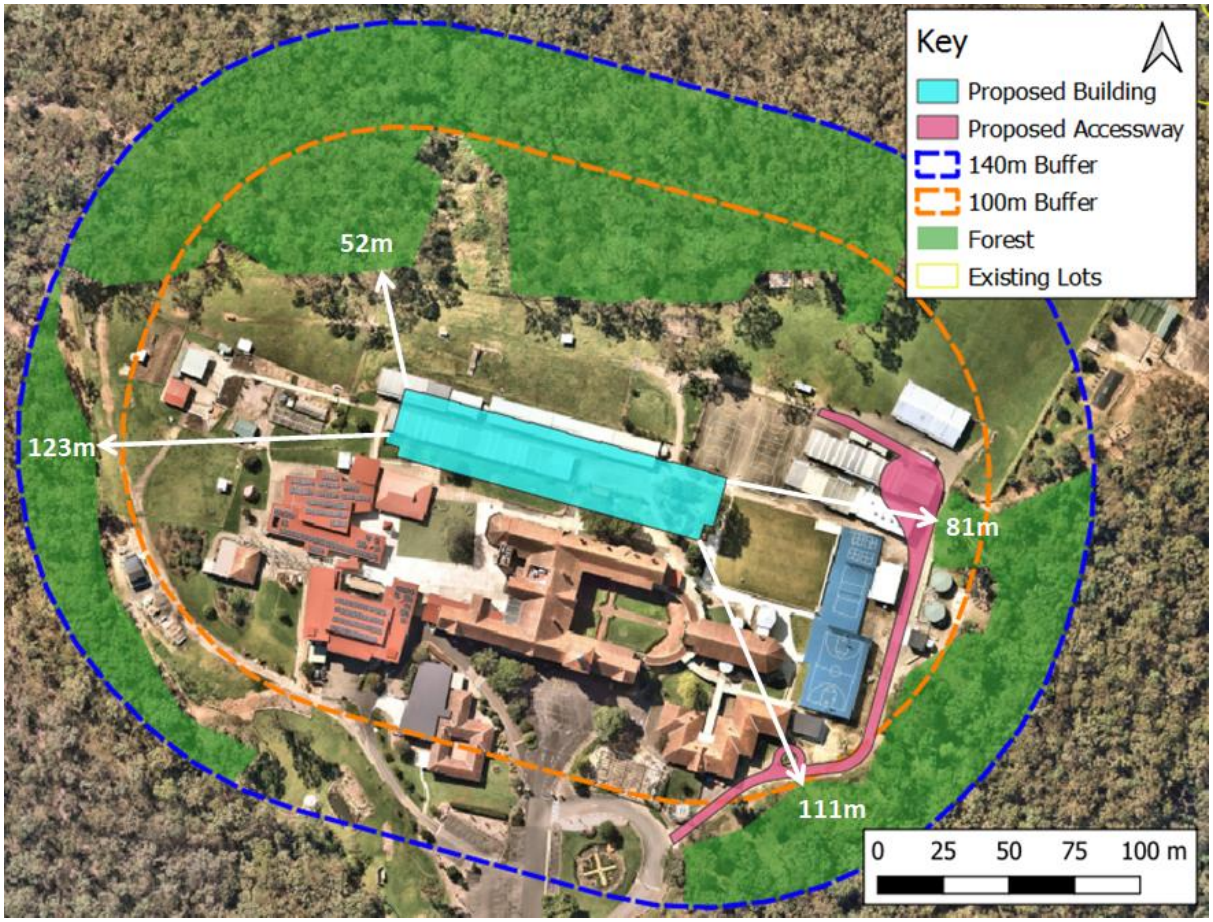
The hazardous vegetation formations for each aspect of the development within 140m of the asset have been identified according to Keith (2004). The bushfire threat emanates from bushland located to the north, east, south, west and northwest of the subject building. This vegetation is within the subject site boundaries. The vegetation to the south and west is >100m from the proposal and is not assessed further.

Within the 140m study area, lands to the approximate east, south and west contain existing buildings of the school campus with curtilages comprising paved areas, internal roads, managed lawns, shrubs, occasional trees, playing fields and similar. These areas are not classified as hazardous and are not considered further in this report (Figure 10).

Based on a site visit and determination of vegetation formation using the Keith (2004) Identification Key, the primary bushland vegetation having the potential to affect the subject building is most representative of Forest in all directions.

To the north, south and west of the proposed works is an area of existing previously approved IPA and OPA as shown in Figure 10 (reference Bushfire Management Advice by Molino Stewart dated 31 May 2021).

Figure 10. Hazardous vegetation affecting the subject building. Source: NearMap (2022) with overlays by BFCS P/L



Vegetation was assessed to a distance of 140m from the subject building

6.2 The effective slope

The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the level of radiant heat flux. The effective slope of the land from the new building for a distance of 100m is derived from a site assessment combined with the most detailed contour data available. The slope is then categorised into one of following classes, relative to the location of the hazard:

all upslope vegetation (considered 0 degrees)

>0 to 5 degrees downslope vegetation

>5 degrees to 10 degrees downslope vegetation

>10 degrees to 15 degrees downslope vegetation, and

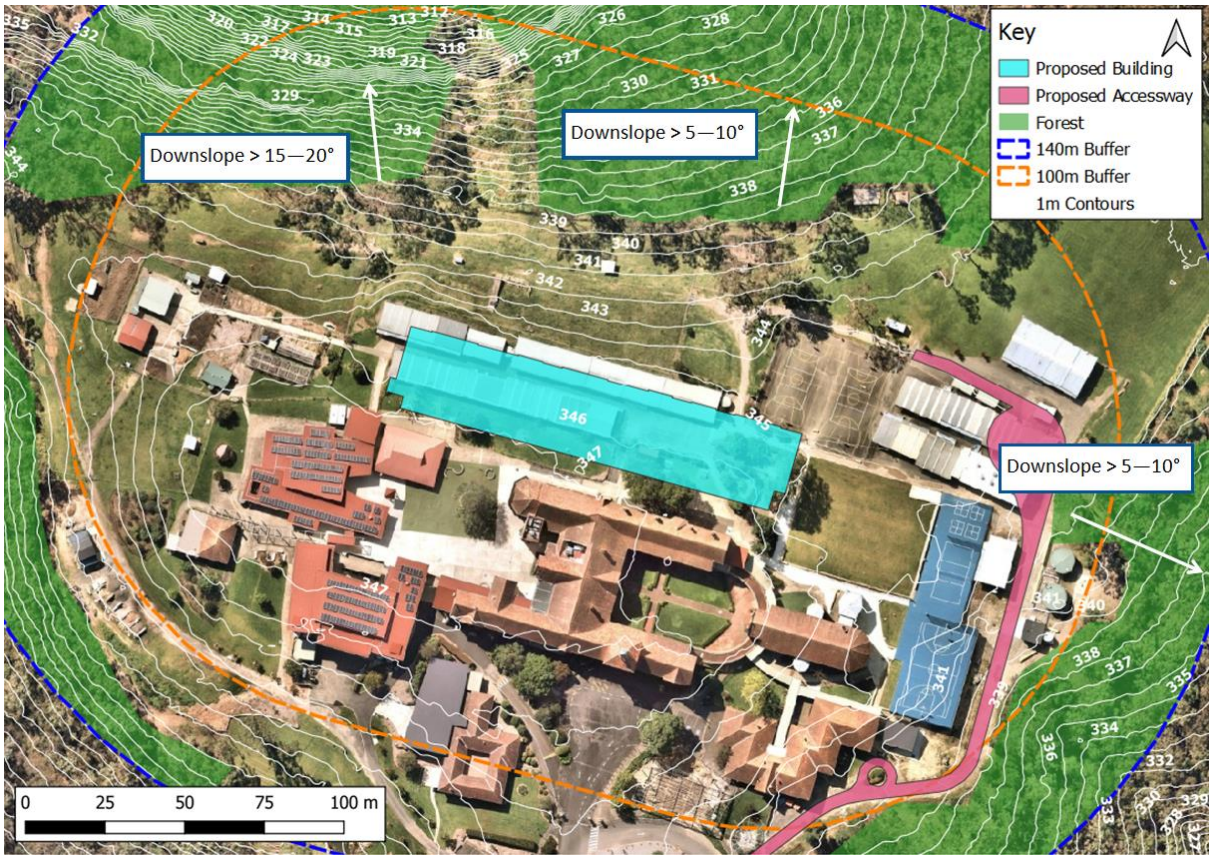
>15 degrees to 20 degrees downslope vegetation.

1m DEM data is sourced from NSW Spatial Services which is captured using LiDAR and has a horizontal accuracy of 0.3m and vertical accuracy of 0.8m at 95%.

The effective slope has been measured manually on site over a distance of 100m from the proposed development where accessible, under the classified vegetation community constituting the hazard. The slope was found to be consistent with the topographical information from NSW Spatial Services LiDAR data.

Direction from Building Footprint	Slope Description
North	Downslope > 5 - 10°
East	Downslope > 5 - 10°
South	N/A
West (northwest)	Downslope > 15 - 20°

Figure 11. Slope Diagram. Source: NearMap (2022) and LiDAR (NSW Government 2022a) with overlays by BFCS P/L



1m contours
North slope is ((339-334)/31.74) x 1/tan = Downslope 8.95°
East slope is ((342-337)/43.66) x 1/tan = Downslope 6.53°
Northwest slope is ((338-325)/39.6) x 1/tan = Downslope 18.2°

6.3 Fire Weather

The development is located in the Blue Mountains City Council area, a part of the Greater Sydney Region, which has a Fire Danger Index of 100.

6.4 Determination of APZs

An Asset Protection Zone (APZ) is a fuel-reduced area surrounding a built asset or structure. An APZ provides a buffer zone between a bush fire hazard and an asset and an area of reduced bush fire fuel that allows suppression of fire. It also provides an area from which backburning or hazard reduction can be conducted, and allows emergency services access as well as providing a relatively safe area for firefighters and owners to defend their property.

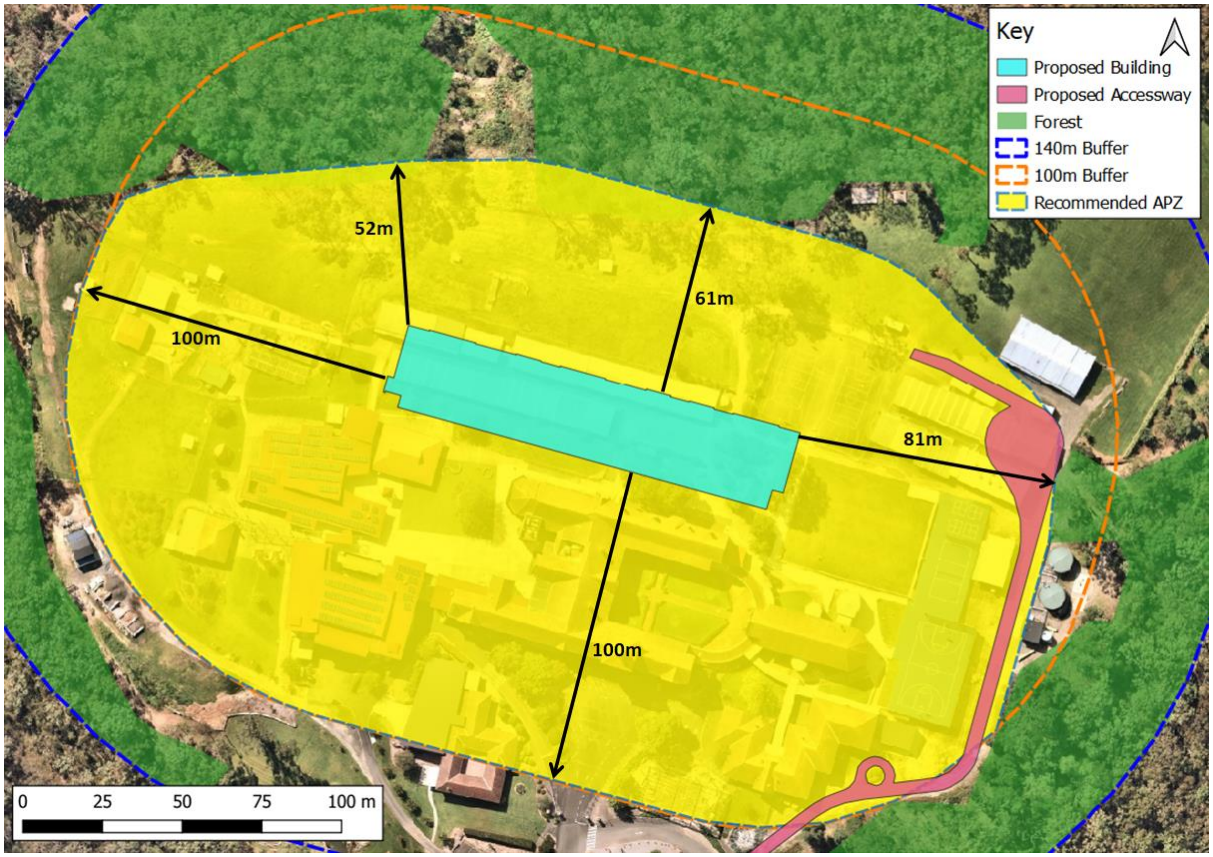
Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy. PBP has minimum specifications for APZs to be established around a building to be managed as an Inner Protection Area (IPA), and in Forest and Woodland situations, there is also an allowable Outer Protection Area (OPA).

An IPA should provide a tree canopy cover of less than 15% and have minimal fine fuel at ground level, the grass mowed on a frequent basis, trees and shrubs retained as clumps or islands and do not take up more than 20% of the area, trees and shrubs located far enough from buildings so that they will not ignite the building, garden beds with flammable shrubs not located under trees or within 10 metres of any windows or doors, minimal plant species that keep dead material or drop large quantities of ground fuel, tree canopies not located within 2 metres of the building, trees separated by 2-5 metres and do not provide a continuous canopy from the hazard to the building, and lower limbs of trees removed up to a height of 2 metres above the ground.

PBP requires APZs for schools to meet a radiant heat level of less than 10kW/m^2. PBP 6.4 allows for development of existing SFPPs to be considered with an appropriate combination of BPMs. It is not possible to meet the 10kW/m^2 standard and therefore the aim is to achieve the greatest possible separation from the hazard, combined with commensurate construction requirements for the new works.

Construction commensurate with the available APZ is proposed. The lot is to be managed as an IPA from the proposed classroom for a distance of 61m to the northeast, 81m to the east, 100m to the south and west and 52m to the northwest. Vegetation modification is required to the north and northwest to comply with the previously approved IPA.

Figure 12. APZ Diagram. Source: NearMap (2022) and LiDAR (NSW Government 2022a) with overlays by BFCS P/L



7. SFPP Bushfire Protection Measures

7.8 APZs and building construction

Intent of measures: to provide suitable building design, construction and sufficient space to ensure that radiant heat levels do not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants.

(Adapted from PBP Table 6.8a – Performance criteria and acceptable solutions for APZs and construction for SFPP development)

Performance Criteria	Acceptable Solutions
Radiant heat levels of greater than 10kW/m² (calculated at 1200K) will not be experienced on any part of the building	Does not comply, however PBP makes provision for existing SFPPs to be treated per Infill Development (PBP 6.4) and an appropriate combination of measures are proposed
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	APZs are located on lands with a slope less than 18 degrees
APZs are managed to prevent the spread of fire to the building	APZs are managed in accordance with PBP Appendix 4
APZs are provided in perpetuity	The APZ is wholly within the boundaries of the development site
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Landscaping is to be in accordance with Appendix 4 All new fences are to be non-combustible material only
The proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact	A construction level of 40 to the north, east and west and BAL 29 to the south and section 7.5 of PBP is applied

7.9 Identify Construction Requirements

The appropriate construction requirements for the development are determined by matching the relevant FFDI, vegetation type, the distance measured from the edge of the unmanaged vegetation to the closest external wall to identify the BAL using the relevant tables from PBP. These construction requirements are located in section 3 of AS3959-2018. These requirements are varied by the applicable additional construction requirements of PBP section 7.5.

PBP Table A1.12.5 Determination of BAL, FFDI 100 – residential developments

Aspect	Distance from hazard	Vegetation Classification	Effective Slope Under Classified Vegetation	Bushfire Attack Level (BAL) required
North	61m	Forest	Downslope > 5 - 10°	BAL 40
East	81m	Forest	Downslope > 5 - 10°	BAL 40
South	>100m	N/A	N/A	BAL 29*
West (northwest)	52m	Forest	Downslope > 15 - 20°	BAL 40

* Due to shielding see 7.10

The assessment indicates that the subject building will experience radiant heat levels of <40kW/m^2 as a result of foreseeable local bushfires under conditions of an FDI of 100. The expected radiant heat levels translate to a Bushfire Attack Level (BAL) on the building of BAL 40. Construction of any new development to BAL 40 specifications is 'primarily concerned with protection from ember attack and radiant heat up to and including 40kW/m^{2}'.

7.10 Reduction in BAL due to Shielding (PBP A1.8)

Where an elevation is shielded from direct radiant heat arising from bush fire attack, then the construction requirements for that elevation can be reduced to the next lower BAL. An elevation is considered to not be exposed to the source of bush fire attack if the line of sight between that elevation and the source of bush fire attack are obstructed by another part of the building.

The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs.

In this instance, the south aspect of the development will be fully shielded from exposure to the source of the greatest bushfire attack by the building itself. Therefore the BAL for the south elevation can be reduced by one level to BAL 29.

Figure 12. Shielding Diagram for the Subject Building. Source: NearMap with overlays by BFCS P/L

8. Bush Fire Protection Measures

The BPMs for residential infill development include provisions relating to APZs, access, water supply, electricity and gas services, construction standards, landscaping and emergency evacuation.

8.1 Asset Protection Zones

PBP Table 7.4a Performance criteria and acceptable solutions for residential infill development

Performance Criteria	Acceptable Solutions/Comment
APZs are provided commensurate with the construction of the building	Construction commensurate with the available APZ is proposed and the lot is to be managed as an IPA from the building for a distance of 61m to the northeast, 81m to the east, 100m to the south and west and 52m to the northwest

Performance Criteria	Acceptable Solutions/Comment
A defendable space is provided	Achieved as adequate defendable space is available to the front of the subject building and pedestrian firefighter access is available to the rear
APZs are managed and maintained to prevent the spread of a fire to the building	Achieved as the APZs are to be managed in accordance with the requirements of Appendix 4 of PBP
The APZ is provided in perpetuity	Achieved as APZs requirements will be specified in the Development Consent conditions
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised	Achieved as the APZ is located on lands with a slope less than 18 degrees. The slope under the site APZ is <18°

8.2 Access

Performance Criteria	Acceptable Solutions/Comment
Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation	Achieved as property access roads are two-wheel drive, all-weather roads and access is being upgraded to allow emergency vehicles to access the north eastern corner of the lot and a suitable turning area is proposed
The capacity of access roads is adequate for firefighting vehicles	Achieved as it is assumed that the capacity of road surfaces is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes)
There is appropriate access to water supply	Achieved as the site is equipped with a fire fighting water reservoir and pump and there is suitable access for a Category 1 fire appliance to within 4m of the static water supply

Performance Criteria	Acceptable Solutions/Comment
Firefighting vehicles can access the development and exit the property safely	Achieved as access is improved by this application and there is a minimum 4m carriageway width and passing bays are located every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay. There is a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress Property access provides for a suitable turning area in accordance with Appendix 3 of PBP The minimum distance between inner and outer curves is 6m The crossfall is not more than 10 degrees Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads

8.3 Water Supplies

Performance Criteria	Acceptable Solutions/Comment
An adequate water supply is provided for fire-fighting purposes	Achieved as reticulated water is provided to the development and two tanks are located at the east of the development with a pump and hydrant ring, included in a previous application
Water supplies are located at regular intervals	Achieved as fire hydrant spacing, design and sizing are assumed to comply with the relevant clauses of AS 2419.1:2005
The water supply is accessible and reliable for fire fighting operations	Achieved as hydrants are not located within any road carriageway and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads (assumed)
Flows and pressure are appropriate	Achieved as fire hydrant flows and pressures are assumed to comply with the relevant clauses of AS 2419.1:2005

Performance Criteria	Acceptable Solutions/Comment
The integrity of the water supply is maintained	Achieved as any new above-ground water service pipes external to the building are to be metal, including and up to any taps

8.4 Electricity Services

Performance Criteria	Acceptable Solutions/Comment
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings	N/A as electricity supply is existing

8.5 Gas Services

Performance Criteria	Acceptable Solutions/Comment
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	Where applicable, reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side, connections to and from gas cylinders are metal Polymer-sheathed flexible gas supply lines are not used, and above-ground gas service pipes are metal, including and up to any outlets

8.6 Construction Standards

Performance Criteria	Acceptable Solutions/Comment
The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact	BAL 40 to the north, east and west and BAL 29 to the south has been determined in accordance with PBP Table A1.12.5 The additional construction requirements of section 7.5 of PBP are to be incorporated into the development and are provided as an Appendix
Proposed fences and gates are designed to minimise the spread of bush fire	Any new fences and gates are to be constructed from non-combustible material only
Proposed Class 10a buildings are designed to minimise the spread of bush fire	There are no bush fire protection requirements for Class 10a buildings located more than 6m from a dwelling in bush fire prone areas. Where a Class 10a building is located within 6m of a dwelling it must be constructed in accordance with the NCC

8.7 Landscaping

Performance Criteria	Acceptable Solutions/Comment
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	Achieved as any landscaping within the APZ is to comply with the NSW RFS 'Asset protection zone standards' (PBP Appendix 4) A clear area of low-cut lawn or pavement is maintained adjacent to the house, and Trees and shrubs are located so that: ▪ The branches will not overhang the roof; ▪ The tree canopy is not continuous; and ▪ Any proposed windbreak is located on the elevation from which fires are likely to approach

9. Objectives for development of existing SFPP facilities

The objectives that apply to existing SFPP development are as follows:

(adapted from PBP section 6.4)

Objectives for Development of existing SFPP facilities	Compliance / Comments
Provide an appropriate defendable space	Achieved as adequate defendable space is available to the north of the subject buildings and pedestrian firefighter access is available to the east, south and west
Site the building in a location which ensures appropriate separation from the hazard to minimise potential for material ignition	New construction commensurate with the bushfire risk is proposed and the new building is sited further from the hazard than the demountables it is replacing. Extensive research has been carried out to best site the building in relation to bushfire risk and the only available option located
Provide a better bush fire protection outcome for existing buildings	Upgrades to existing buildings has progressively been carried out since the 2013 fires with the main building being ember protected and fitted with internal sprinklers and other buildings being constructed to AS3959-2009. The new building is replacing demountables and provides a far superior level of bushfire protection than currently exists
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 PBP section 6.8)	All options were considered for the development and the proposal provides for the only feasible building location

Objectives for Development of existing SFPP facilities	Compliance / Comments
Ensure there is no increase in bush fire management and maintenance responsibility on adjoining land owners without their written confirmation	Complies
Ensure building design and construction enhances the chances of occupant and building survival	Achieved as new works shall be constructed to the specifications of AS3959-2018 BAL 40 to the north, east and west and BAL 29 to the south. The additional construction requirements of section 7.5 of PBP are to be incorporated into the development and are provided as an Appendix The new building can also accommodate the entire school population, being the most bushfire resistant building on the campus
Provide for safe emergency evacuation procedures including capacity of existing infrastructure	Achieved as a Bush Fire Emergency Management and Evacuation Plan is to be prepared, or the existing plan revised

10. Likely Impact of any BPMs

The proposed bushfire protection measures will not adversely impact on the environment. It should be noted that this report has not focused on environmental issues and as such they may require further specialist investigation.

11. Recommendations

The following recommendations are made for the bushfire measures for the proposed residential development of a classroom building and upgrade to vehicular access at Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood, and are based upon the relevant provisions of the NSW Rural Fire Service Guideline entitled *Planning for Bush Fire Protection 2019*.

1. Asset Protection Zones

At the commencement of the development, and in perpetuity, the site shall continue to be managed as an Inner Protection Area (IPA) Asset Protection Zone from the new building for a distance of 61m to the northeast, 81m to the east, 100m to the south and west and 52m to the northwest, as outlined in PBP 2019 Appendix 4.

Trees

- 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 ground
- canopies should be separated by 2 to 5m
- preference should be given to smooth barked and evergreen trees

Shrubs

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

Grass

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

2. Access

Access is to meet the acceptable solutions identified in Table 7.4a of *Planning for Bush Fire Protection*.

- Property access roads are two-wheel drive, all-weather roads
- The capacity of road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes)
- There is suitable access for a Category 1 fire appliance to within 4m of the static water supply
- A minimum 4m carriageway width
- A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches
- a suitable turning area in accordance with Appendix 3 of PBP
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- The crossfall is not more than 10 degrees
- Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.

3. Construction Standards

New construction shall comply with Sections 3 and 8 (BAL 40) to the north, east and west and Sections 3 and 7 (BAL 29) to the south of AS3959-2018 *'Construction of buildings in bush fire-prone areas'*, as varied by the applicable additional construction requirements of PBP section 7.5 (shown as Appendix 4 below).

4. Gas Services

Where applicable, reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 *The storage and handling of LP Gas* and the requirements of relevant authorities, and metal piping is used.

All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side, connections to and from gas cylinders are metal.

Polymer-sheathed flexible gas supply lines are not used, and above-ground gas service pipes are metal, including and up to any outlets.

5. Fences and gates

All new fences and gates are to be constructed from non-combustible material only.

6. Landscaping

Any new landscaping within the APZ is to comply with the NSW RFS '*Asset protection zone standards*' (PBP Appendix 4).

7. Emergency and Evacuation Planning

The need to formulate an emergency evacuation plan is suggested. To do so, occupants can complete a Bush Fire Safety Plan on the NSW RFS Website http://www.rfs.nsw.gov.au/ under publications / bushfire safety.

12. Summary

This report consists of a bush fire assessment for the proposed classroom building and upgrade to vehicular access at Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood. The report concludes that the proposed development is on designated bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable.

This report has considered all the elements of bushfire attack and finds that the development has a Bushfire Attack Level of 40 to the north, east and west and BAL 29 to the south. The development satisfies the Objectives and Performance requirements of '*Planning for Bush Fire Protection*' 2019, subject to implementation of the recommendations made by this report.

It should be noted that all options were explored to best locate the proposal on the land to minimise bushfire risk, and the proposal provides enhanced resilience to bushfire attack.

Notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains and although the standard is designed to improve the performance of such buildings, there can be no guarantee because of the variable nature of bushfires that any one building will withstand bushfire attack on every occasion.

This report is a bush fire assessment that provides the required information to assist local Council in determining compliance in accordance with Planning for Bush Fire Protection and AS3959-2018. The local Council is the final consenting authority and the construction of the building must comply with the recommendations included in the Council's conditions of consent.

Catherine Gorrie

(a person who is recognised by the NSW Rural Fire Service as a suitably qualified consultant in bush fire risk assessment)

Accredited Bushfire Planning and Design Practitioner

Fire Protection Association Australia BPAD-Level 3 (BPAD 20751)

Grad Dip Bushfire Protection (UWS 2010)

Diploma Environmental Health & Building Surveying (TAFE 2005)

Corporate Bronze Member Fire Protection Association Australia

Bushfire Consulting Services Pty Ltd

Tel: 02 4744 5800 | Mob: 0425 833 893

13. References

Keith D 2004, *Ocean Shores to Desert Dunes, the Native Vegetation of NSW and the ACT,* Department of Environment and Conservation, Sydney

NearMap 2022, *NearMap Photomap Aerial Imagery*, NearMap Australia, Barrangaroo, NSW

NSW Government 2022a, *NSW Spatial Services*, NSW Department of Finance, Services and Innovation.

NSW Government 2022b, *NSW Planning Portal*, NSW Department of Planning and Environment.

NSW Government 2022c, *Biodiversity Values Map*, NSW Department of Environment and Heritage.

NSW RFS 2019, *Planning for Bush Fire Protection*, NSW Rural Fire Service, Sydney.

Standards Australia 2018, *Australian Standard AS 3959-2018 'Construction of Buildings in Bushfire Prone Areas'*, SAI Global, Australia.

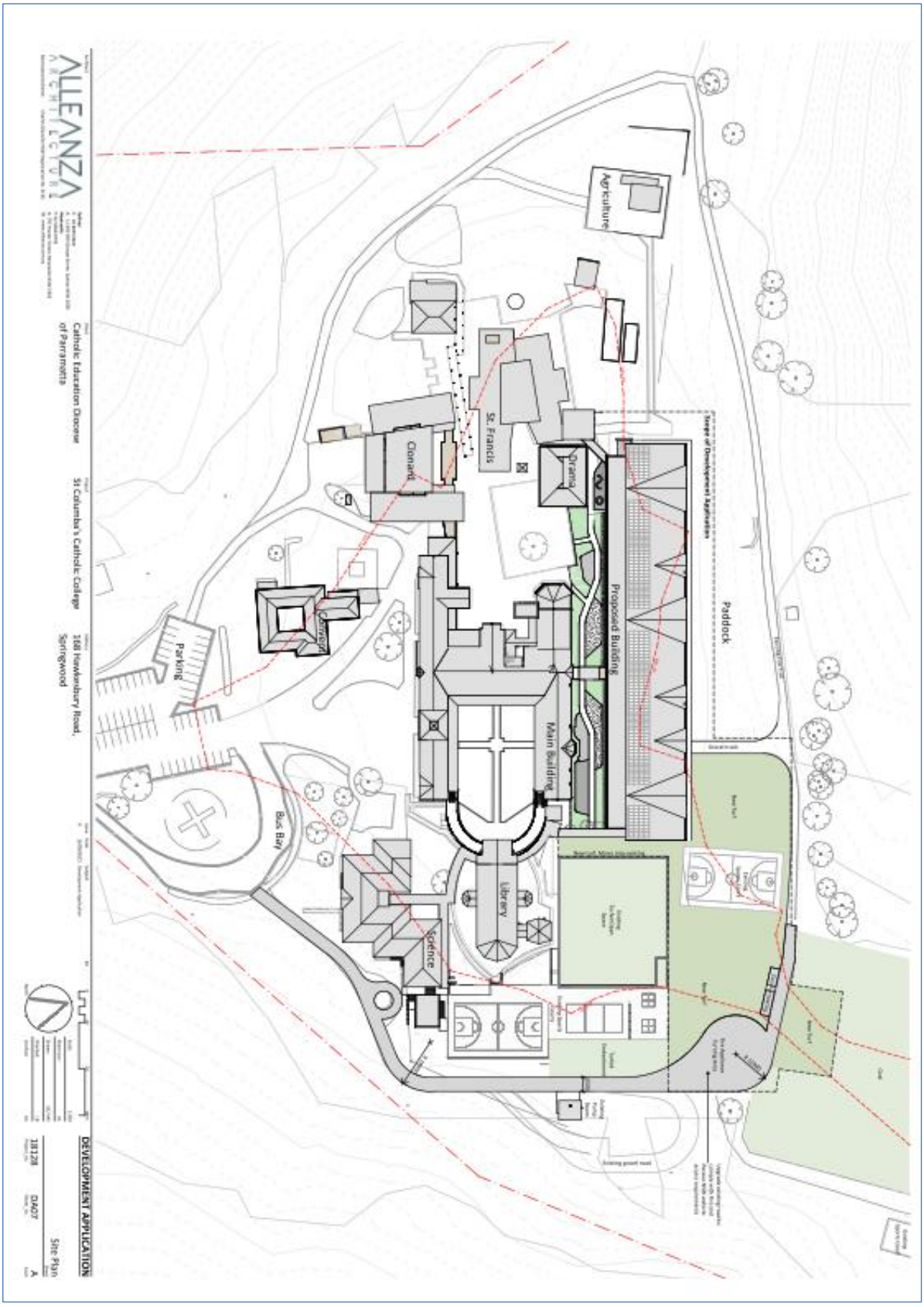
14. Legislation

Environmental Planning & Assessment Act 1979

Rural Fires Act 1997

Rural Fires Regulation 2013

Appendix 1 - Site Plan



Appendix 2 – Photos of Site and Surrounds

Source: BFCS P/L 02/05/2022

Subject site

Existing access to be upgraded

Proposed building location

Vegetation to the east, approximately 81m from the proposal

Vegetation to the south >100m from the proposal

Vegetation to the northwest, approximately 52m from the proposal

Vegetation to the west >100m from the proposal

Appendix 3 – Bushfire Risk Assessment Certificate

This form is completed by a recognized consultant in bushfire risk assessment in accordance with section s4.14 of the *Environmental Planning and Assessment Act 1979 No 203*

PROPERTY ADDRESS:	Lot 7 DP 1227293, St Columba's Catholic College, 168 Hawkesbury Road Springwood
DESCRIPTION OF PROPOSAL:	Classroom building and upgrade to vehicular access
PLAN REFERENCE: (relied upon in report preparation)	Plans by Alleanza Architecture numbered 18128 issue A dated 16/08/2021
BAL RATING	BAL 40 to the north, east and west and BAL 29 to the south (If the BAL rating is FZ the application is to be referred to NSW RFS for assessment)
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	YES NO (Circle the relevant response) (If YES the application is to be referred to NSW RFS for assessment)

I, Catherine Gorrie, of Bushfire Consulting Services Pty Ltd, have carried out a bushfire risk assessment on the above mentioned proposal and property. A detailed Bushfire Assessment Report is attached which includes the submission requirements set out in Appendix 2 of *Planning for Bushfire Protection 2019* together with recommendations as to how the relevant specifications and requirements are to be achieved.

REPORT REFERENCE:	J22/0334
REPORT DATE:	25/05/2022
CERTIFICATION NO/ACCREDITED SCHEME:	BPAD-Level 3 Accredited Practitioner FPAA Cert No: BPAD20751

Note: this certificate must be completed and signed by a person recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment in accordance with s4.14 of *the EP&A Act 1979* No 203.

****

I hereby certify, in accordance with Section 4.14 of the Environmental Planning and Assessment Act 1979 No 203:

That I am a person recognised by the NSW Rural Fire Service as a qualified consultant in bushfire risk assessment; and

That subject to the recommendations contained in the attached Bushfire Risk Assessment Report the proposed development conforms to the relevant specifications and requirements*.

* The relevant specifications and requirements being; specifications and requirements of the document entitled Planning for Bush Fire Protection prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other document as prescribed by Section s4.14 of the *Environmental Planning and Assessment Act 1979 No 203.*

I am aware that the bush fire assessment report, prepared for the above mentioned site is to be submitted in support of a development application for this site and will be relied upon by Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bush Fire Protection 2019*.

Attachments:

☑ Bush Fire Risk Assessment Certificate

☑ Recommendations

☑ Statement of vegetation impact in relation to APZ

SIGNATURE:

DATE: 25/05/2022

Appendix 4 - Modifications of section 7.5 of PBP

7.5 Additional construction requirements

To ensure the performance criteria for construction standards given in section 7.4 can be met, PBP adopts additional measures over and above AS 3959 and NASH Standard as follows:

- construction measures for ember protection at BAL-12.5 and BAL-19 provided by AS 3959
- construction measures for development in BAL-FZ; and
- requirements over and above the performance criteria contained within AS 1530.8.1 and AS 1530.8.2 apply in regards to flaming.

7.5.1 Ember protection

Based on the findings from the 2009 Victorian Bush Fires Royal Commission, PBP aims to maintain the safety levels previously provided by AS 3959:1999 in relation to ember protection at lower Bush Fire Attack Levels.

In particular, the areas addressed are in relation to:

- sarking;
- subfloor screening;
- floors;
- verandas, decks, steps, ramps and landings;
- timber support posts and beams; and
- fascias and bargeboards.

7.5.2 NSW State Variations under G5.2(a) (i) and 3.10.5.0(c)(i) of the NCC

Certain provisions of AS 3959 are varied in NSW based on the findings of the Victorian Bush Fires Royal Commission and bush fire industry research.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC;

- clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:
    - be non-combustible; or

- comply with AS/NZS 4200.1, be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and

- clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
- clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL; and
    - fascias and bargeboards, in BAL-40, shall comply with:
    - clause 8.4.1(b) of AS 3959; or
    - clause 8.6.6 of AS 3959.