

- Design & Assessment of Development in Bushfire Prone Areas
- > Bushfire Risk Assessment & Management Plans
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- > Building Solutions Advice for Bushfire Prone Areas

# **Bushfire Assessment**

Proposed alterations and additions to an existing dwelling

Lot 10 DP111562 10 Lethbridge Road, Elizabeth Beach

January 2024 Final

Prepared for Bessonte Pty Ltd

Project No:23085



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#### 1. INTRODUCTION

This Bushfire Assessment has been prepared in relation to proposed alterations and additions to an existing dwelling on land at Lot 10 DP111562, 10 Lethbridge Road, Elizabeth Beach.

The land within the site and surrounds is mapped as bushfire prone land for the purposes of Section 10.3 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

As the land within the site is mapped as bushfire prone land, the purpose of this Bushfire Assessment is to assist in the planning process, to identify the proximity of the proposed development to any potential bushfire threat and to determine what, if any, level of construction is required in accordance with the New South Wales Rural Fire Service guideline entitled *Planning for Bush Fire Protection 2019* (PBP).

#### 2. PROPOSED DEVELOPMENT

The proposed development involves alterations and additions to the existing dwelling on the land.

While parts of the existing dwelling will be retained, the proposal involves alterations and additions to the first floor level of the dwelling and a new balcony to the eastern elevation at that floor level.

New cladding is proposed on external elevations, as well as replacement of the roof.

The existing ground floor level of the dwelling will be unchanged except for the addition of a new stairwell at the north-western (rear) corner to connect the ground and first floor levels.

An existing landing and steps to the western (rear) elevation is to be demolished, with a new deck and steps proposed to that elevation.

The proposed work is shown on drawings by RGR Design (Job no. 1023, Revision A – Development Application, dated 07/11/2023).

An extract of the site plan is at Figure 2.1.

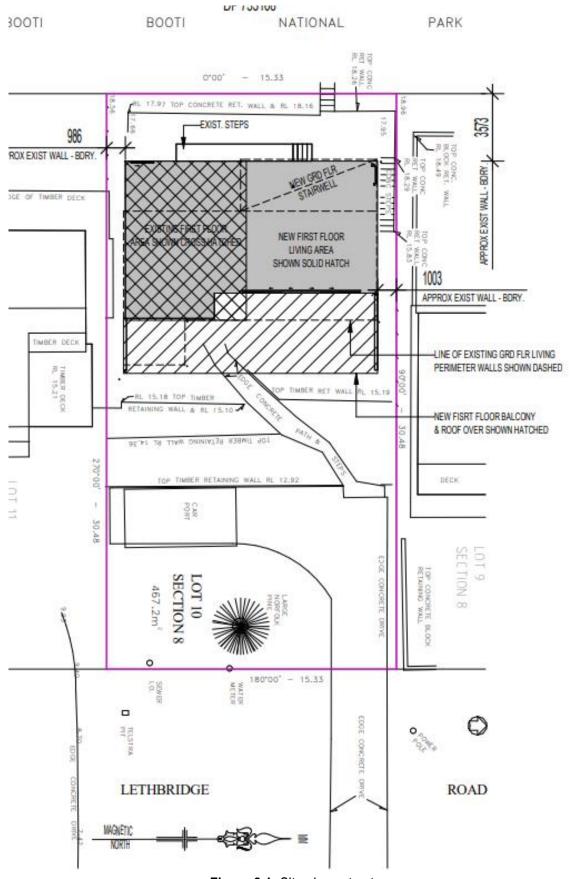


Figure 2.1: Site plan extract (Source: RGR Design) Not to scale.

#### 3. SITE DESCRIPTION

The site comprises land described as Lot 10 DP111562, 10 Lethbridge Road, Elizabeth Beach. The site is on the western side of Lethbridge Road, approximately 100 metres north of the intersection of Lethbridge Road with Lakeside Crescent.

The site has an area of approximately 461.6m<sup>2</sup> and is currently occupied by an existing two-storey dwelling in the western part of the site. Access to the site is via an existing concrete driveway at the eastern site frontage with Lethbridge Road.

The land within the site slopes up from the eastern site boundary with Lethbridge Road towards the western/rear site boundary. The rear (western) boundary of the site adjoins part of Booti Booti National Park (BBNP). A fire trail (Lethbridge Fire Trail) runs through the portion of National Park immediately to the west of the site, upslope from and parallel to the western/rear site boundary.

The western (rear) elevation of the existing dwelling on the land is about 3.573 metres from the western site boundary with the adjacent part of Booti Booti National Park.

Established residential allotments adjoin the northern and southern site boundaries.

The nearest area of vegetation that is likely to present a potential bushfire hazard in relation to development of the site is on land within BBNP, adjoining the western boundary. Vegetation within BBNP also exists to the east of the site, on the eastern (lower) side of the Lethbridge Road reserve.

Land within the part of BBNP to the west of the site is subject to management by NSW National Parks and Wildlife Service (NPWS) via the *Booti Booti National Park – Fire Management Strategy* (FMS).

The FMS identifies land within BBNP to the west of the site as a fire trail. The Booti State Recreation Area Plan of Management (PoM) applies to the adjacent National Park and notes the following relevant action: "the track behind the houses in Lethbridge Road, Elizabeth Beach and the track around Green Point village will be retained for fire protection purposes". The PoM does not prescribe any specific vegetation management regimes and it is expected that the current vegetation condition is representative of the future vegetation characteristics.

The land within BBNP is mapped as containing Category 1 potential bushfire hazard vegetation. The subject site is also mapped as being within the vegetation buffer on the bushfire prone land map (Figure 3.1).

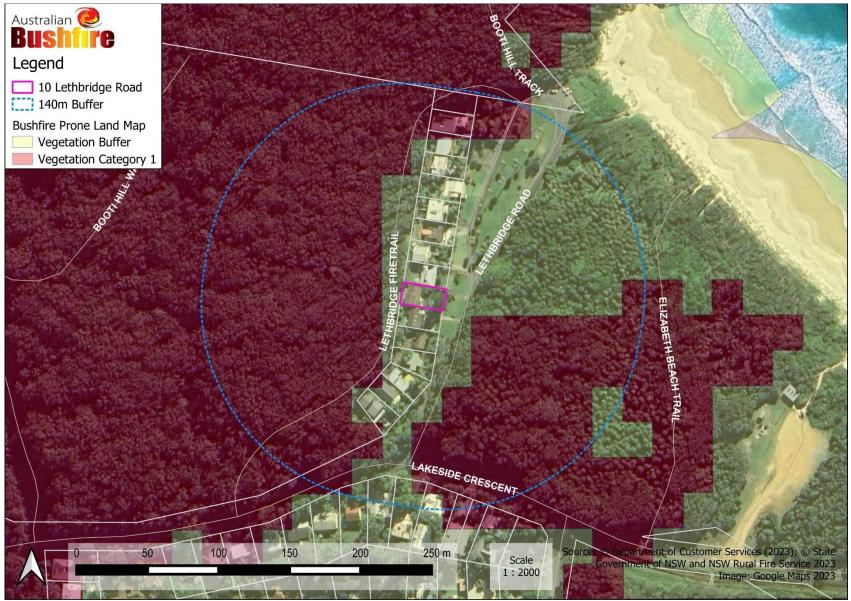


Figure 3.1: Site Locality and Bushfire Prone Land Map

The site is serviced by reticulated water. Overhead electricity is in Lethbridge Road.

The following photos show the condition of land on and around the site.



Photo 3.1: Existing dwelling looking west from the eastern side of Lethbridge Road.



Photo 3.2: Looking south along the rear of the property showing existing dwelling.

# 3.1 Vegetation Classification

The nearest area of unmanaged/potential bushfire hazard vegetation is on adjacent land to the west of the site, within BBNP.

Vegetation within BBNP also exists to the east of the site, on the eastern (lower) side of the Lethbridge Road reserve.

For the purposes of determining Asset Protection Zones (APZs) and Bushfire Attack Levels (BALs), the predominant vegetation formation has been classified in accordance with Appendix 1 of PBP as *Wet Sclerophyll Forest* (Shrubby formation).

## 3.2 Slope Assessment

The assessment of slope has been undertaken in accordance with the methodology in Section A1.5 of PBP. The assessment of slope was undertaken via analysis of 1 metre resolution Digital Elevation Model (DEM) and through field analysis using a hand-held inclinometer and range finder.

The slope of land most likely to influence bushfire behaviour in relation to the proposal is:

- Upslope (approximately 16-17° upslope) under vegetation to the west; and;
- Relatively flat under vegetation on the eastern (lower) side of Lethbridge Road.

#### 4. BUSHFIRE ASSESSMENT

#### 4.1 Bushfire Attack Levels

The proposed development involves alterations and additions to a Class 1a building for the purposes of Volume 2 of the National Construction Code (Building Code of Australia, the NCC/BCA). The site is in the North Coast fire (weather) area and is subject to a Fire Danger Index (FDI) of FDI 80.

Appendix 1 of PBP provides the site assessment methodology for determining the applicable Bushfire Attack Level (BAL). Once the BAL is determined, construction requirements for the corresponding BAL apply subject to *AS3959-2018: Construction of buildings in bushfire-prone areas* subject to Section 7.5 of PBP.

The separation distance between the rear (western) elevation of the existing dwelling and the nearest vegetation is approximately 3.573 metres from the rear (western) boundary with the adjacent part of BBNP as shown in Figure 2.1. While there appears to be some degree of informal management of vegetation within the adjacent part of BBNP between the eastern (lower) side of the fire trail and the western (rear) boundary of the site, the land able to be lawfully managed in conjunction with the existing dwelling is technically limited to the separation distance between the dwelling and the rear site boundary.

According to Table A1.12.6 of *Planning for Bush Fire Protection 2019* (PBP), the highest assessed BAL is BAL-FZ.

While this is the case, the discussion in the following section sets out a performance-based approach in relation to construction of the east-facing parts of the building to BAL-40 (subject to radiant heat levels <40kW/m²).

In relation to the remainder of the building, the NSW variation to Volume 2 of the NCC/BCA excludes Section 9 of AS3959-2018 Construction of buildings in bushfire-prone areas as a deemed-to-satisfy solution for buildings subject to BAL-FZ. While this is the case, as described in PBP, although Section 9 of AS 3959 and the NASH Standard have not been adopted in NSW for deemed-to-satisfy construction in BAL-FZ, the content still provides the basis for construction in the 'flame zone' (BAL-FZ).

On this basis, and subject to the discussion in the following section in relation to construction of the east-facing parts of the building to BAL-40, the recommendations of this assessment include the adoption of Section 9 of AS 3959 as a performance solution relating to building construction standards for those parts of the new building work subject to BAL-FZ. Approval of any consent with a condition requiring

construction of new work to the requirements of Section 9 of AS3959 will constitute a building solution for the purposes of Volume 2 of the NCC/BCA.

In relation to the western parts of the building subject to proposed new work, it is also noted that parts of the new building works will be located closer than 10 metres from classified vegetation. As per Section 9.1 of AS 3959, any building elements <10 metres from any classified vegetation (within BAL-FZ) are to conform to AS 1530.8.2.

## 4.1.1 Shielding

According to Section A1.8 (Shielding) of PBP, 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. Section A1.8 of PBP also provides that reduced construction requirements do not apply where any elevation is BAL-FZ unless justified with an appropriate performance-based assessment.

The highest assessed BAL for the proposed work is BAL-FZ. BAL-FZ will apply to any new building work to the roof and the northern, southern and western elevations of the dwelling (as each of these elevations have a line of sight, whether parallel or perpendicular, to potential bushfire hazard vegetation in the adjacent part of the National Park to the west of the site).

It is proposed that new work to the east-facing elevation(s) to Lethbridge Road be constructed to BAL-40 at each floor level.

In relation to a performance-based approach to the proposed construction of the east-facing elevation(s) of the dwelling to BAL-40 at each floor level, the following is relevant:

- There is no line of sight between the east-facing elevations and any vegetation within the National Park outside the western site boundary.
- The eastern elevation(s) of the dwelling face Lethbridge Road, with existing dwellings on land to the north and south of the site.
- Any vegetation on the eastern (lower) side of Lethbridge Road is ~34 metres from the easternmost extent of the proposed new deck/balcony facing Lethbridge Road at first floor level.
- In relation to vegetation on the eastern side of Lethbridge Road, physical separation is provided by the road reserve in Lethbridge Road, including the road carriageway (Lethbridge Road forms

a loop to the north of the site with eastern and western carriageways) and cleared land within the road reserve.

- Any of the eastern parts of the building proposed to be constructed to BAL-40 are >12 metres
  east (12.09 metres) from the western site boundary with the adjacent part of the National Park.
- The proposal has been modelled to determine what the radiant heat flux (RHF) in relation to the vegetation to the west of the site is likely to be at a line 12 metres east from the western site boundary. This is the distance between the rear boundary of the site with the National Park and any of the eastern parts of the building proposed for construction at BAL-40. The modelled radiant heat is 35.1kWm² (outside flame zone based on the modelled RHF). In relation to the modelling, and to be conservative, the effective slope under the vegetation to the west of the site has been adopted as 10° upslope (as per the Kataburn paper) from the site.
- The proposal has been modelled to determine what the flame length in relation to the vegetation to the west of the site is likely to be at a line 12 metres east from the western site boundary.
- The modelled flame length is 11.22 metres.

The output of the modelling is at the Annexure to this assessment. On this basis, for the purposes of Section A1.8 of PBP, the performance-based approach outlined above supports the proposition that new building work to the east-facing elevation(s) to Lethbridge Road can be constructed to BAL-40 at each floor level.

#### 4.1.2 Better Bushfire Outcomes

Section 7.8 of PBP includes considerations for infill development where alterations/additions are proposed to a dwelling built prior to 2002 and the existing building has little or no BPMs incorporated into its design. In this circumstance, PBP notes that:

- a. consideration must be given to upgrading the existing structure; and
- b. the new works are required to comply with the National Construction Code of Australia (NCC).

It is to be recommended that:

 The roof and the northern, southern and western elevations of the dwelling be constructed to the requirements for BAL-FZ as per Section 9 of AS3959-2018, noting that any building elements

- <10 metres from the western site boundary are to conform to AS1530.8.2 as per Section 9.1 of AS3959-2018.
- Any new work to the east-facing elevation(s) and the proposed balcony/deck facing
   Lethbridge Road be constructed to BAL-40 at each floor level.

Any parts of the existing building not subject to new building work are to be upgraded to improve ember protection in accordance with the RFS Development Assessment and Planning guideline – Upgrading of Existing Buildings.

#### 4.2 Bushfire Protection Measures

The proposal is for alterations and additions to an existing dwelling on an existing lot and is residential infill development. Residential infill development refers to the development of land by the erection of, or alteration or addition to, a dwelling which does not require the spatial extension of services including public roads, electricity, water or sewerage and is within an existing lot (PBP, 2019).

Infill development is assessed in accordance with the acceptable solutions and performance criteria in Chapter 7 (Residential Infill Development) of PBP. The Bushfire Protection Measures for residential infill development include provisions relating to APZs, access, water supply, electricity and gas services, construction standards, landscaping and emergency evacuation.

Table 4.1 considers the proposal in relation to the acceptable solutions contained in Chapter 7 (Residential Infill Development) of PBP.

Table 4.1: Performance Criteria (Re: Table 7.4a-c) of PBP

#### RELATIONSHIP OF PROPOSAL TO ACCEPTABLE SOLUTIONS PERFORMANCE CRITERIA ASSET PROTECTION ZONES The proposal constitutes infill development on an existing residential allotment. The existing allotment – containing the existing dwelling – is constrained by proximity to vegetation on land to the west. As per the discussion in Sections 4.1 and 4.1.1 above, proposed new > APZs are provided commensurate building work is to be constructed to the requirements of Section 9 of with the construction of the building; AS3959-2018 for BAL-FZ, except the east-facing elevation (at each floor level) which can be constructed to the requirements for BAL-40. Land within the site is currently maintained as an APZ, consistent with > A defendable space is provided the standard for an Inner Protection Area (IPA). The land is to continue to be maintained in that condition. Any available defendable space will be limited to land within the site boundaries and Lethbridge Road to the east of the site. Recommendations are made for all land within the site to continue to APZs are managed and maintained to be maintained to the standard of an IPA (in accordance with the prevent the spread of a fire to the building. requirements of Appendix 4 of PBP) in perpetuity. The land to be maintained (and to continue to be maintained) as an APZ/IPA is within the boundaries of the development site. The The APZ is provided in perpetuity. APZ proposal does not rely on maintenance of vegetation beyond the western boundary. maintenance is practical, soil stability is not compromised and the potential for There do not appear to be any significant issues in relation to the crown fires is minimised. continuing maintenance of land within the site as an APZ/IPA given that it has been historically maintained as such in conjunction with the

existing dwelling on the land.

PERFORMANCE CRITERIA	RELATIONSHIP OF PROPOSAL TO ACCEPTABLE SOLUTIONS			
ACCESS				
Firefighting vehicles are provided with safe, all-weather access to structures.	Existing vehicular access to the site is via an existing driveway from Lethbridge Road at the eastern site frontage.  Existing access arrangements to the site will not change via the proposal.  The Lethbridge Fire Trail runs through the adjacent area of National Park outside and above the western boundary of the site.  The current condition of the fire trail does not appear to facilitate access by larger firefighting vehicles.			
The capacity of access roads is adequate for firefighting vehicles.	Public roads serving the site have capacity to carry fully loaded firefighting vehicles.			
There is appropriate access to water supply.	Reticulated water supply is available to the site. The nearest hydrant is on the eastern side of Lethbridge Road. It appears that the nearest hydrant will be within 70 metres of the most distant part of the dwelling (including the proposed additions). If this is found not to be the case, then consideration should be given to provision of a static water supply for firefighting purposes in accordance with Table 5.3d of PBP.			
Firefighting vehicles can access the dwelling and exit the property safely.	Lethbridge Road forms the eastern site boundary.  Apart from the existing driveway, there is no ability for fire fighting vehicles to access other parts of the site.			
WATER SUPPLIES				
Adequate water supplies are provided for firefighting purposes.	Reticulated water supply is available.			
<ul> <li>Water supplies are located at regular intervals; and</li> <li>The water supply is accessible and reliable for firefighting operations.</li> </ul>	Hydrants are located in Lethbridge Road at regular intervals. The nearest hydrant is on the eastern side of Lethbridge Road.			
Flows and pressure are appropriate.	No information is available in relation to flows and pressure.			
The integrity of the water supply is maintained.	Recommendations are made in relation to above-ground water services and pipes to be metal.			
A static water supply is provided for firefighting purposes in areas where reticulated water is not available.	As discussed above in this table, if it is found that the nearest hydrant will be more than 70 metres from the most distant part of the dwelling (including the proposed additions), then consideration should be given to provision of a static water supply for firefighting purposes in accordance with Table 5.3d of PBP.			
ELECTRICITY SERVICES				
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Existing overhead electricity supplies are in Lethbridge Road. There are no details of any changes proposed to the existing electricity supply.			

#### PERFORMANCE CRITERIA

#### RELATIONSHIP OF PROPOSAL TO ACCEPTABLE SOLUTIONS

#### **GAS SERVICES**

Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings Any existing and/or proposed bottled gas installation(s) are to be consistent with the relevant acceptable solutions of PBP. Where practical, it is recommended that gas bottles (if proposed) are located away from the building.

#### **CONSTRUCTION STANDARDS**

The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.

As per the discussion in Sections 4.1 and 4.1.1 above, proposed new building work is to be constructed to the requirements of Section 9 of AS3959-2018 for BAL-FZ, except the east-facing elevation(s) (at each floor level) which can be constructed to the requirements for BAL-40 for the purposes of Section A1.8 of PBP.

In relation to the western parts of the building subject to proposed new work, it is also noted that parts of the new building works will be located closer than 10 metres from classified vegetation.

As per Section 9.1 of AS 3959, any building elements <10 metres from any classified vegetation are to conform to AS 1530.8.2.

Any parts of the existing building not subject to new building work are to be upgraded to improve ember protection in accordance with the RFS Development Assessment and Planning guideline – Upgrading of Existing Buildings.

Proposed fences and gates are designed to minimise the spread of bush fire

N/A. No details.

Proposed Class 10a buildings are designed to minimise the spread of bush fire

No Class 10a buildings are proposed.

#### LANDSCAPING

Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for winddriven embers to cause ignitions.

Recommendations are made in relation to the continued management of land within the site as an APZ/IPA for the purposes of Appendix 4 of PBP.

#### 5. RECOMMENDATIONS

The following recommendations are made in relation to the bushfire protection measures for the proposed alterations and additions to an existing dwelling on land at Lot 10 DP111562, 10 Lethbridge Road, Elizabeth Beach:

- **A.** All land within the site boundaries is to continue to be managed as an Asset Protection Zone (APZ).
- **B.** APZs are to be maintained in accordance with the requirements of an Inner Protection Area (IPA) as described in Appendix 4, Section A4.1.1 of *Planning for Bush Fire Protection 2019* (PBP) and any grassy vegetation within the IPA is to be maintained to a height <100mm. A clear area of low-cut lawn or pavement is to be maintained adjacent to the dwelling and proposed additions.
- **C.** Subject to (A), (B) and (D), construction of new building work (including the roof and any replacement of external cladding and windows/doors) is to comply with the construction requirements for BAL-FZ as per Section 9 of AS 3959-2018 (Construction of buildings in bushfire-prone areas) and any additional construction requirements/variations as outlined in Section 7.5 of Planning for Bush Fire Protection 2019. As per Section 9.1 of AS 3959, any building elements <10 metres from any classified vegetation within the part of the National Park to the west/rear of the site are to conform to AS 1530.8.2.
- **D.** Applying Section A1.8 of PBP, consideration may be given to construction of any new building work to the east-facing elevation(s) (all floor levels) of the dwelling (and the proposed balcony/deck facing Lethbridge Road) being reduced by one level of construction to meet the requirements for BAL-40 as per AS3959-2018 and any additional construction requirements as per Section 7.5 of PBP.
- **E.** Any parts of the existing dwelling which are not subject to new building work as part of this proposal are to be upgraded to improve ember protection as follows:
  - i. Enclosing or covering openings with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture of 2mm. Where applicable, this includes the openable portion of the windows, vents, weepholes and eaves, but does not include roof tile spaces.
  - ii. Weather strips, draught excluders or draught seals shall be installed at the base of sidehung external doors as per AS 3959.

- **F.** Leafless guttering and/or metal leaf guard with a flammability index of 5 or less tested in accordance with *AS 1530.2* is to be installed in the gutters and/or roof valleys of the dwelling to reduce the potential build-up of flammable material.
- **G.** Where bottled gas is existing or proposed:
  - It is to be installed and maintained in accordance with AS 1596 and the requirements of relevant authorities.
  - ii. All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.
  - iii. Gas cylinders should be separated from the proposed building. If gas cylinders need to be kept close to the buildings, the release valves are to be directed away from the buildings and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion.
  - iv. Connections to and from gas cylinders are to be metal.
- H. If any part of the existing dwelling and proposed alterations and additions are found to be more than 70 metres from the nearest hydrant in Lethbridge Road, a static water supply of not less than 5,000 litres is to be provided/available on site for firefighting purposes. Where the static water supply is to be provided in tank(s), then any tanks are to be of concrete or metal construction. A 65mm Storz fitting is to be provided to ensure access to the static water supply for RFS firefighting vehicles. If the static water supply is to be contained in tank(s), then all tank penetrations, above-ground pipes and fittings should be metal. Access to the static water supply should be clearly identified with an SWS marker supplied by or approved by the RFS.
- **I.** All above-ground water service pipes external to the dwelling are to be metal, including and up to any taps.
- J. Occupants are advised to prepare a Bush Fire Survival Plan which is revised annually prior to the bushfire season. A *Guide to Making a Bush Fire Survival Plan* has been developed by the NSW RFS to assist residents in the preparation of their plan and can be found at the NSW RFS website www.rfs.nsw.gov.au. On days of catastrophic fire weather, the NSW RFS recommends leaving early as the only safe option.

#### **NOTES & DISCLAIMER:**

- (i) This assessment relates only to the development described in Section 2 of this assessment.
- (ii) This assessment has been based on bushfire protection guidelines as outlined in the document entitled Planning for Bush Fire Protection 2019 (PBP).
- (iii) Notwithstanding the precautions recommended, it should always be remembered that bushfires burn under a range of conditions and an element of risk, no matter how small, always remains.
- (iv) This assessment does not imply or infer any approval for the removal and/or thinning of vegetation for Asset Protection or other purposes. It is the responsibility of the client/landowner to obtain all necessary approvals in this regard.

#### 6. REFERENCES

NSW National Parks and Wildlife Service (2008), Booti Booti National Park – Fire Management Strategy

NSW Rural Fire Service (2019)

Planning for Bush Fire Protection 2019

Standards Australia (2018)

AS 3959-2018 Construction of buildings in bushfire-prone areas

CSIRO (2015)

Kataburn – Predicting downslope rate of fire spread

#### **ANNEXURE**



# **NBC Bushfire Attack Assessment Report V4.1**

AS3959 (2018) Appendix B - Detailed Method 2

**Print Date:** 10/01/2024 **Assessment Date:** 10/01/2024

Site Street Address: 10 Lethbridge Road, Elizabeth Beach

Assessor: Simon Carroll; ABAC Australian Bushfire Assessment Consultants

Local Government Area: Mid-Coast Alpine Area: No

**Equations Used** 

Transmissivity: Fuss and Hammins, 2002 Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: 1

**Vegetation Information** 

**Vegetation Type:** Forest (including Coastal Swamp Forest)

Vegetation Group: Forest and Woodland

Vegetation Slope:10 DegreesVegetation Slope Type:UpslopeSurface Fuel Load(t/ha):22Overall Fuel Load(t/ha):36.1

Vegetation Height(m): 2 Only Applicable to Shrub/Scrub and Vesta

**Site Information** 

Site Slope: 15 Degrees Site Slope Type: Upslope

Elevation of Receiver(m) Default APZ/Separation(m): 12

Fire Inputs

Veg./Flame Width(m): 100 Flame Temp(K): 1090

**Calculation Parameters** 

Flame Emissivity: 95 Relative Humidity(%): 25
Heat of Combustion(kJ/kg 18600 Ambient Temp(K): 308
Moisture Factor: 5 FDI: 80

**Program Outputs** 

Peak Elevation of Receiver(m): 7.38 Level of Construction: BAL 40 Radiant Heat(kW/m2): 35.1 Flame Angle (degrees): 48 **Maximum View Factor:** 0.53 Flame Length(m): 11.22 Inner Protection Area(m): Rate Of Spread (km/h): 1.06 6 0.871 Outer Protection Area(m): 6 Transmissivity:

Fire Intensity(kW/m): 19758