

Appendix G15

Bush Fire

Assessment Report

Environmental

Impact Statement

for Alterations and Additions to
St Philip's Christian College,
Cessnock

BUSHFIRE ASSESSMENT REPORT

ALTERATIONS AND ADDITIONS TO EXISTING SCHOOL

**LOT 1 DP 126765, Lot 1 DP 744377,
Lot 2 DP 600895 and Lot 518 DP 837571**

10 Lomas Lane and 210 Wine Country Drive, Nulkaba

Date: **20/1/2022**

Prepared for: **St Philips Christian College**

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed school alterations and additions against the requirements of Planning for Bush Fire Protection (2019) and specific measures identified by New South Wales Rural Fire Service in SEARS SSD-10360337.

This report establishes that the development is capable of complying with the acceptable solutions of Planning for Bush Fire Protection (2019).

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	St Philips Christian College		
Site Address	10 Lomas Lane and 210 Wine Country Drive, Nulkaba	Lot/Sec/DP	Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571
Local Government Area	Cessnock	FDI	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	Alterations and Additions to Existing School	Type of Area	Farmland/Vineyard
Special Fire Protection Purpose	Yes. Special Fire Protection Purpose as Infill	Flame Temperature	1200K
Application Complies with Acceptable Solutions	Yes	Referral to RFS required	Yes. Bushfire Safety Authority Required

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	North	East	South	West
Vegetation Structure	Remnant Vegetation < 1 hectare in size	Forest	Grassland	Grassland
Asset Protection Zone	70 metres or greater	67 metres or greater	> 50 metres	> 50 metres
Slope Range	Level	Level	1 to 5 degrees downslope	Level/Upslope
PBP (2019) Table A1.12.1 Minimum Setbacks	38 metres	67 metres	N/A	N/A
AS3959 (2018) Bushfire Attack Level (BAL)	BAL-12.5	BAL-12.5	BAL-LOW	BAL-LOW

TABLE 3 – PLANNING FOR BUSH FIRE PROTECTION (2019) SECTION 6 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2019) Table A1.12.1 and are able to be achieved within the subject site.	Acceptable Solution
Landscaping	Landscaping shall be in accordance with Planning for Bush Fire Protection (2019) Appendix 4; and fencing is constructed in accordance with section Planning for Bush Fire Protection (2019) 7.6.	Acceptable Solution
Construction	Construction level of BAL-12.5 under AS 3959 or NASH Standard and section 7.5 of Planning for Bush Fire Protection (2019) is applied where the building is within 100 metres of bushland or 50 metres of grassland.	Acceptable Solution
Access – Internal Roads	The internal access roads shall comply with Planning for Bush Fire Protection (2019) Section 6 property access provisions.	Acceptable Solution
Water Supply	The fire hydrant network shall be extended in accordance with AS 2419.1.	Acceptable Solution
Electrical Supply	The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002). Electrical supply onsite is recommended to be located underground.	Acceptable Solution
Gas Supply	Any proposed gas supply will be located underground.	Acceptable Solution
Emergency and Evacuation Planning	The proposed buildings, open structures and sporting fields shall be included in an emergency management plan for the school which complies with AS 3745-2010 Planning for emergencies in facilities and have specific consideration for bushfire.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed Alterations and Additions to Existing School, to be constructed at Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571, 10 Lomas Lane and 210 Wine Country Drive, Nulkaba.

Development on Bush Fire Prone Land must satisfy the aim and objectives of Planning for Bush Fire Protection (2019). The aim of Planning for Bush Fire Protection is to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, onsite amenity and protection of the environment.

More specifically, the objectives are to:

- (i) Afford occupants of any building adequate protection from exposure to a bush fire;
- (ii) Provide for a defensible space to be located around buildings;
- (iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- (iv) Ensure that safe operational access and egress for emergency service personnel and residents is available;
- (v) Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and
- (vi) Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2019) to reduce the risk of ignition of the school in a bushfire event and provide safe refuge.

2.2 PROPOSED DEVELOPMENT

The land is zoned RU2 Rural Landscaping and is comprised of four allotments totalling 41.8 hectares in size. The proposed development comprises alterations and additions to the existing St Philips Christian College Cessnock Campus. Consent is sought for the following:

- New indoor aquatic centre
- New 'Narnia' pre-school and early learning centre;

- New building for 'DALE' special school
- New building for administration and welcome centre;
- New performing arts centre building;
- New middle school building (2 modules);
- Extension to existing junior school building;
- Extension to existing senior school to include three new building modules including a library;
- Extension to the hub building and retrofit for canteen/cafeteria and IT services
- Extension to staff and hospitality/trade training building;
- Extension to sports hall building
- Extension to switch board building to accommodate a café
- Road upgrades to Lomas Lane including provision of bus bays and bus layover area;
- Additional vehicular access to the site from Wine Country Drive;
- Increase in student numbers to 1,700.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

The only known significant environmental feature is that mapped waterways extend through the site.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

A preliminary Aboriginal Heritage Assessment was undertaken by AECOM at the site in December 2008. There is the potential for archaeological material to exist within the site with a preliminary predictive model for the area suggesting that open sites, in the form of stone tool artefact scatters or isolated finds, may occur within 100m of Black Creek or within 50m of a low stream-order tributary or on basal slopes in close proximity to reliable water courses.

It is likely that any subsurface deposits have been subjected to disturbance, which may mitigate their cultural heritage value. Areas of the study area greater than 100m from Black Creek or greater than 50m from one of its tributaries are considered to have low potential for archaeological deposits. It is considered that about 50% of the study area retains moderate archaeological potential, with the remaining 50% being of low potential. There is also a high percentage of ground cover, which reduces the chances of success for detecting surface archaeological features (AECOM, 2008).

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Cessnock Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is somewhat inaccurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bush Fire Protection (2019). General vegetation structures have been translated to AS3959 (2018) groupings.

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

3.2 EFFECTIVE SLOPE

Effective slope was measured using 1-metre contour data obtained from Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective Slopes have been identified in Figure 1 and 2 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Table A1.12.1 (Planning for Bush Fire Protection). The minimum Asset Protection Zone for special fire protection purpose development has been demonstrated in Section 1 Executive Summary and Compliance Tables.

The required asset protection zones are available within the subject site.

3.4 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2019) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.



PHOTOGRAPH 1 – PROPOSED AQUATIC CENTRE LOCATION

View of the location of the proposed aquatic centre looking east. The existing greenhouse will be demolished and the unmanaged grassland surrounding the building shall be maintained.



PHOTOGRAPH 2 – NARROW BAND OF TREES LOCATED EAST OF ACQUATIC CENTRE

View of low threat vegetation located east of the aquatic centre. The vegetation is a thin band of casuarinas that offer a reduced vegetative threat to the proposed buildings and open structures. The ecological constraints analysis identifies a 20 metre riparian buffer to be located around the mapped waterway.

Bushfire Assessment: Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571, 10 Lomas Lane and 210 Wine Country Drive, Nulkaba



FIGURE 1 – SITE CONSTRAINTS MAP

3.5 COMPLIANCE WITH AIMS AND OBJECTIVES OF PLANNING FOR BUSH FIRE PROTECTION

The aims and objectives of Planning for Bushfire Protection (2019) are addressed below for the school.

Afford occupants of any building adequate protection from exposure to a bush fire

The existing school was approved using Planning for Bush Fire Protection (2006) legislation which was current at time of approval. Following the establishment of additional asset protection zones, the buildings within the existing site will have a reduced exposure to bushfire. Evacuation planning in the event of bushfire should clearly indicate to workers to evacuate early in a direction away from the fire.

Provide for a defensible space to be located around buildings

Defensible space is provided around all buildings and will be expanded around proposed school additions and the aquatic centre in accordance with the acceptable solutions.

Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition

Following establishment of the asset protection zones all buildings will comply with the setbacks of special fire protection purpose development and new buildings will be built to BAL-12.5.

Ensure that safe operational access and egress for emergency service personnel and building users is available

The property access to the site offers compliance with Planning for Bush Fire Protection.

Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ)

The school shall maintain landscaping and fuel management in accordance with Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.

Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting)

Utility services shall comply with Planning for Bush Fire Protection (2019). Electrical supplies onsite will be located underground, and the hydrant network will be expanded in accordance with AS2419.1.

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available providing coverage of the development in accordance with AS 2419.1 – 2005. It is noted that hydrant pressures have not been tested as part of this report.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite should be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).



PHOTOGRAPH 3 – MANAGEMENT EAST OF LOW-THREAT RIPARIAN CORRIDOR

View of managed fields located east of the low-threat riparian corridor. Forest can be seen in the distance, with the majority of the open fields presently being mechanically managed grass. The forest is dominated by eucalypts in the upper stratum with an understorey of native shrubs and grasses. Black Creek runs along the eastern boundary of the site.



FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap



FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

Bushfire Assessment: Lot 1 DP 126765, Lot 1 DP 744377, Lot 2 DP 600895 and Lot 518 DP 837571, 10 Lomas Lane and 210 Wine Country Drive, Nulkaba

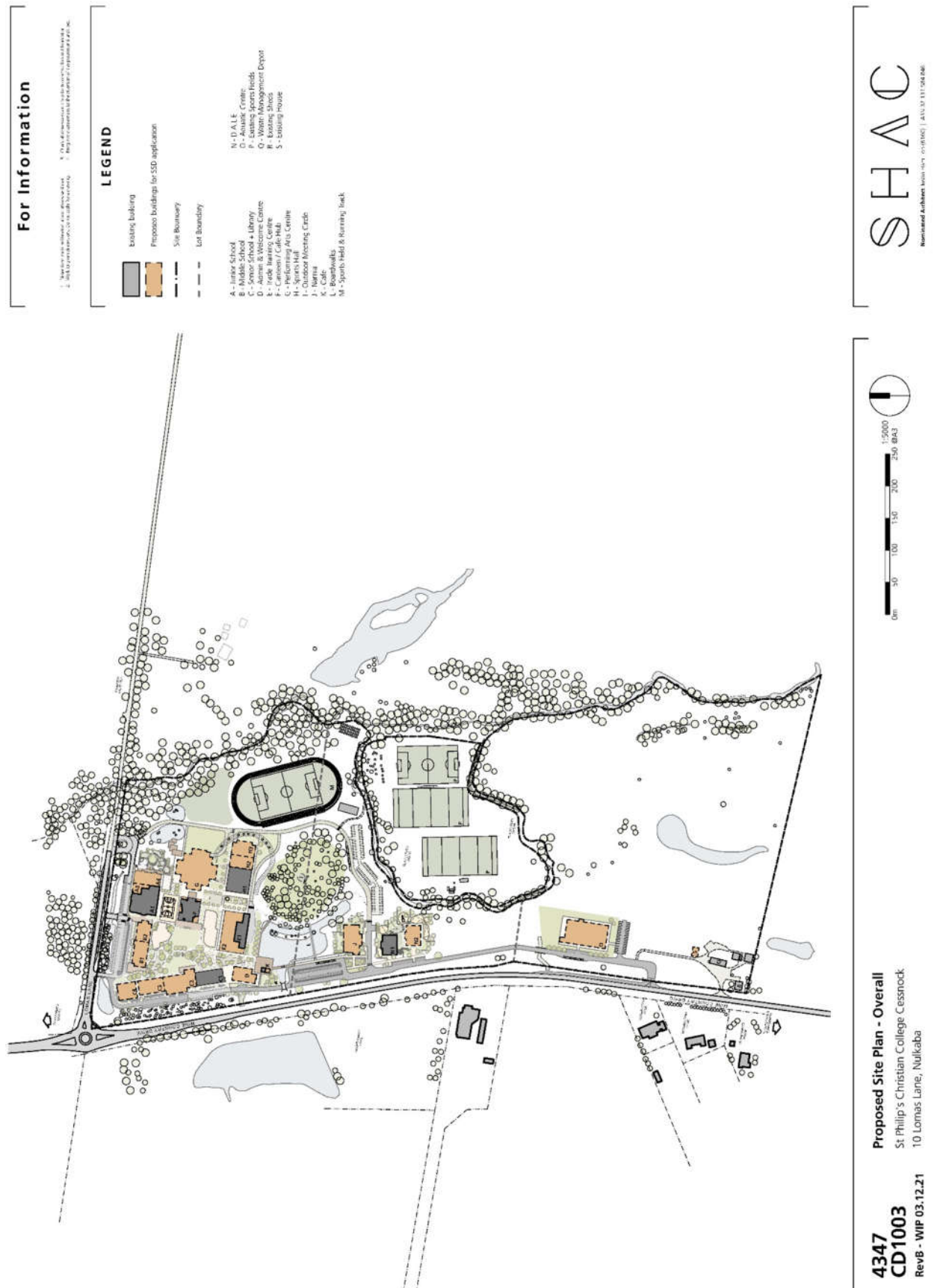


FIGURE 4 – DEVELOPMENT PLAN

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the building are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

5.0 PROPERTY ACCESS

Public Road Access

The subject site is located on the corner of Lomas Lane and Wine Country Drive being two way roads interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The existing public road network is deemed adequate to handle increased volumes of traffic in the event of a bushfire emergency. No new public roads are proposed for this development.

Fire Trails

Fire trails do not intersect the vegetation in the local area. No new fire trails are proposed for this development.

Property Access

Property access is provided by way of Lomas Lane providing access from the public road system directly to the private land, giving firefighters access to the building. The proposed development includes provision of a second site access directly off Wine Country Drive, further improving firefighting access and site egress for vehicles.

Property access roads shall comply with sections 6 of Planning for Bush Fire Protection 2019 as detailed below:

ACCESS (GENERAL REQUIREMENTS)	
Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	• Internal roads are two-wheel drive, sealed, 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.
Compliance: The development can offer full compliance. The proposed design incorporates a loop road around the bulk of the school alterations/additions which will support effective evacuation of facility users and access for firefighters. Access to the hazard vegetation will be improved by sporting fields and the new road network.	
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.
Compliance: The development can offer full compliance.	
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; Hydrants are provided in accordance with the relevant clauses of AS2419.1 (2005) - Fire hydrant Installations - System design, installation and commissioning;
Compliance: The development can offer full compliance.	
PERIMETER ROADS	
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating, as well as providing a safe operational environment for emergency service personnel during firefighting and	• There are two-way sealed roads; • Minimum 8 metre carriageway width kerb to kerb; • Parking is provided outside of the carriageway width; • Hydrants are located clear of parking areas; • There are through-roads, and these are linked to the internal road system at an interval of no greater than 500 metres; • Curves of roads have a minimum inner radius of 6 metres; • The maximum grade road is 15 degrees and average grade of not more than 10 degrees;

emergency management on the interface.	• The road crossfall does not exceed 3 degrees; and • A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.
Compliance: A perimeter road is provided around the bulk of the school. The aquatic centre and D.A.L.E. will be located outside the perimeter road. The two way road at the north of the site will have lanes wrapping around the dam with 4 metre carriageway width on each lane.	
NON-PERIMETER ROADS	
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Minimum 5.5 metre carriageway width kerb to kerb; Parking is provided outside of the carriageway width; Hydrants are located clear of parking areas; Roads are through-roads and are linked to the internal road system at an interval of no greater than 500 metres; Curves of roads have a minimum inner radius of 6 metres; The road crossfall does not exceed 3 degrees; and A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided.
Compliance: The development can offer full compliance.	

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with appendix 4 of Planning for Bush Fire Protection (2019) and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris. Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

A bushfire maintenance plan is to be prepared that addresses the following requirements:

- a) Contact person/department and details; and
- b) Schedule and description of works for the construction of asset protection zones and their continued maintenance.
- c) Landscaping shall be managed 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.

7.2 FIRE EMERGENCY PROCEDURES

Arrangements for emergency and evacuation are to comply with section 6 of Planning for Bush Fire Protection 2019.

An Emergency/Evacuation Plan is to be prepared consistent with AS 3745 'Emergency control organisation and procedures for buildings, structures and workplaces' which includes consideration of bushfire.

The Bush Fire Emergency Management and Evacuation Plan is to be prepared consistent with the:

- The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;
- NSW RFS Schools Program Guide;

8.0 RECOMMENDATIONS

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

1. The proposed building works for the below listed buildings shall comply with BAL-12.5 in accordance with AS3959 (2018) Construction of buildings in bushfire-prone areas or NASH Standard (1.7.14 updated) National Standard Steel Framed Construction in Bushfire Areas – 2014 as appropriate and the additional construction requirements of Planning for Bush Fire Protection (2019) Section 7.5.2. Buildings requiring BAL-12.5:
 - a. A3 and A4 – Junior School
 - b. G – Performing Arts Centre
 - c. H2 and H3 – Sports Hall

2. At the commencement of building works and in perpetuity, the property to a distance of 67 metres surrounding the buildings to the east towards the forest, shall be maintained as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.
3. A minimum 50 metre asset protection zone shall be managed within grassland surrounding the buildings.
Note: The existing asset protection zones that exceed the above distances are recommended to continue in perpetuity.
4. A 20 metre break in the vegetation shall be managed with the vehicle crossings that dissect the riparian corridor that circles the sporting fields.
5. A bushfire maintenance plan is to be prepared for the site.
6. Water, electricity and gas are to comply with section 6 of Planning for Bush Fire Protection 2019.
7. The property access is to comply with section 6 of Planning for Bush Fire Protection 2019.
8. Landscaping is to be undertaken in accordance with Appendix 4 of Planning for Bush Fire Protection 2019 and managed and maintained in perpetuity.
9. An Emergency/Evacuation Plan is to be prepared consistent with AS 3745 'Emergency control organisation and procedures for buildings, structures and workplaces' which includes consideration of bushfire. The Bush Fire Emergency Management and Evacuation Plan is to be prepared consistent with the:
 - The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;
 - NSW RFS Schools Program Guide;

9.0 CONCLUSION

The final recommendation is that there is buildable area onsite for the development with appropriate services and asset protection zones available. The proposed development can comply with the requirements of Planning for Bush Fire Protection 2019 guidelines. The proposed development will result in a better bushfire outcome than if the development did not proceed, by increasing asset protection zones to the existing school, improving vehicular access and water supply throughout the site.

10.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in appendix 4 of Planning for Bush Fire Protection (2019) and the NSW Rural Fire Services “Standards for Asset Protection Zones.” The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refer to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a building’s glazing and vent openings.
2. Avoid planting around entry-ways if the vegetation is flammable.
3. A maximum 20% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3 metres of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Reduce or trim large stands of shrubs

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

11.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2018) AS3959 Construction of Buildings in Bushfire-Prone Areas

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

New South Wales Rural Fire Service (2019) Planning for Bush Fire Protection

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2019) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2018) Building in Bushfire-Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.