BUSHFIRE ASSESSMENT REPORT

SOUTHERN CROSS ALPINE LODGE
SMIGGIN HOLES
KOSCIUSZKO NATIONAL PARK

Lot 1 DP 875254

Additions and alterations to existing Alpine Lodge

Prepared for Southern Cross Alpine Lodge

17 July 2020

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Approved by:	Jeffrey Dau (BPAD – 33128)

EXECUTIVE SUMMARY

EMBER Bushfire Consulting has been engaged by Southern Cross Alpine Lodge, to prepare a bushfire assessment report for additions and alterations to the Lodge at 43 Corroboree Road, Smiggin Holes.

The development proposal is located on declared bushfire prone land and as a result is subject to Section 4.46 of the Environmental Planning and Assessment Act (1979) (EP&A Act) and Section 100B of the Rural Fires Act (1997).

The development proposal is to perform a range of works, including the following additions and alteration:

- A new deck/porch, balustrades, entry and walkway and fascia to west and east elevations.
- Ski room (storage, preparation), drying room and laundry.
- New windows, doors and internal works

This report establishes the level of bushfire threat to the proposed development and examines the protection of the structure through measures such as asset protection, access, water supplies, landscaping, construction and emergency management requirements.

Given the age of the Lodge and the leasehold arrangements of the allotment within the environmentally significant setting of KNP, the subject site presents challenges in achieving the specific protection requirements for SFPP developments. In lieu of achieving strict compliance with the acceptable solutions for SFPP developments a performance-based solution is proposed which seeks a better bushfire protection outcome for the Lodge.

APZ currently are well managed and provide the necessary defendable space. The dimensions of the APZs will remain unchanged for the proposed works and will not encroach into the neighbouring KNP.

To maintain consistency with the previous recommendation and to ensure overall improvement of the Lodge, the proposed works to the western, eastern and southern elevations requires BAL-40 construction. With the principle of shielding in mind, additions to the northern elevation may adopt BAL-29 construction.

Updated emergency management plans will add to the protection of Lodge guests. Access to the Lodge is well provided for and will enable compliant egress to the site for occupants and attending fire crews.

Firefighting water supplies is provided, and gas and electricity supplies have been deemed to meet the requirements of PBP 2019.

Based on the bushfire assessment and the recommendations contained in this report the proposed development is deemed to comply with the specific and broad objectives of PBP 2019 and therefore suitable for submission to the NSWRFS for the issuing of a bush fire safety authority.

KEY DETAILS OF THE DEVELOPMENT

Table 1 – Development Summary

Information	Detail
Lot & DP Number	Lot 1 DP 875254
Street Address	Southern Cross Alpine Lodge 43 Corroboree Road, Smiggin Holes Kosciuszko National Park
Local Government Area	Snowy Monaro Regional Council. Regulation and approval covered by: - NPWS Dept of Planning Industry and Environment - Alpine Resorts Team NSW Rural Fire Service
Zoning of subject land	E1 – National Parks and Nature Reserves
Zoning of adjoining lands	E1 – National Parks and Nature Reserves
Lot size	800 m^2
Staging issues	Nil
Development classification	Addition and alterations to existing Alpine Resort (Special Fire Protection Purpose)
Type of assessment	100b (Special Fire Protection Purpose) for Bushfire Safety Authority
Fire weather area	Alpine areas
Fire Danger Index	50
Predominant vegetation	Alpine complex
Slope	Upslope to flat / upslope
Environmental constraints	Constraints associated with E1 – National Parks and Nature Reserves zoning
Cultural constraints	Nil known
Method of meeting performance requirements	Using acceptable solutions and alternative solutions to achieve better bushfire ouctomes.

1 INTRODUCTION AND OVERVIEW

1.1 BACKGROUND

EMBER Bushfire Consulting has been engaged by Southern Cross Alpine Lodge, to prepare a bushfire assessment report for proposed alterations and additions to the Lodge (the subject site).

The development proposal is located in area regarded as an Alpine Resort and on land that is considered bushfire prone land. As a result the proposal is subject to Section 4.46 of the Environmental Planning and Assessment Act (1979) (EP&A Act) and Section 100B of the Rural Fires Act (1997).

Under the EP&A Act the development proposal must be shown to conform with the broad aims and objectives of the NSW RFS document Planning for Bushfire Protection (2019) (PBP 2019) and therefore is the key reference document for this assessment.

1.2 AIM AND OBJECTIVES

The aim of this report is to:

- Evaluate the potential bushfire threat to the subject site, and
- Assess the capacity of the proposed development to provide the minimum bushfire protection necessary to offer life safety to the occupants, improve property protection and facilitates fire service intervention during a bushfire event.

The specific objectives expected of the proposed development is detailed in Chapter 6.6 – Special Fire Protection Purpose Developments (Alpine Resorts) PBP 2019.

The specific objectives for SFPP developments are to:

- provide an appropriate defendable space;
- provide a better bush fire protection outcome for existing structures (e.g. via ember protection measures);
- ensure new building work complies with the construction standards set out in AS 3959;
- to ensure ongoing management and maintenance responsibilities are in place where APZs are proposed outside of the sub lease or leasehold area;
- written consent from the land managers is provided for all proposed works outside of the sub lease or leasehold area;
- proposed APZs outside of the sub lease or leasehold area are supported by a suitable legal mechanism to ensure APZs are managed under a binding legal agreement in perpetuity;
- ensure building design and construction standards enhance the chances of occupant and building survival; and provide safe emergency evacuation procedures.

Any additional construction requirements should be commensurate with the following:

- the scope of the proposed works, including any increase in size and footprint of the building;
- any additional capacity for the accommodation of guests and/or staff on site; and
- the cost associated with the proposed upgrade of any building.

Accordingly, the following bushfire protection measures are to be assessed:

- Asset Protection Zones (APZs), and Landscaping,
- Construction Standards,
- Access,
- Services (water and utility services), and
- Emergency management.

The NSW RFS has an expectation that a better bush fire outcome is achieved where new development is proposed in association with existing facilities and as a result a "Better Bush Fire Outcome" approach has been taken in this assessment with a corresponding performance-based solution proposed to address a reduction in construction standards.

1.3 LIMITATIONS AND DISCLAIMER

This report is primarily concerned with assessing the capacity of the proposed development to withstand the impacts of a bushfire, including ember attack, radiant heat exposure and flame contact.

Where necessary protection measures will be recommended to provide a level of protection to the occupants and the structures themselves.

It should be kept in mind that the measures recommended cannot guarantee the proposed development will survive a bushfire event on every occasion. This is primarily due to the dependence on ongoing vegetation management, the unpredictable behaviour of fire, and extreme weather conditions.

EMBER Bushfire Consulting has prepared this report with all reasonable diligence. The information contained in this report has been gathered from field investigations of the site as well as plans provided by the building designer and discussions held with the property owner.

Table 2 - Stakeholders

Stakeholder	Role	Contact	Detail
Paul Campbell-Allen	Architect and Project Manager	Paul Campbell-Allen	0418 457 059
Southern Cross Alpine Lodge	Property Owner	Not Given	-
NSW Department of Planning, Industry and Environment	Consent Authority	Daniel James	02 6456 1733
NSW National Parks and Wildlife Service	Assessment Coordinator	Rebecca Owen	02 6450 5543
NSW Rural Fire Service	Consent Authority	Brad Bourke	02 4475 1300

1.4 SUBJECT SITE DESCRIPTION

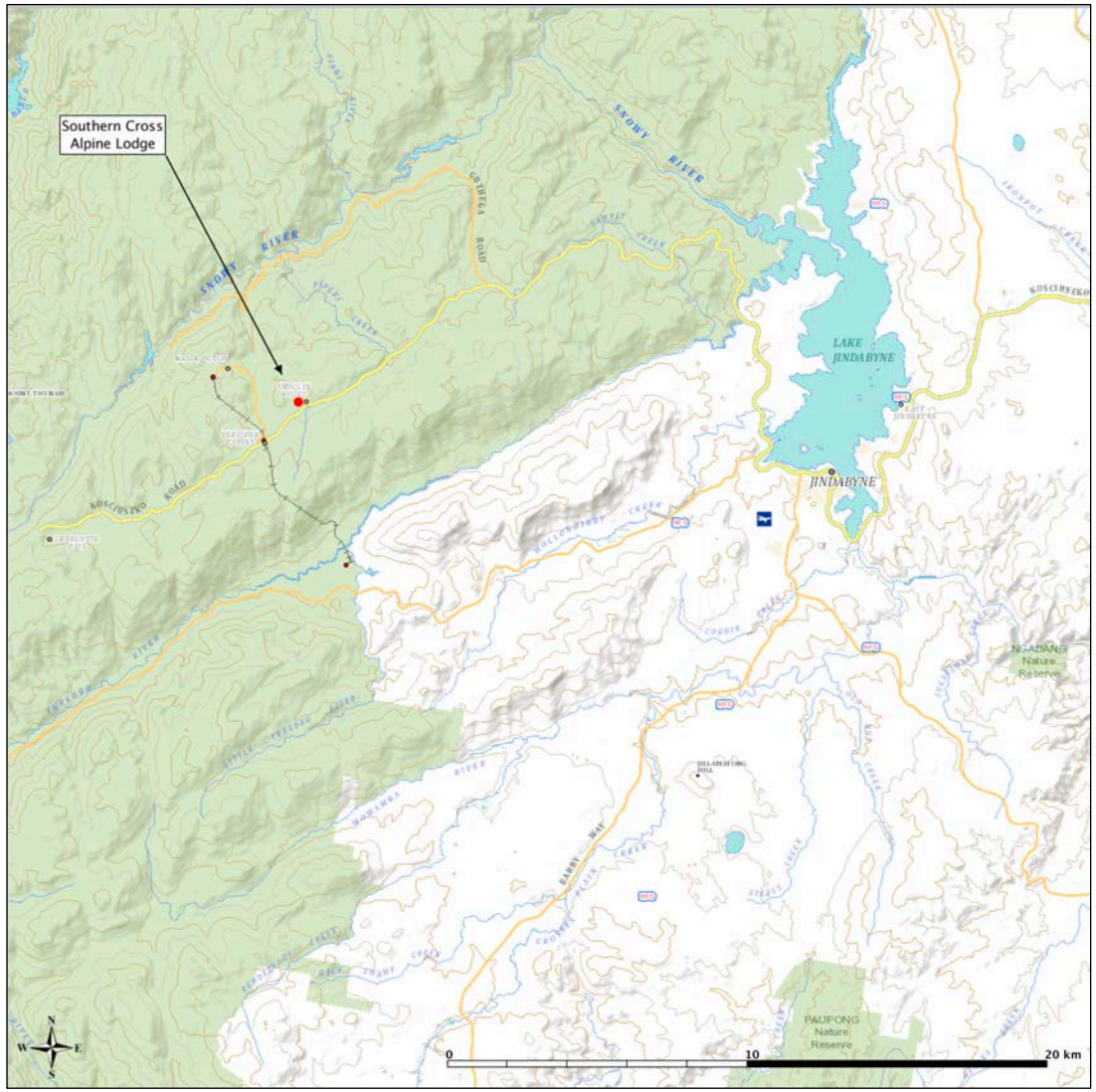


Figure 1 – Regional context of subject site (FireMaps, 2020)

The subject site is located on the southern edge of the alpine village of Smiggin Holes, in the Snowy Mountains of NSW (Figure 1) 31 km by road, west of Jindabyne.

While the 800 m² lot falls within the Snowy Monaro Regional Council Local Government Area, as the Village is located within the bounds of Kosciuszko National Park (KNP), the consent authority for any proposed works is the NSW Department of Planning, Industry and Environment with NSW National Parks and Wildlife Service and NSW Rural Fire Service (NSW RFS) included as referral entities.

The site is currently zoned as E1 – National Parks and Nature Reserves.

Adjacent to the Lodge (north, west and east) is similar alpine Lodges and to the rear (south) is unmanaged alpine vegetation running upslope towards Mount Piper within KNP (Figure 2).

All proposed works are to the existing Lodge and remains within the property allotment.

For the purpose of this assessment the dominate vegetation formation is classified as alpine complex.

1.5 SUBJECT SITE DESCRIPTION CONTINUED

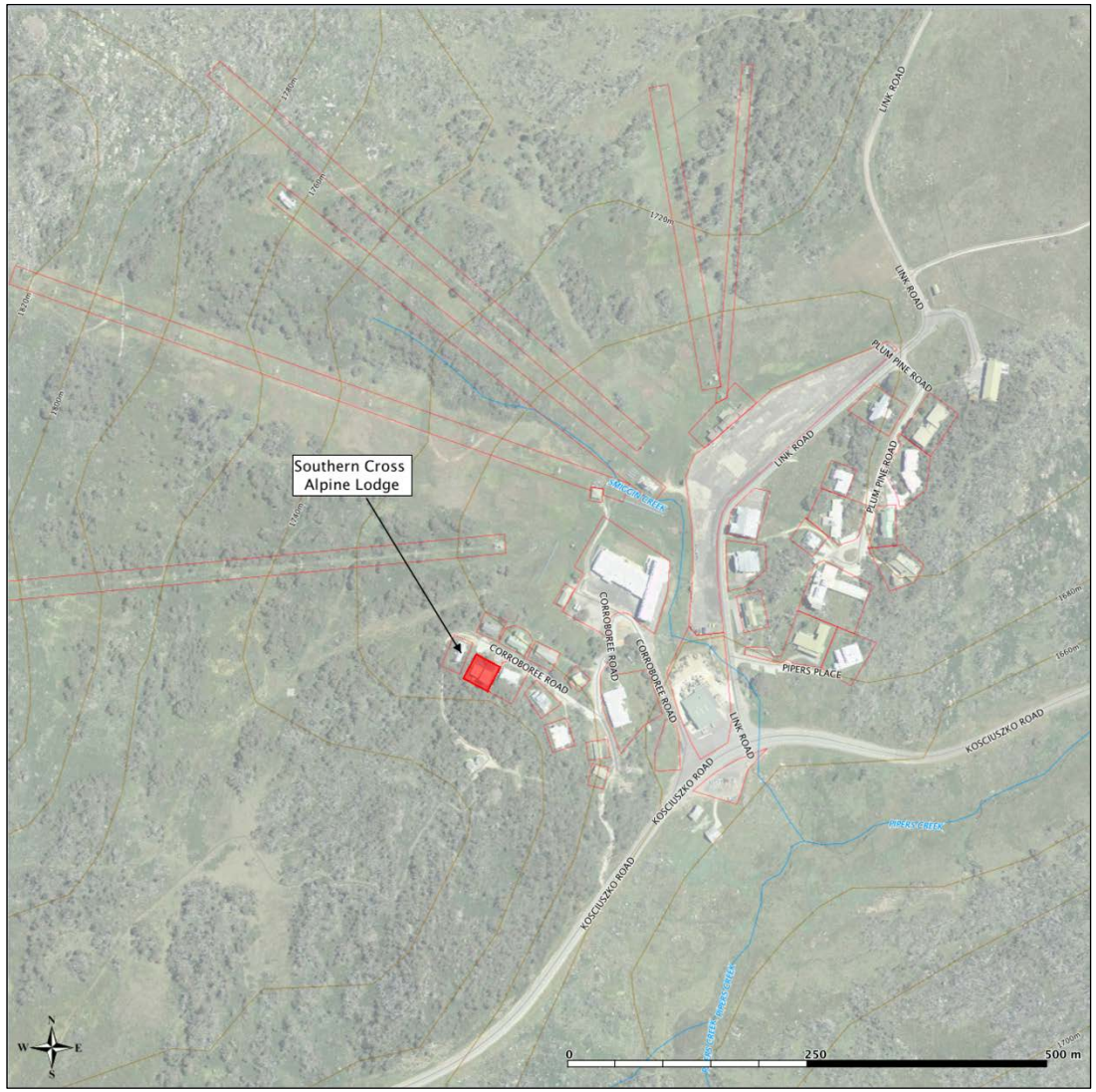


Figure 2 – Local context of subject lot (FireMaps, 2020)

The Lodge was originally constructed in 1963. Over time the Lodge has seen 2 major renovations, in 1990 and 2013.

During the most recent works, a bushfire assessment was carried out in 2011, determining the Bushfire Attack Level (BAL) rating for the Lodge to be BAL-40 and recommending (along with other measures) that all new construction be in accordance with Sections 3 and 8 of AS3959-2009.

The NSW RFS supported this assessment and a Bush Fire Safety Authority (BFSA) was issued for the development. While it is assumed that all new construction adopted BAL-40, older sections of the structure remained unchanged and therefore no assumption should be made that the entire building is fully BAL-40 compliant and therefore vulnerable to attack.

The Lodge fronts Corroboree Road (a public road) which provides egress to Kosciuszko Road and via it to the township of Jindabyne.

The Lodge is provided with reticulated gas and water supplies and overhead electricity. The Lodge is also provided with a fire detection and occupant warning system.

1.6 THE DEVELOPMENT PROPOSAL

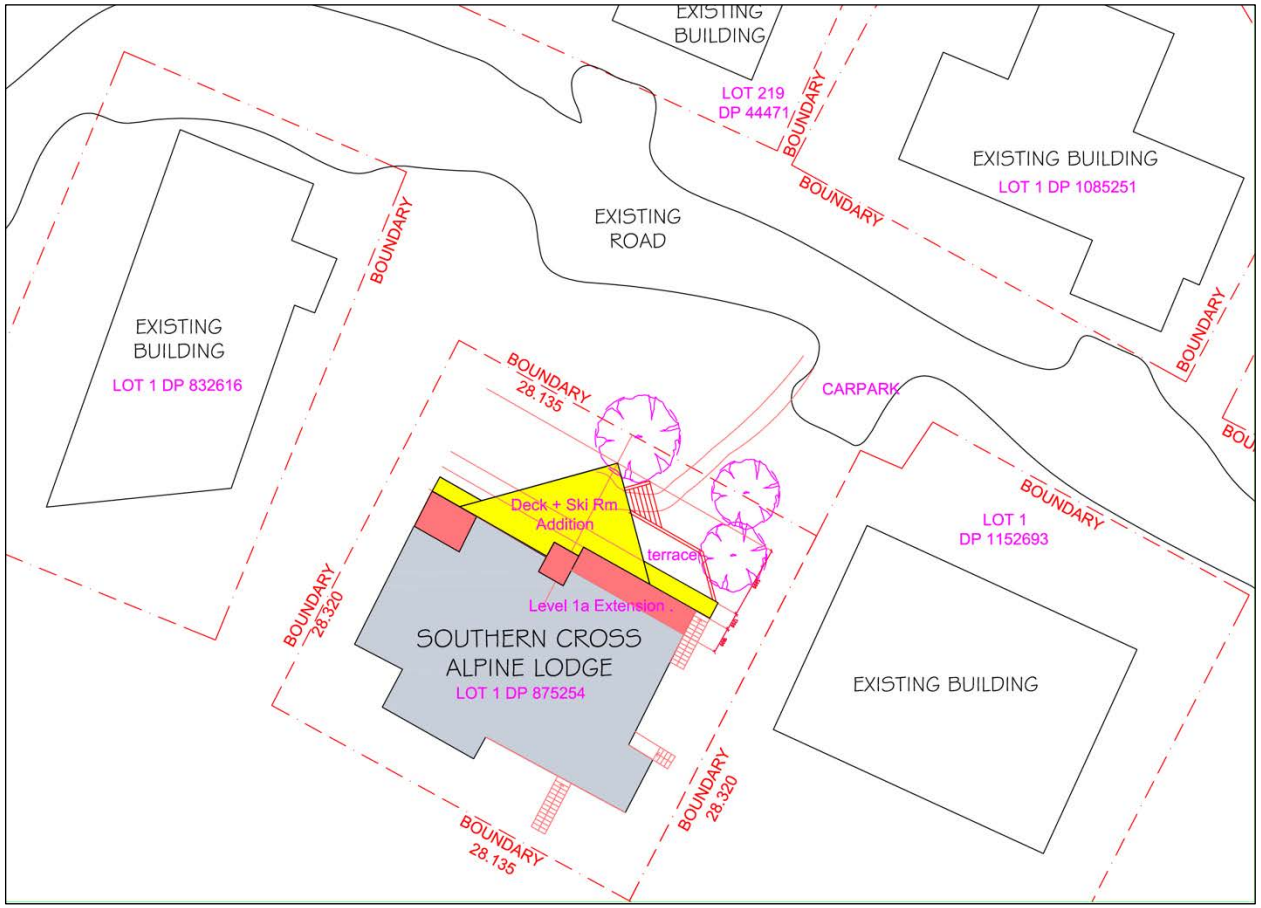


Figure 3 - Proposed development site plan (Paul Campbell-Allen, 2020)

The development proposal is to provide for a number of additions and alterations.

Additions extending from the front of the Lodge will include:

- A new deck/porch, balustrades, entry and walkway and fascia to west and east elevations.
- Ski room (storage, preparation), drying room and laundry.

Alterations to the Lodge will include:

- New windows, doors and internal works

Note:

- Lodge extension will be on the non-hazard side of the Lodge.
- Proposed works represent less than 50% of the GFA of the Lodge
- Proposed works to western, eastern and southern elevations will maintain previous BAL-40 compliant construction levels.

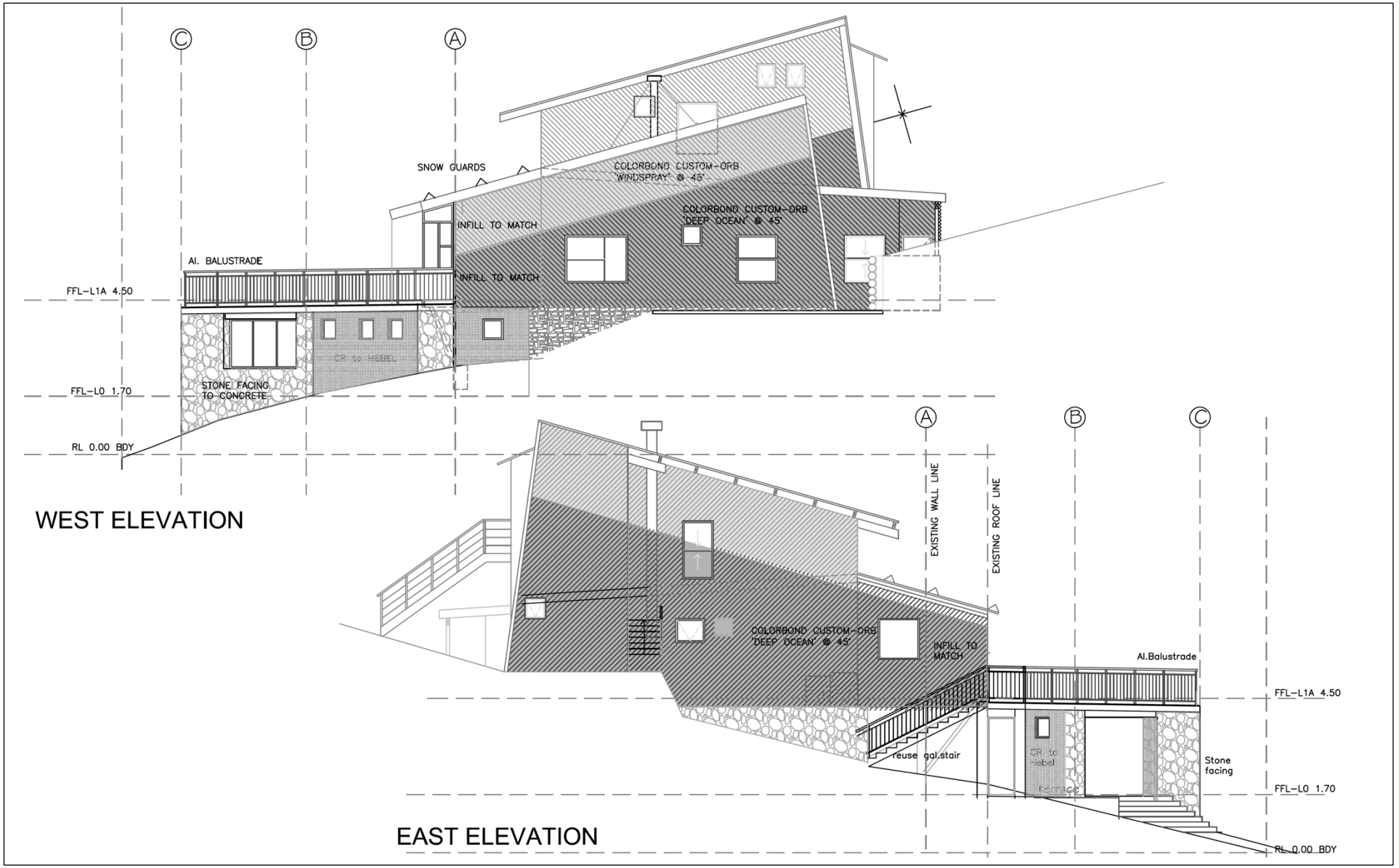


Figure 4 – Elevations of proposed works (Paul Campbell-Allen, 2020)

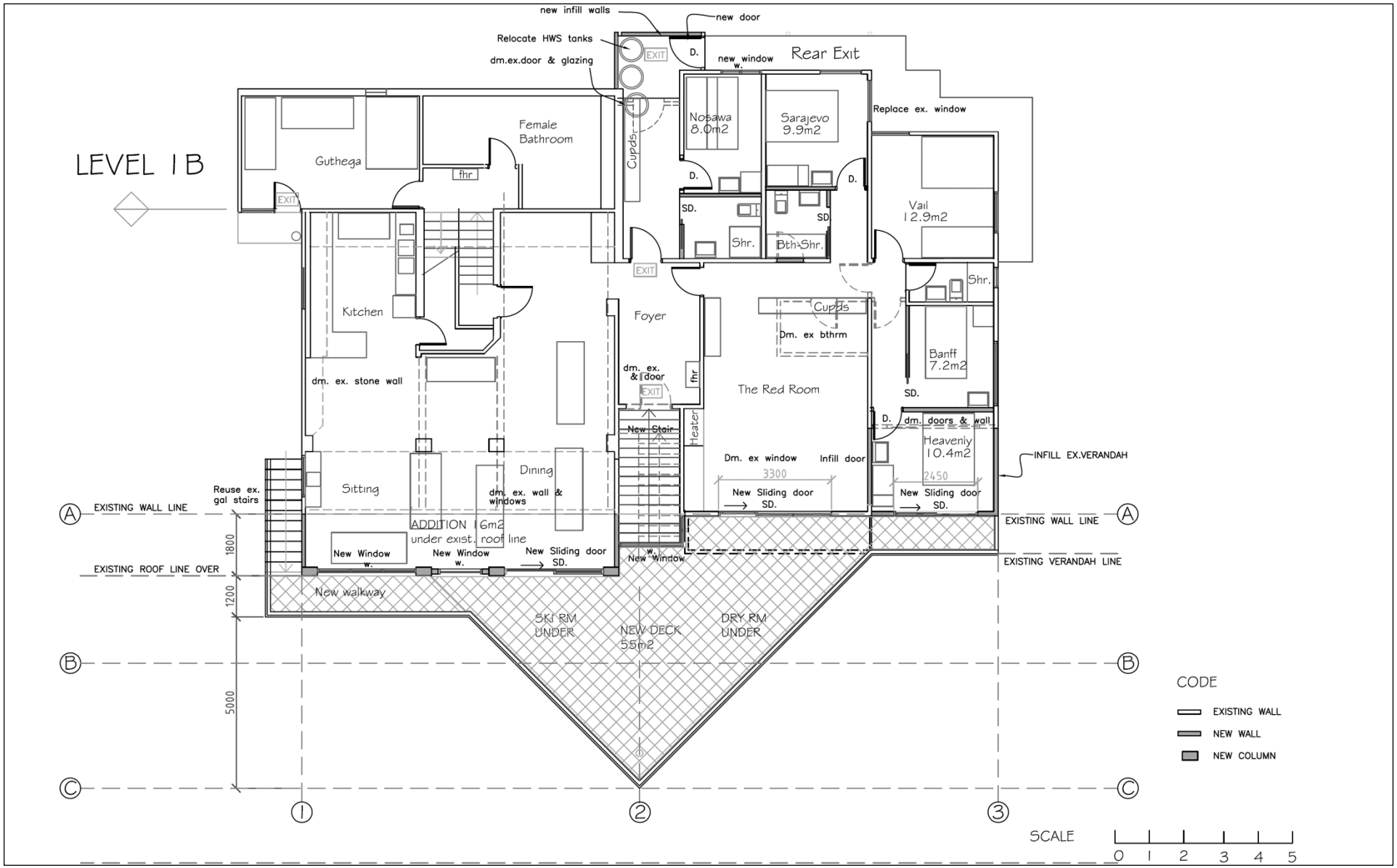


Figure 5 – Master plan of proposed works Level 1 (Paul Campbell-Allen, 2019)

2 BUSHFIRE THREAT ANALYSIS

2.1 METHODOLOGY

The methodology adopted by this report is as follows:

Table 3 - Report methodology

Method	Task	Considerations
Desktop analysis	Review available mapping resources, policy documents & development plans	Online Maps Development Control Plans Local Environmental Plan
Site inspection	Evaluate context of site, determine bushfire threat, options for asset protection zones, access roads and infrastructure.	Ground truth online mapping data, validate vegetation class, obtain site measurements, assess existing structures and infrastructure.
Assessment of proposal against the NSWRFS Planning for Bushfire Protection (PBP 2019).	Assess the development proposal against the performance criteria of PBP 2019.	Does the proposal comply with the acceptable solutions provided under of PBP 2019.
Report	Preparation and publication of bushfire assessment report	Demonstrate the proposal is capable of meeting the aims and objectives of PBP 2019.

2.2 BUSHFIRE ENVIRONMENT

To determine the potential bushfire threat posed to the subject site, the following environmental factors are adopted across the site.

Table 4 - Bushfire behaviour factors

Factor	Value
Fire Weather Area	Alpine Areas
FDI	50
Predominant Vegetation Classification	Alpine Complex
Slope	Upslope.

Note: A detailed bushfire hazard analysis is detailed below.

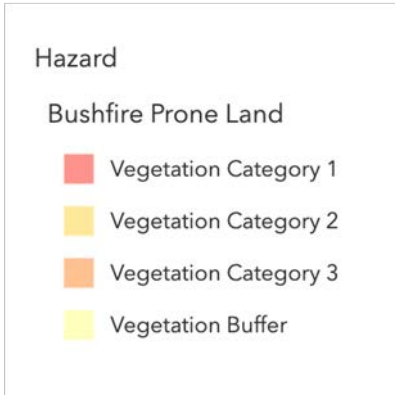
2.3 BUSHFIRE PRONE LAND MAPPING

Figure 6 – Subject site bushfire prone land map. (NSW Planning Portal, 2020)

Bushfire prone mapping relative to the subject site (Figure 6) showing the site surrounded by areas of declared bush fire prone land by Department of Planning, Industry and Environment and NSW RFS.

Note: The mapping does not take into account land use changes, i.e. recent urban development in the area which may alter the validity of the mapping as it is currently published.

Hazard classification key:



2.4 VEGETATION FORMATIONS

Figure 7 – Subject site vegetation classification. (National Map, 2020)

Subject site vegetation formations as defined by Vegetation Formations and Classes of NSW, David A. Keith and Christopher C. Simpson. (version 3.03 - 200m Raster).

Vegetation mapping indicates that the subject site is wholly influenced by Alpine complex vegetation.

Vegetation classification key:

- Alpine complex
- Arid shrublands (Acacia subformation)
- Arid shrublands (Chenopod subformation)
- Cleared
- Dry sclerophyll forests (Shrub/grass subformation)
- Dry sclerophyll forests (Shrubby subformation)
- Forested wetlands
- Freshwater wetlands
- Grasslands
- Grassy woodlands
- Heathlands
- Rainforests
- Saline wetlands
- Semi-arid woodlands (Grassy subformation)
- Semi-arid woodlands (Shrubby subformation)
- Wet sclerophyll forests (Grassy subformation)
- Wet sclerophyll forests (Shrubby subformation)

2.5 HAZARD, APZ AND ACCESS ASSESSMENT

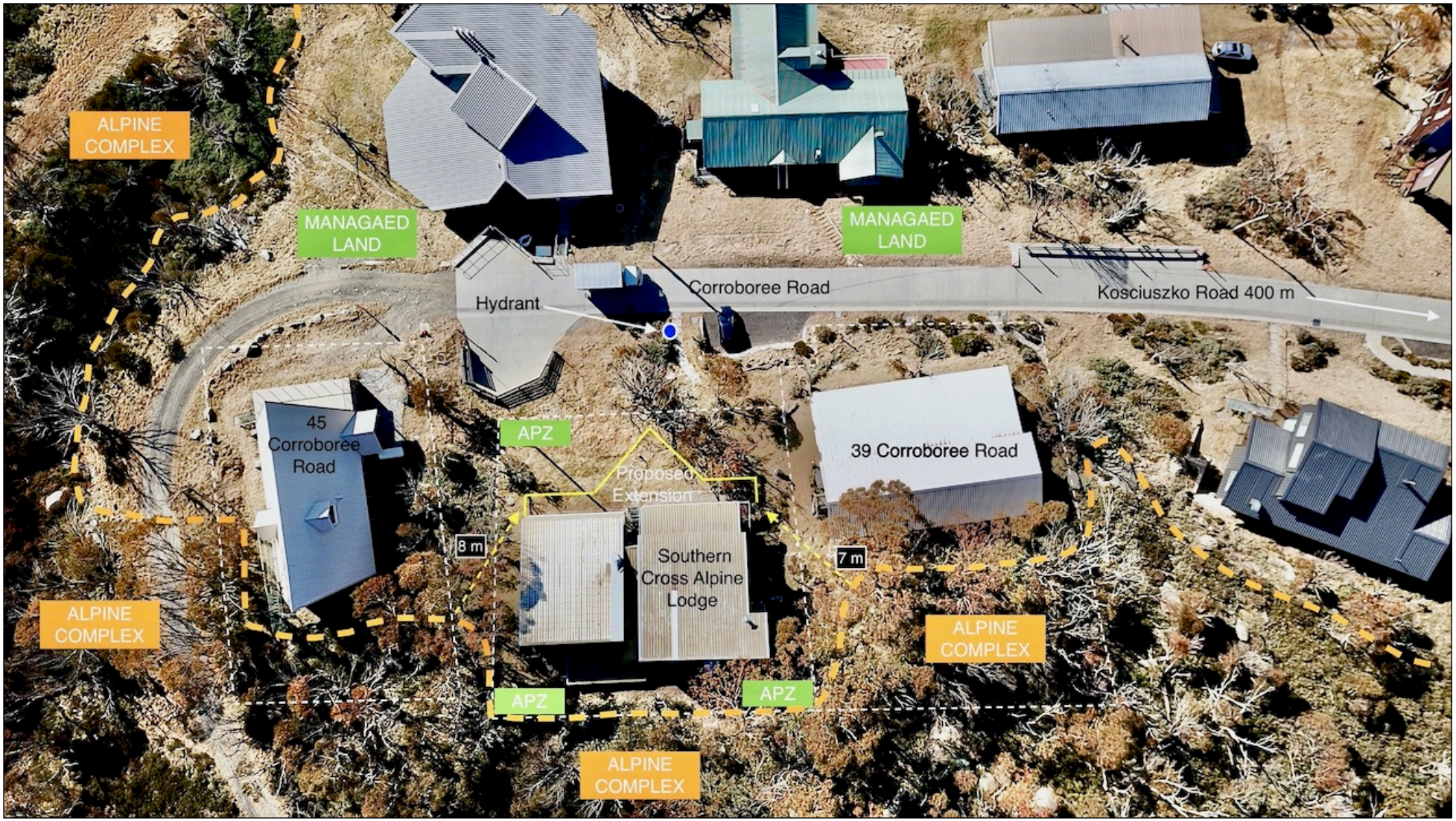


Figure 8 - Showing vegetation class, indicative APZ & setback distances and pathways of egress. Not to scale. (Dau, 2020)

2.6 SLOPE ANALYSIS

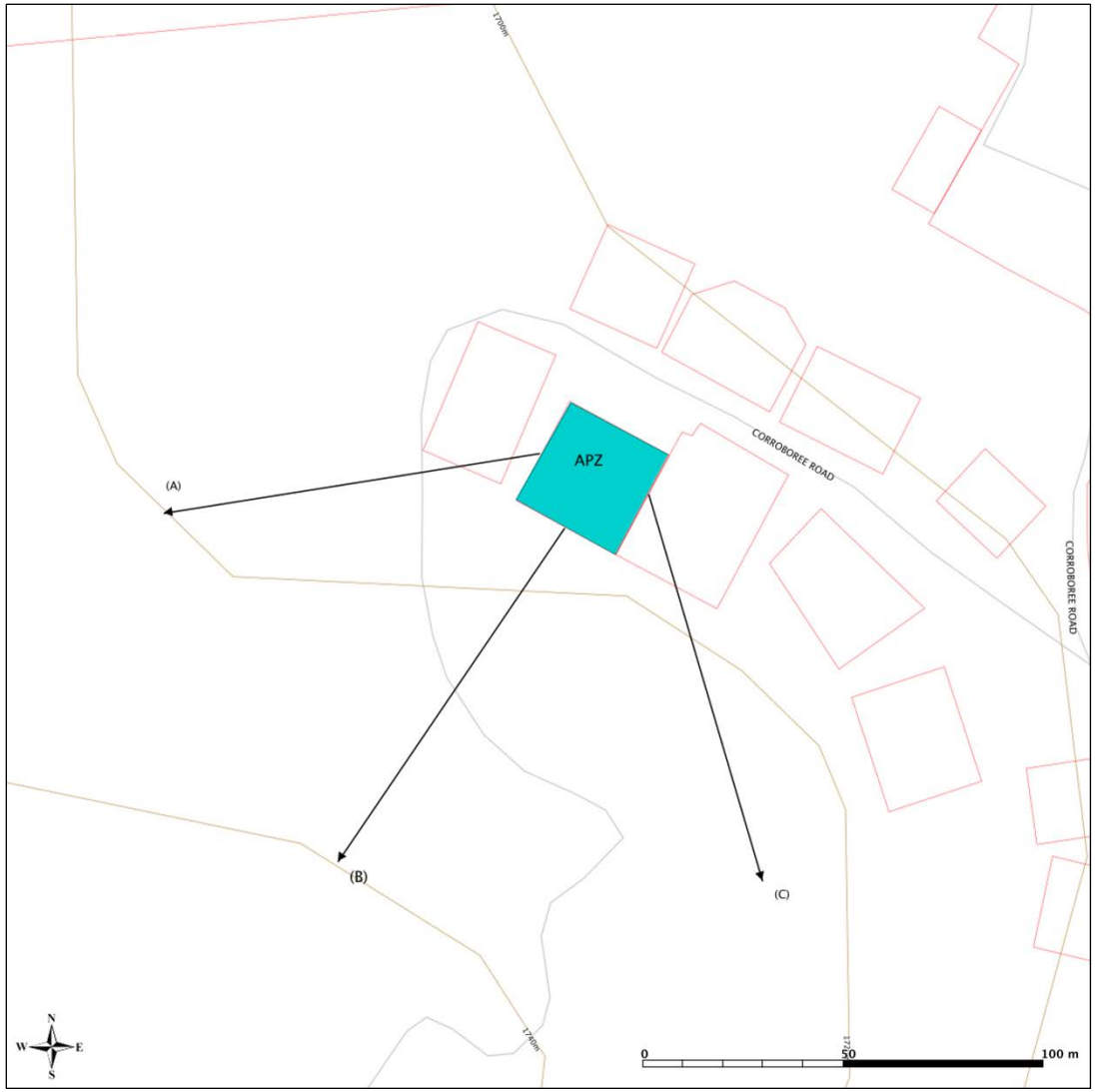


Figure 9 – Slope analysis of subject site. (Dau, 2020)

(A) SOUTHWEST – Upslope

(B) SOUTH – Upslope

(C) SOUTHEAST – Upslope

2.7 NORTH SOUTH AERIAL OVERVIEW OF SUBJECT SITE

Figure 10 – Aerial overview looking west showing subject site, APZ setbacks, access and vegetation classification to the south. Not to scale (Dau, 2020)

2.8 OVERVIEW OF SUBJECT SITE PROTECTION MEASURES

Figure 11

Figure 12

Figure 13

Figure 14

Figure 15 – Corroboree Road looking east (Dau, 2020)

Figure 16 – Strobe associated with fire detection system (Dau, 2020)

Figure 17 – Hydrant located directly in front of Lodge (Dau, 2020)

2.9 THREAT ANALYSIS CONCLUSIONS

2.9.1 VEGETATION FORMATIONS

Vegetation formations within 140 m of the subject site were identified and classified in accordance with Appendix A1.2 of PBP (2019).

Aspect	Formation
North	Managed Land
South East	Alpine Complex
South	Alpine Complex
South West	Alpine Complex

2.9.2 RELEVANT FIRE DANGER INDEX

The fire danger index for the site has been determined in accordance with the NSW Rural Fire Service.

NSW Fire Area	Fire Danger Index (FDI)
Alpine Areas	50

2.9.3 SLOPE, APZ AND BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

Site slope, APZs (both currently available and those required to be established) were assessed. The resultant BAL ratings (Table 4) were determined in accordance with Table A1.12.7 of PBP (2019).

Table 4 - Slope assessment and BAL Table

Aspect	Vegetation Formation	Slope	Setback available	BAL
N	Managed Land	Not Applicable	N/A	N/A
SE	Alpine Complex	Upslope	7 m	29
S	Alpine Complex	Upslope	Shielded	N/A
SW	Alpine Complex	Upslope	8 m	29

3 BUSHFIRE PROTECTION MEASURES

In response to the bushfire threat analysis, a suite of Bushfire Protection Measures (BPMs) are to be adopted by the proposed development in accordance with Section 6 Special Fire Protection Purpose Developments (SFPP) – Alpine development The BPMs for SFPP developments are provided to minimise the risk of fire spread to buildings and take into account the increased vulnerability of the occupants.

A statement of compliance against the performance criteria and specific objectives of PBP 2019 is provided in Appendix A of this report.

3.1 BPM DISCUSSION AND RECOMMENDATIONS:

3.1.1 ASSET PROTECTION ZONES

Discussion (Performance Based Solution):

Given the age of the Lodge and the leasehold arrangements of the allotment within the environmentally significant setting of KNP, the subject site presents challenges in achieving the required APZs for SFPP developments.

In lieu of achieving strict compliance with the acceptable solutions for APZs for SFPP development a performance-based solution is proposed which seeks a better bushfire protection outcome for the Lodge through improved construction.

A better bush fire outcome approach acknowledges the site constraints but seeks overall improvement of the site once development is complete.

This approach was taken for works undertaken in 2013 with the adoption of BAL-40 construction components and is proposed for these current works and therefore bringing a consistent and ongoing improvement to the Lodge.

In relation to the existing APZs the following is made:

- Existing APZs were found to be managed as Inner Protection Area (IPA).
- Existing APZs extend to lot boundaries (maximum allowable distance) with no encroachment into the KNP.
- Defendable space is provided 360 degrees around Lodge.

Recommendations:

- Existing APZ dimensions to remain unchanged.
- At the commencement of building works, and in perpetuity, all land within the subject lot is to be managed as IPA in accordance with the requirements of Asset Protection Zone Standards - Appendix 4 of PBP (2019) (Attachment B).

3.1.2 LANDSCAPING

Recommendations:

- All landscape within the area identified as APZ (Figure 8 & 9) is to be managed in perpetuity and in accordance with the requirements of Asset Protection Zone Standards - Appendix 4 of PBP (2019) (Attachment B).

3.1.3 CONSTRUCTION

Discussion (Performance Based Solution):

With an appreciation of the age of the Lodge and previous construction works it can be assumed that the structure as a whole is not fully compliant with current construction standards.

While new additions to the structure will comply with the appropriate construction standards, compliance with PBP 2019 is not strictly achieved. In lieu of this a performance-based solution is proposed which seeks a better bushfire protection outcome for the Lodge through improved construction overall.

A better bush fire outcome approach acknowledges the site constraints but seeks overall improvement of the site once development is complete.

In response to previous recommendations, additions and alteration to the Lodge were completed in 2013 in accordance with Sections 3 and 8 of AS3959-2009 (BAL-40).

To maintain consistency with the previous report and to ensure the overall improvement of the Lodge, the proposed works will take this previous level of construction into account.

Recommendations:

- All proposed new additions and alterations to the southern, eastern and western elevations shall comply with Sections 3 and 8 (BAL 40) of Australian Standard AS3959-2018 'Construction of buildings in bush fire-prone areas' or NASH Standard 'National Standard Steel Framed Construction in Bushfire Areas – 2014' as appropriate.
- Given the dominant hazard is to the south of the Lodge, as an option, shielding may be applied to the northern elevations of the Lodge under the principles of shielding in Section 3.5 of AS3959-2018. On this basis all proposed new additions to the northern elevations shall comply with Sections 3 and 7 (BAL 29) of Australian Standard AS3959-2018 'Construction of buildings in bush fire-prone areas' or NASH Standard 'National Standard Steel Framed Construction in Bushfire Areas – 2014' as appropriate.
- Additional construction requirements to comply with Section 7.6 PBP 2019 provided here in Attachment C.
- Where not currently provided the existing building is required to be upgraded to improve ember protection. This is to be achieved by:

- enclosing all openings (excluding roof tile spaces) or covering openings with a non-corrosive metal screen mesh with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves.
- External doors are to be fitted with draft excluders.

The performance criteria for APZ's, landscaping and construction can be achieved by the proposed development through the application of PBP 2019 acceptable solutions including the adoption of a performance-based solution.

3.1.4 ACCESS

Discussion:

- The Lodge fronts Corroboree Road (a public road) which provides sealed egress to Kosciuszko Road and via it to the township of Jindabyne.
- Access is deemed to meet all the requirements of the acceptable solutions under PBP 2019.

Recommendations:

- Nil changes

The performance criteria for Access can be achieved by the proposed development through the application of PBP 2019 acceptable solutions.

3.1.5 SERVICES

Discussion:

- The Lodge is provided with a hydrant within 10 m of the front of the structure, satisfying the requirement that reticulated water supply is required.
- Reticulated gas supplies are provided to the Lodge.

The performance criteria for water electricity and gas supplies can be achieved by the proposed development through the application of PBP 2019 acceptable solutions.

3.1.6 EMERGENCY MANAGEMENT

- A bush fire emergency management and evacuation plan is to be prepared consistent with the NSW RFS document: "*A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan"*, and Australian Standard AS 3745:2010 "*Planning for emergencies in facilities"*.
- The emergency and evacuation management plan should include a mechanism for the early relocation of the facility users.
- An Emergency Planning Committee is to be established to consult with Council.

- Detailed plans of all emergency assembly areas including on-site and off-site arrangements as stated in AS 3745:2010 are clearly displayed, and an annually emergency evacuation is conducted.

The performance criteria for emergency management can be achieved by the proposed development through the application of PBP 2019 acceptable solutions.

4 CONCLUSION

This report documents the findings from a bush fire protection assessment conducted on proposed additions and alterations to the Southern Cross Alipne Lodge at 43 Corroboree Road, Smiggin Holes.

This report establishes the level of bushfire threat to the proposed development and examines the protection of the structure through measures such as asset protection, access, water supplies, landscaping, construction and emergency management requirements.

Given the age of the Lodge and the leasehold arrangements of the allotment within the environmentally significant setting of KNP, the subject site presents challenges in achieving the specific protection requirements for SFPP developments.

In lieu of achieving strict compliance with the acceptable solutions for APZs and construction for SFPP developments a performance-based solution is proposed which seeks a better bushfire protection outcome for the Lodge which seeks overall improvement of the site once development is complete.

APZ are currently well managed and provided defendable space. While APZ dimensions remain unchanged and do not encroach into the neighbouring KNP the ongoing maintenance as an IPA is essential and a requirement of this report.

Although the BAL rating for the proposed additions is measured as BAL-29, to maintain consistency with the previous recommendation and to ensure the overall improvement of the Lodge, the proposed works to the western, eastern and southern elevations requires BAL-40 construction. Under AS3959-2018, shielding may be applied and therefore all works on the northern elevation shall adopt BAL-29 construction.

The protection of guests at the Lodge triggers a higher need for protection which can be largely addressed through well thought out and documented bushfire emergency management. Any existing plans will need to be reviewed and updated as required.

Access to the Lodge is well provided for and will enable compliant egress and access to the site for occupants and attending fire crews.

Fire fighting water supplies is provided and gas and electricity supplies have been deemed to meet the requirements of PBP 2019.

Based on the bushfire assessment and the recommendations contained in this report the proposed development is capable of:

- providing an appropriate defendable space;
- provide a better bush fire protection outcome for existing structures;
- ensure new building work complies with the construction standards set out in AS 3959;
- ensure building design and construction standards enhance the chances of occupant and building survival; and
- provide safe emergency evacuation procedures.

Be advised that the NSWRFS may alter recommendations and/or impose additional conditions as it feels is necessary to offer further protection to the structures, occupants and fire fighters during a bush fire.

5 REFERENCE

- Keith D. (2004) "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney.
- NSW Rural Fire Service. (2019) "Planning for Bushfire Protection". Sydney
- Standards Australia, (2018) "AS/NZS 3959-2018 Construction of buildings in bush fire prone areas."
- Six Maps, NSW Department of Finance and Services, accessed 17 July 2020, https://maps.six.nsw.gov.au/#
- ePlanning Spatial Viewer, Department of Planning Industry and Environment, accessed 17 July 2020, https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address

ATTACHMENT A – PERFORMANCE CRITERIA COMPLIANCE STATEMENT

The following compliance report tables the performance criteria to be met under each protection measure for the proposed development. The table also identifies which avenue is used to achieve compliance, details of the acceptable solution and specific information on the how this is achieved for the proposed development.

Performance Criteria	Method of Compliance	Acceptable Solution	Comments / Details
ASSET PROTECTION ZONES			
• the building will not be exposed to radiant heat levels exceeding 29kW/m² (1090K).	Proposed Alternative Solution.	• an APZ is provided in accordance with Tables A1.12.2 or A1.12.3 in Appendix 1 of PBP 2019 around the entire building or structure.	Given the constraints of the site and the age of the Lodge, a better bush fire outcome approach is undertaken which seeks a balanced overall improvement of the site post construction. This is achieved through enhanced construction improvements to the structure.
• APZs are managed and maintained to prevent the spread of a fire towards the building.	Will meet the acceptable solutions.	• the APZ is managed in accordance with the requirements of Appendix 4 of this document and is wholly within the boundaries of the development site.	Landscaping within the APZ is required to be managed as an IPA in accordance with the principles provided Appendix 4 – Asset Protection Zone Standards, PBP 2019 which is provided in Attachment B of this report.
• The APZs is provided in perpetuity.	Will meet the acceptable solutions.	• APZs are wholly within the boundaries of the development site; and • other structures located within the APZ need to be located further than 6m from the refuge building.	All APZs are within the boundaries of the development site.
• APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	Will meet the acceptable solutions.	• APZs are located on lands with a slope less than 18 degrees.	No land within the area identified as APZ (Figure 9) is over 18°.
LANDSCAPING			
• Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Will meet the acceptable solutions.	• landscaping is in accordance with Appendix 4; and • fencing is constructed in accordance with section 7.6 of PBP 2019.	Landscaping within the APZ is required to be managed as an IPA in accordance with the principles provided Appendix 4 – Asset Protection Zone Standards, PBP 2019 which is provided in Attachment B of this report.
CONSTRUCTION			

Performance Criteria	Method of Compliance	Acceptable Solution	Comments / Details
• the proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	Will meet the acceptable solutions.	• construction is applied in accordance with Appendix 1 of PBP.	Given the constraints of the site and the age of the Lodge, a better bush fire outcome approach is undertaken which seeks a balanced overall improvement of the site post construction. This is achieved through enhanced construction improvements to the structure. The construction standard to be adopted by the eastern, western and southern elevations is BAL-40 and northern elevations BAL-29 as per AS3959-2018, and additional construction requirements to comply with Section 7.6 PBP 2019.
ACCESS			
• Firefighting vehicles are provided with safe, all-weather access to structures.	Will meet the acceptable solutions.	• 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.	Property access specifications will be in accordance with the min requirements provided Property Access Table 6.8b.
• the capacity of access roads is adequate for firefighting vehicles.	Will meet the acceptable solutions.	• the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded fire fighting vehicles (up to 23 tonnes); bridges / causeways are to clearly indicate load rating.	The capacity of road surfaces and any bridges/causeways will be sufficient to carry fully loaded firefighting vehicles; bridges / causeways are not proposed.
• there is appropriate access to water supply.	Will meet the acceptable solutions.	• 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 - Fire hydrant installations System design, installation and commissioning; and • there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	Access to a compliant reticulated water supply is provided.
PERIMETER ROADS			

Performance Criteria	Method of Compliance	Acceptable Solution	Comments / Details
• 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 emergency management on the interface.	Will meet the acceptable solutions.	• are two-way sealed roads; • minimum 8m carriageway width kerb to kerb; • parking is provided outside of the carriageway width; • hydrants are located clear of parking areas; • are through roads, and these are linked to the internal road system at an interval of no greater than 500m; • 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.	Not applicable.
NON-PERIMETER ROADS			
• access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	Will meet the acceptable solutions.	• minimum 5.5m 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 these are linked to the internal road system at an interval of no greater than 500m; • curves of roads have a minimum inner radius of 6m; • the road crossfall does not exceed 3 degrees; and • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	Corroboree Road complies with the specifications detailed in PBP 2019.
WATER SUPPLIES			
• adequate water supplies is provided for firefighting purposes.	Will meet the acceptable solutions.	• reticulated water is to be provided to the development where available; • a 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.	A compliant reticulated water supply is provided.
• water supplies are located at regular intervals; and • the water supply is accessible and reliable for firefighting operations.	Will meet the acceptable solutions.	• fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005; • 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.	A compliant reticulated water supply is provided.
• flows and pressure are appropriate.	Will meet the acceptable solutions.	• fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	A compliant reticulated water supply is provided.

Performance Criteria	Method of Compliance	Acceptable Solution	Comments / Details
• the integrity of the water supply is maintained.	Will meet the acceptable solutions.	• all above-ground water service pipes external to the building are metal, including and up to any taps.	Where provided all above-ground water service pipes will be metal and above-ground water storage tanks shall be of concrete or metal.
• water supplies are adequate in areas where reticulated water is not available.		• a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure; a 65mm Storz outlet with a ball valve is fitted to the outlet; • ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume; • underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; • a hardened ground surface for truck access is supplied within 4m of the access hole; above-ground tanks are manufactured from concrete or metal; • raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959); • unobstructed access is provided at all times; • tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; and • underground tanks are clearly marked, • all exposed water pipes external to the building are metal, including any fittings; • where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; • Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and • fire hose reels are constructed in accordance with AS/NZS 1221:1997 Fire hose reels and installed in accordance with the relevant clauses of AS 2441:2005 Installation of fire hose reels.	A compliant reticulated water supply is provided
ELECTRICITY SERVICES			
• location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Will meet the acceptable solutions.	• where practicable, electrical transmission lines are underground; • where overhead, electrical transmission lines are proposed as follows: o lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and o no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	Electricity services to be provided in accordance with the specifications provided in Attachment C - Services.

Performance Criteria	Method of Compliance	Acceptable Solution	Comments / Details
GAS SERVICES			
• location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Will meet the acceptable solutions.	• 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 are not used; and • above-ground gas service pipes are metal, including and up to any outlets.	Gas services to be provided in accordance with the specifications provided in Attachment C - Services.
EMERGENCY MANAGEMENT PLANNING			
• a Bush Fire Emergency Management and Evacuation Plan is prepared.	Will meet the acceptable solutions.	• Bush Fire Emergency Management and Evacuation Plan is 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; ○ Australian Standard AS 3745:2010 Planning for emergencies in facilities; and ○ Australian Standard AS 4083:2010 Planning for emergencies – Health care facilities (where applicable). • the Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants. Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.	A bush fire emergency management and evacuation plan is to be prepared consistent with the NSW RFS document: "*A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan"*, and Australian Standard AS 3745:2010 "*Planning for emergencies in facilities"*. The emergency and evacuation management plan should include a mechanism for the early relocation of the facility users.
• appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	Will meet the acceptable solutions.	• an Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and • detailed plans of all emergency assembly areas including on-site and off-site arrangements as stated in AS 3745:2010 are clearly displayed, and an annually emergency evacuation is conducted.	An Emergency Planning Committee should be established to consult with Council. Detailed plans of all emergency assembly areas including on-site and off-site arrangements as stated in AS 3745:2010 are clearly displayed, and an annually emergency evacuation is conducted.

ATTACHMENT B – APZS,
LANDSCAPING, FENCES AND GATES

In Australia, bush fires are a natural and essential aspect of the landscape as many plants and animals have adapted to fire as part of their life cycle. However, development adjacent to bush land areas has increased the risk of fire impacting on people and their assets. The impact on property and life can be reduced with responsible preparation and management of bush fire hazards.

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps in reducing vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset protection zones

An APZ is a fuel-reduced area surrounding a built asset or structure.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at: www.rfs.nsw.gov.au/resources/publications.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset
- an area of reduced bush fire fuel that allows suppression of fire
- an area from which backburning or hazard reduction can be conducted,
- an area which allows emergency services access and provides a relatively safe area for firefighters and home 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.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset
- damage to the built asset from intense radiant heat
- ember attack.

The APZ should be located between an asset and the bush fire hazard.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an inner protection area (IPA) and an outer protection area (OPA).

Inner protection areas (IPAs)

The IPA is the area closest to the asset and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and be a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the dwelling, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

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.

Outer protection areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. Vegetation within the OPA can be managed to a more moderate level. The reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathways to crown fuels; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

In practical terms the OPA is an area where there is maintenance of the understorey and some separation in the canopy.

When establishing and maintaining an OPA the following requirements apply:

Trees:

- tree canopy cover should be less than 30%
- trees should have canopy separation
- canopies should be separated by 2 to 5m

Shrubs:

- shrubs should not form a continuous canopy
- shrubs should form no more than 20% of ground cover

Grass:

- should be kept mown (as a guide grass should be kept to no more than 100mm in height)
- leaf and other debris should be mown, slashed or mulched.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA to the standards given above should be undertaken on an annual basis, in advance of the fire season, as a minimum.

ATTACHMENT C – SERVICES

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLY	an adequate water supply for firefighting purposes is installed and maintained.	reticulated water is to be provided to the development, where available; or a 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.
	VARIATIONS	
	Caravan and camping grounds: an adequate water supply for firefighting purposes is installed and maintained. **Primitive camping**: an adequate water supply for firefighting purposes is installed and maintained.	either a reticulated water supply is provided or a 10,000 litres minimum water supply on site.
	water supplies are located at regular intervals. the water supply is accessible and reliable for firefighting operations.	fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; hydrants are not located within any road carriageway; and reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.
	flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
	the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.
	water supplies are adequate in areas where reticulated water is not available.	a connection for firefighting purposes is located within the IPA or non hazard side and away from the structure; a 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal; supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; a hardened ground surface for truck access is supplied within 4m of the access hole; above-ground tanks are manufactured from concrete or metal; raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959); unobstructed access is provided at all times; tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; and underground tanks are clearly marked,

Table 5.3d

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
WATER SUPPLIES	*(continued from previous page)* water supplies are adequate in areas where reticulated water is not available.	all exposed water pipes external to the building are metal, including any fittings; where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter; and fire hose reels are constructed in accordance with AS/NZS 1221:1997 *Fire hose reels*, and installed in accordance with the relevant clauses of AS 2441:2005 *Installation of fire hose reels*.
ELECTRICITY SERVICES	location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground; where overhead, electrical transmission lines are proposed as follow: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 *Guideline for Managing Vegetation Near Power Lines*.
GAS SERVICES	location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	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; 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.

ATTACHMENT D - ACCESS

Table 5.3b

Performance criteria and acceptable solutions for access for residential and rural residential subdivisions

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
	The intent may be achieved where:	
ACCESS (GENERAL REQUIREMENTS)	firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation	property access roads are two-wheel drive, all-weather roads; and perimeter roads are provided for residential subdivisions of three or more allotments; and subdivisions of three or more allotments have more than one access in and out of the development; and traffic management devices are constructed to not prohibit access by emergency services vehicles; and maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient; and all roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; and where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; and where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system.
	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.
	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 AS 2419.1:2005; there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.
PERIMETER ROADS	access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface	perimeter roads are two-way sealed roads; and 8m carriageway width kerb to kerb; and parking is provided outside of the carriageway width; and hydrants are located clear of parking areas; and there are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and the maximum grade road is 15° and average grade is 10°; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
NON-PERIMETER ROADS	access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating	minimum 5.5m width kerb to kerb; and parking is provided outside of the carriageway width; and hydrants are located clear of parking areas; and roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
PROPERTY ACCESS	firefighting vehicles can access the dwelling and exit safely	No specific access requirements apply in a urban area where a 70 metre unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply). In circumstances where this cannot occur, the following requirements apply: minimum carriageway width of 4m; in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; and provide a suitable turning area in accordance with Appendix 3; and curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; and the minimum distance between inner and outer curves is 6m; and the crossfall is not more than 10°; and maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads; and a development comprising more than three dwellings has formalised access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.

A3.3 Vehicle turning head requirements

Dead ends that are longer then 200m must be provided with a turning head area that avoids multipoint turns. "No parking" signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

Figure A3.3

Multipoint turning options.