



Bushfire
Environmental
Management
Consultancy



BUSH FIRE ASSESSMENT REPORT

Special Fire Protection Purpose

27 & 29 Stronach Avenue, East Maitland, NSW

Lot 98 & Lot 99 / DP 247251



**BRONZE
MEMBER**
Fire Protection
Association Australia



Disclaimer

Please note that every effort has been made to ensure that information provided in this report is accurate. It should be noted that the information is for the client for the specific purpose for which it is supplied, that is to support a DA application. This report is strictly limited to the purpose including the facts and matters stated within it and is not to be used, directly or indirectly, for any other application, purpose, use or matter.

Due consideration has been given to site conditions and to appropriate legislation and documentation available at the time of preparation of the report. As these elements are liable to change over time, the report should be considered current at the time of preparation only. Should further information become available regarding the conditions at the site, BEMC reserves the right to review the report in the context of the additional information. BEMC has made no allowance to update this report and has not considered events occurring after the time its assessment was conducted.

Bushfire and Environmental Management Consultancy (BEMC) Pty Ltd will not be liable in respect of any losses arising out of any event or events beyond our reasonable control. Samantha Jennings or Duncan Scott-Lawson or will not be liable in respect of any business losses, including without limitation, loss of or damage to profits, income, revenue, use, production, anticipated savings, business, contracts, commercial opportunities, or goodwill. Samantha Jennings or Duncan Scott-Lawson will not be liable to you in respect of any special, indirect, or consequential loss or damage.

Apart from fair dealing for the purposes of private study, research, criticism, or review as permitted under the Copyright Act, no part of this report, its attachments or appendices may be reproduced by any process without the written consent of BEMC Pty Ltd. All enquiries should be directed to BEMC Pty Ltd.

Title	Bush Fire Assessment Report – Special Fire Protection Purpose				
Description	Special Fire Protection Purpose 27 & 29 Stronach Avenue, East Maitland, NSW				
Created By	Duncan Scott-Lawson 0408 667 137 duncan@emconsultancy.com.au				
Prepared For	True Wealth Property - David Clynych C/o Ashlee Rutherford ashlee@perceptionplanning.com.au 0428 801 720				
Version Number	Author	Date	Reviewed	Date	Status
1	SJ / DSL	23/09/2023	DSL	25/10/2023	Completed

16 APPENDIX 8 Class 3 NCC Fire Certification.....59

17 APPENDIX 9 Compliance and Approval Strategy61

TABLES

Table 1 Description of Proposed development9

Table 2 Bush fire risk assessment study13

Table 3 Hazard Assessment (Method 2 AS3999)21

Table 4 – Chapter 6 - Special Fire Protection Methods23

FIGURES

Figure 1 East Maitland, NSW (Mecone Mosaic, 2023)7

Figure 28

Figure 3 (Council 2023)11

Figure 4 (D Portal)17

Figure 518

PLATES

Plate 1 (P1) Access along Stronach Avenue.....39

Plate 2 (P2) Entrance into property from Stronach Avenue.....39

Plate 3 (P3) Reticulated water supply to development.....40

Plate 4 (P4) Creek within the classifiable bush fire threat40

Plate 5 (P5) Vegetation to the northwest along fire run 1 that creates the greatest bushfire threat41

Plate 6 (P6) Effective slope of Transect 141

Plate 7 (P7) Site slope of Transect 242

Abbreviations and Acronyms

AHIMS	Aboriginal Historic Information Management System
APZ	Asset Protection Zone
AS/NZS 1221:1997	Australian Standard – Fire hose reels
AS1596-2014	Australian Standard – The storage and handling of LP Gas
AS2419-2021	Australian Standard – Fire hydrant installations
AS2441:2005	Australian Standard – Fire hose reels installation
AS37	Emergencies in facilities
AS3	Buildings in bush fire prone areas
AS4	Facilities
BA	
BCA	
BFS	
BPA	(e Land)
BPL	
BPI	
BV	
EP&	ment Act 1979
FFD	
GFD	
ha	
HOC	Heat Of Combustion
IPA	Inner Protection Area
kJ/kg	Kilo Joules per Kilo gram
LGA	Local Government Area
LAT	Large Air Tanker
OPA	Outer Protection Area
PBP	Planning for Bush fire Protection
RF Act	<i>Rural Fires Act 1997</i>
RF Regs	<i>Rural Fires Regulations 2013</i>
RHG	Restricted Head Growth
SEED	Central Resource for Sharing and Enabling Environmental Data
SFR	Short Fire Run
SFPP	Special Fire Protection Purpose

1 EXECUTIVE SUMMARY

BEMC Pty Ltd was engaged by True Wealth Property - David Clynych to complete a Bush Fire Assessment Report (BFAR) on proposed Special Fire Protection Purpose at 27 & 29 Stronach Avenue, East Maitland, NSW (**Figure 1, page 7**). The proposed development includes a Co-living development.

Vegetation not mapped within the bushfire prone area map can be assumed to not meet the requirements of Category 2 and the risk of a landscape fire is so low that it's not considered a landscape bushfire threat in accordance with PBP 2019 and AS3959. Notwithstanding, this report considers this some risk from this vegetation and applies bushfire protection measures.

BEMC has used Method 2 assessment pathway from AS3959:2018 to undertake this assessment and to prepare the Bush Fire Assessment Report (BFAR).

Based upon the assessment, perusal of the site plan prepared by Arkhi Design and Consulting (**Appendix 1, page 35**), and a site visit, it is recommended that development consent be granted subject to the following conditions to comply with PBP 2019:

Recommendation 1 – Asset Protection Zone

At the commencement of building works and in perpetuity the property around the proposed development shall be maintained as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW RFS document Standards for asset protection zones to a distance of:

- 8.2 metres on the north-eastern elevation (or to the property boundary, which ever if furthest),
- 3 metres on the south-eastern elevation (or to the property boundary, which ever if furthest),
- 8 metres on the south-western elevation (or to the property boundary, which ever if furthest),
- 4.2 metres on the north-western elevation (or to the property boundary, which ever if furthest)

Recommendation 1 – Landscaping

A Landscaping plan is required to illustrate:

- Compliance with APZ standards within Appendix 4 of PBP 2019,
- If fencing, retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed of non-combustible materials,
- A minimum 1-metre-wide area (or to the property boundary where the setbacks are less than 1 metre), suitable for pedestrian traffic, must be provided around the immediate curtilage of the building.
- Planting is limited in the immediate vicinity of the building.
- Planting does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters).
- Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do no touch or overhang buildings.
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies.
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown.
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter)
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building.

- Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and
- Low flammability vegetation species are used.

Recommendation 1 – Construction

New construction must comply with section 3 and section 7 (BAL 29) Australian Standard AS3959-2018 Construction of buildings in bush fire-prone areas or NASH Standard National Standard Steel Framed Construction in Bushfire Areas – 2021 as appropriate and section 7.5 of Planning for Bush Fire Protection 2019.

Recommendation 1 – Electricity services

Where possible electricity should be placed underground.

Recommendation 1 – Gas services

Any reticulated or bottled gas shall be installed and maintained in accordance with the below requirements as outlined in Table 7.4a of PBP:

- Placed on the southern elevation of the building.
- Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side.
- Connections to and from gas cylinders are metal.
- Polymer-sheathed flexible gas supply lines are not used; and
- Above-ground gas service pipes are metal, including and up to any outlets.

Recommendation 1 – Emergency Management

The Bush Fire Emergency Management and Operation Plan shall:

- Be consistent with the NSW BFE document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*.
- Be consistent with *Australian Standard AS 3745:2010 Planning for emergencies in facilities*.
- Be provided to the Local Emergency Management Committee for its information prior to occupation of the development.
- Establishes an Emergency Management Committee with responsibilities for decisions identified.
- Provides decision triggers to inform when to evacuate and all potential evacuation routes.
- Provides guidance on the appropriate management actions during elevation fire danger days.
- An appropriate refuge location should also be considered if bushfire prevents evacuation.
- Consider the amount of travel likely to be generated during an emergency evacuation; the capacity of the broader road network to facilitate safe emergency evacuation; limitations/constraints inherent in the road system; and management of potential traffic conflicts (such as emergency vehicles versus evacuating staff).
- The size and age group of the existing population within the locality and the number of other SFPP facilities within the locality.
- Provide monitoring schedules, and triggers to undertake management and maintenance of Bush fire protection measures.

Finally, the implementation of the adopted measures and recommendations forwarded within this report comply with Planning for Bush fire Protection (2019) and will contribute to the amelioration of the potential impact of any bush fire upon the development, but they do not and cannot guarantee that the area will not be affected by bush fire at some time.

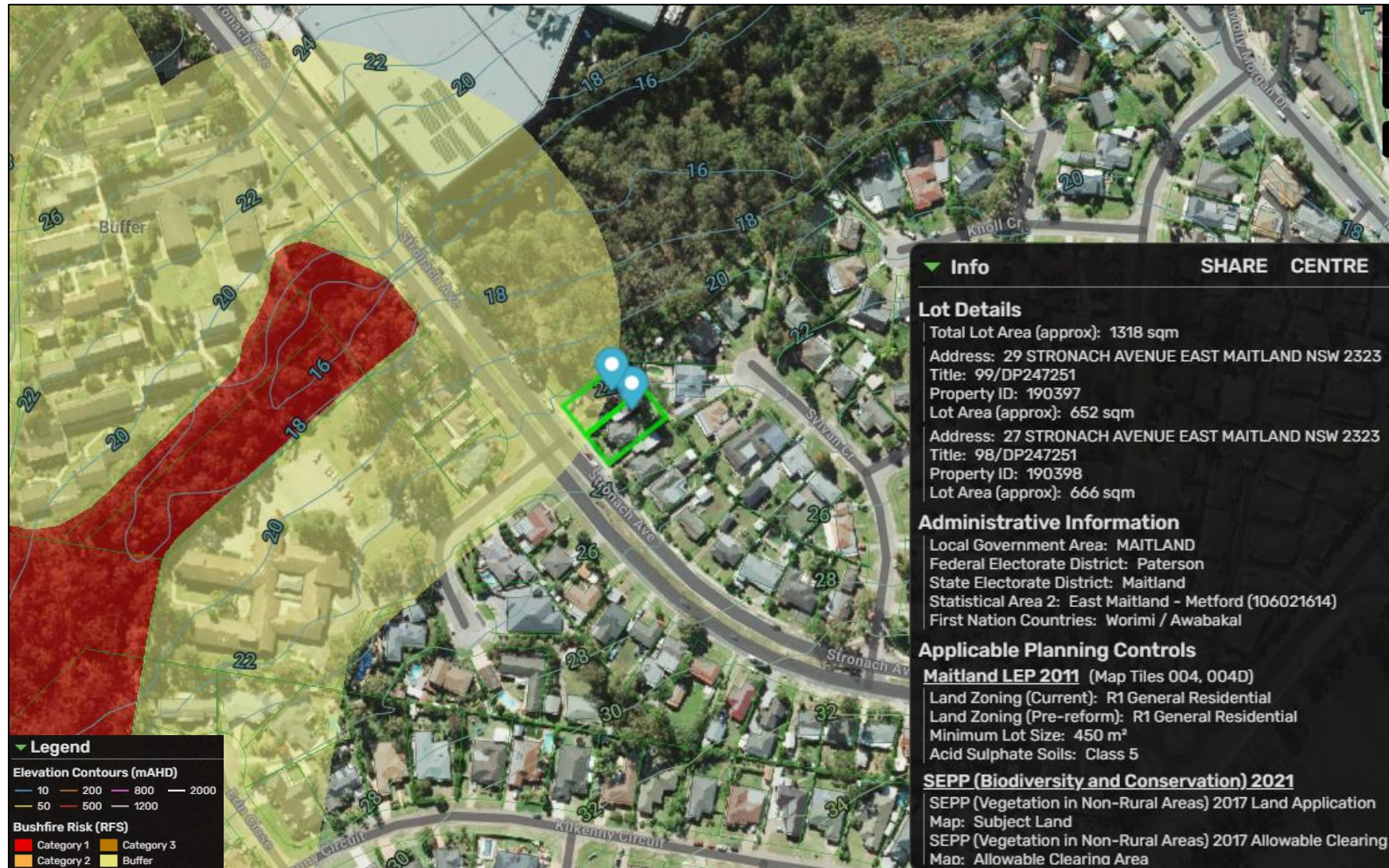
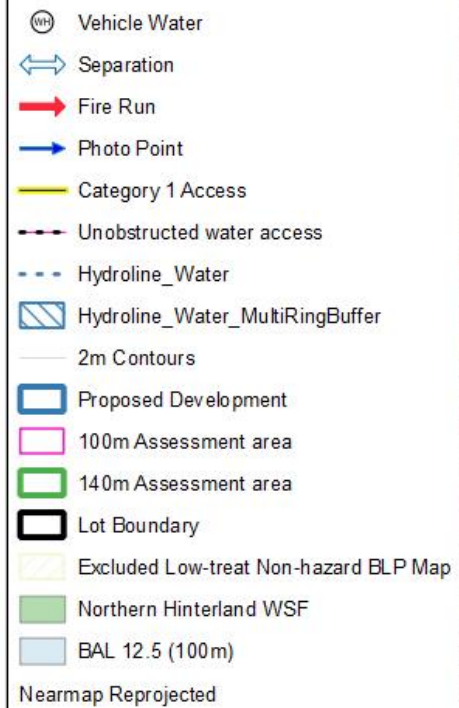


Figure 1 Property Location of 27 & 29 Stronach Avenue, East Maitland, NSW (Mecone Mosaic, 2023)

Figure 2 Bushfire Assessment



2 INTRODUCTION

BEMC Pty Ltd was engaged by True Wealth Property - David Clynych to complete a Bush Fire Assessment Report (BFAR) to accompany a Development Application for a class 3 Special Fire Protection Purpose located at 27 & 29 Stronach Avenue, East Maitland, NSW (**Figure 1, page 7**).

The identification of bush fire prone lands (BPL Map) in NSW is required under s 10.3 of the *EP&A Act*. S. 4.14 of the *EP&A Act* requires development to compliance with Planning for Bushfire Protection, 2019 (PBP 2019) if any part of a development site is affected by bush fire hazard as indicated within the BPL Map.

It is clear from the investigation and assessment of proposal; the site is located within Bush fire Prone Land. This development falls within identified bush fire affected land within the Maitland Council bush fire prone land map and the applicant is required to submit a bush fire assessment consistent with PBP 2019.

If the applicant determines that the project is integrated through the Development Application process, this document can support an application for *General Terms of Agreement* via a *Bush Fire Safety Authority* (BFSA) from NSW Rural Fire Service (RFS) as the report adheres to the requirements of s 45 of the *Rural Fires Regulation 2013* (RF Regs), Appendix 1, A2.1, A2.1.1 of PBP 2019. The proposed development is not listed under s 46 of the *Rural Fire Regulation 2013* (RF Regs) excluded from requirements for BFSA. The proposed development is listed under s 47 of the RF Reg as an additional Special Fire Protection Purpose (SFPP) development requiring a BFSA.

Site Particulars are illustrated within Table 1 below and Figure 1, **page 7**, and subdivision plans in **Appendix 1, page 35**.

2.1 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development. The location of this type of development is found to offer a high level of amenity to lifestyle in regard to access of shopping, medical, pharmacy, social interactions, and has all the required attributes for a care facility.

It is noted that a aged care facility is being constructed immediately to the west, there would be a perceived discrimination against specialist disability participants to achieve a high level of amenity if this proposal was not supported.

The required objectives for Special Fire Protection Purpose Developments have been considered in this assessment.

Table 1 Description of Proposed development

Boundaries	Existing buildings east and south, Stronach Avenue west, forested vegetation north.
Topography	Slight downslope north-west
Type of development	SFPP – Co-living development.
Proposed dwellings	Class 3 residential building.
Landscaping plan provided	No
Current land-use	Residential
Fire weather	Maitland – FFDI – 100

2.2 OBJECTIVES OF ASSESSMENT

To assess the proposed development in consideration of s4.14 of the EP&A Act 1979, PBP 2019 and AS 3959:2018 to enable council to make a determination.

This report assesses whether the development meets the six objectives listed in section 1.1 of PBP 2019, which provide for the protection of human life and minimize impacts on property as follows:

1. Afford buildings and their occupants protection from exposure to a bush fire.
2. Provide for a defensible space to be located around buildings.
3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.
4. Ensure appropriate operation access and egress for emergency services personnel and residents is available.
5. Provide for ongoing management and maintenance of Bush fire Protection Measures (BPMs); and
6. Ensure the safety of the development is consistent with the needs of firefighters.

2.3 SPECIFIC OBJECTIVES OF SPECIAL FIRE PROTECTION PURPOSE DEVELOPMENTS

The aims and objectives listed in section 1.1 of PBP 2019 remain applicable to Special Fire Protection Purpose developments, however further consideration has been given to these types of developments to ensure Bush fire Protection Measures (BPMs) are fully incorporated at the design stage of the development. The specific objectives of Special Fire Protection Purpose developments outlined in section 6.2 of PBP 2019 are:

- Minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting.
- Provide an appropriate operational environment for emergency service personnel during firefighting and emergency management.
- Ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development, and
- Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

2.4 METHOD 2 FIRE BEHAVIOUR CALCULATIONS

The design fire methodology outlined in Appendix B of AS3959:2018, Detailed BAL Assessment, provides the mathematical methodology and accepted inputs of the simplified BAL assessment from which Method 1 matrix was derived. Method 2 fire design modelling consists of accurately determining input into nested calculations within the modelling to provide increased accuracy in determining radiant heat flux and flame length.

Furthermore, Method 2 can consider the impact of the Kataburn rate of spread, radiant heat shielding, and short fire runs which may have an impact on the radiant heat exposure of a proposed development.

Understanding the knowledge gaps for bush fire prediction is required to enable accurate interpretation of bush fire modelling and fire engineering calculations used through the Method 2 detailed assessment. The gaps in knowledge include:

- Duration of the initial fire growth phase.
- Fire spread on slopes, in complex terrain and extreme condition.
- Fire spread around the entire perimeter.
- Short-distance (wind-driven) spotting.
- Characteristics of flames in different fuel types.

When interpreting the results of the detailed method, each of these elements are considered when determining the effect of the outputs of the calculations.

2.5 BUSHFIRE AFFECTED LANDS

The identification of bush fire prone lands (BPL Map) in NSW is through the s 10.3 of the EP&A Act through the application of NSW RFS 'Guide for bush fire prone land mapping– Version 5b, November 2015'. The Maitland Council Bushfire prone lands map is provided below in **Figure 3, page 11**. The vegetation immediately north of the proposed development has not been identified as bush fire prone land.

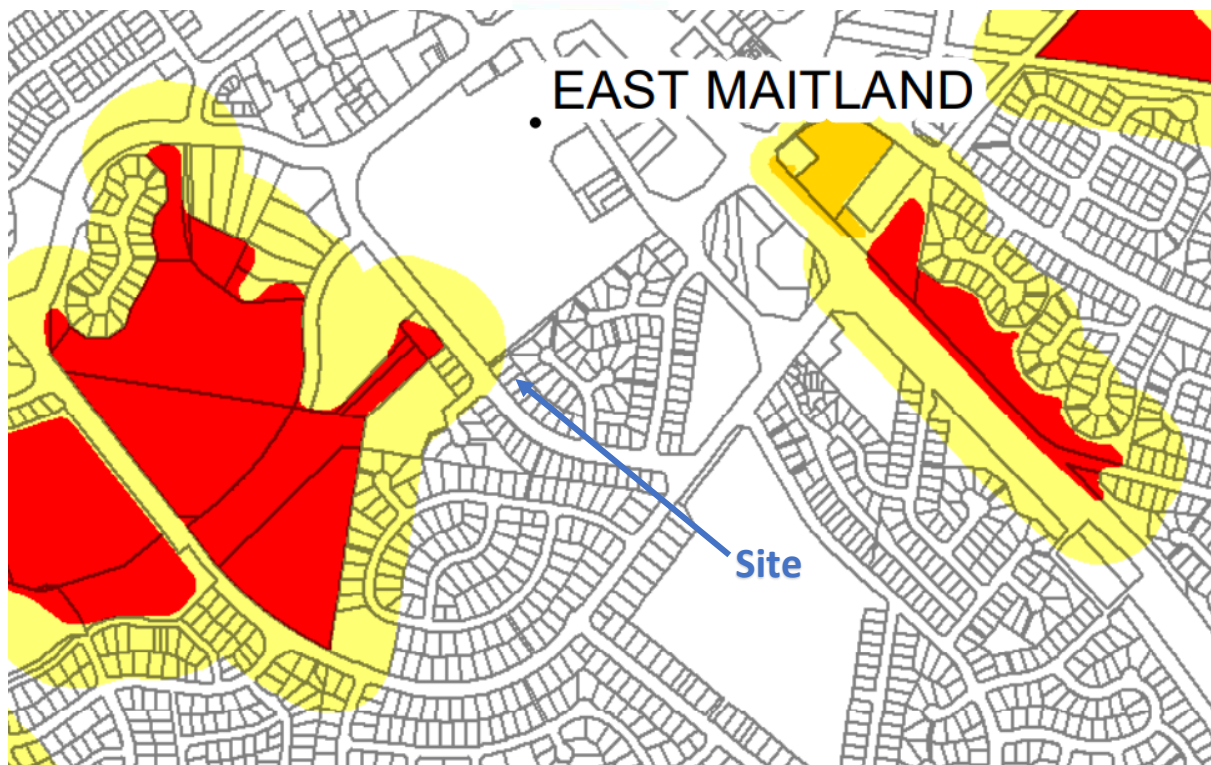


Figure 3 Maitland Bushfire prone area map (extract Maitland Council 2023)

NSW RFS 'Guide for bush fire prone land mapping– Version 5b, November 2015' provides the processes for identifying and mapping bushfire prone areas. When undertaking mapping a variety of considerations and exclusions are taken into account.

Category 1 Vegetation - highest risk for bush fire. It is represented as red on the bush fire prone land map and will be given a 100m buffer. This vegetation category has the highest combustibility and likelihood of forming fully developed fires including heavy ember production. Vegetation Category 1 consists of:

- areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations.

Category 2 Vegetation - a lower bush fire risk than Category 1 and Category 3 but higher than the excluded areas. It is represented as light orange on a bush fire prone land map and will be given a 30 metre buffer. This vegetation category has lower combustibility and/or limited potential fire size due to the vegetation area shape and size, land geography and management practices. Vegetation Category 2 consists of:

- Rainforests.
- Lower risk vegetation parcels. These vegetation parcels represent a lower bush fire risk to surrounding development and consist of:

- Remnant vegetation;
- Land with ongoing land management practices that actively reduces bush fire risk. These areas must be subject to a plan of management or similar that demonstrates that the risk of bush fire is offset by strategies that reduce bush fire risk; AND include:
 - Discrete urban reserve/s;
 - Parcels that are isolated from larger uninterrupted tracts of vegetation and known fire paths;
 - Shapes and topographies which do not permit significant upslope fire runs towards development;
 - Suitable access and adequate infrastructure to support suppression by firefighters;
 - Vegetation that represents a lower likelihood of ignitions because the vegetation is surrounded by development in such a way that an ignition in any part of the vegetation has a higher likelihood of detection.

Category

the exclu
map and

-

Vegetati
requirem
bushfire
in this lo

The veg
identifie
map), or

The hierarchy of planning instruments determines the application of Acts, Regulations, SEPP and LEP (in that order) are to be followed. The process that classifies vegetation within this assessment is within Planning for Bush fire Protection 2019 which is a call-up document under the EP&A Act. Call-up documents cannot be utilised to override legislation and hence the vegetation to the north of the of the development site (within lot 311/DP1031540) is no longer assessed or considered as a bushfire threat, as the EP&A Act has determined that it is not bushfire prone land or hazard.

3 BUSH FIRE STRATEGIC STUDY

Planning for Bushfire Protection (2019) is based on the worst-case scenarios for each of the bush fire behaviour elements of fire weather, vegetation, slope and assumes not human intervention. All development shall be assessed on an individual basis as broad-brush approaches of documents such as PBP 2019 may not be applicable in every instance.

A Bush Fire Risk Strategic Study (BFRSS) is a Bush Fire Risk Assessment Report (BFAR). The level of information gathered and analysis within the BFRSS depends on the level of risk. The BFRSS provides a broad-brush approach to determine landscape wildfire risk in considerations of vegetation cover, fuel load, topography, access and evacuation. This enables an assessment of the *actual* bushfire risk, determine if the proposed development is appropriate in the bush fire hazard context.

Table 2 Bush fire risk strategic study

ELEMENT	Low Threat	Moderate Threat	High Threat	Extreme Threat
Adjoining Lands	The proposed development and changing land use will have positive impacts on the ability of adjoining landowners to implement Bush fire Protection Measures ✓	The proposed development and changing land use do not impact on the ability of adjoining landowners to implement Bush fire Protection Measures	The proposed development and changing land use do not impact on the ability of adjoining landowners to implement Bush fire Protection Measures	The proposed development will significantly impact on the wildfire risk profile of adjoining lands.
Surrounding infrastructure	The proposed development does not significantly impact on community water, electricity, or gas services. ✓	The proposed development is associated with community water, electricity, or gas services but will not have significant impact.	The proposed development impact on community water, electricity, or gas services.	The wildfire risk profile of significant infrastructure will increase due to this development.
Emergency services	The proposed development does not significantly impact on the ability of emergency services to plan, prepare, respond, or recover prior, during or after a bush fire event.	The proposed development is located within 30-minute flight from a Large Air Tanker (LAT) airbase and within 30-minutes of multiple fire response units.	The proposed development is located more than 30-minute flight from a Large Air Tanker (LAT) airbase and only 1 or 2 fire response units within 30-minutes. ✓	It is unlikely emergency services will respond to wildfire in this location during extreme and catastrophic events.

ELEMENT	Low Threat	Moderate Threat	High Threat	Extreme Threat
Access	Good, multiple route evacuation is possible and connects with the public road network in a direction away from the wildfire threat to shelter location. ✓	More than one access or egress routes is provided from the property to a safer location which then can access the public road network with multiple access/egress routes o shelter location.	One access or egress routes is provided, which is <200m from the property to a safer location.	Only one access or egress route with no nearby safe location.
Emergency egress	Seamless integration with existing settlement - no effect on evacuation. ✓	Short bushland pinch points that may restrict access temporarily or carry fire across roads. Unlikely impact on evacuation.	Pinch points that are likely to restrict access along evacuation routes for short periods (15-30mins) and carry fire across roads.	Large areas of bushland or multiple pinch points along evacuation routes that could block evacuation routes for an extended time.
Vegetation continuity	Forested vegetation beyond 140m form the site is scattered with low continuity due to built development. ✓	Forested vegetation beyond 140m form the site is scattered and isolated, forming a dominate fast moving grassland and open woodland fire event.	Patches of forested vegetation associated riparian and isolated ridgelines beyond 140m from the site may result in localised fire event.	Continuous forested areas within mountainous terrain beyond 140m from the site will result in broadscale landscape emergency management operations.
Vegetation connectiveness	Forested vegetation corridors beyond 140m are restricted and do not enable landscape fire to enter and move through the site by a continuous fire path. ✓	Forested vegetation corridors beyond 140m from the site exist, although grasslands >100m provide separations between forested vegetation restricting the fire head progression of landscape fire.	Forested vegetation corridors beyond 140m from the site exist, although grasslands <100m provide separations between forested vegetation restricting the fire head progression of landscape fire.	Forested vegetation corridors beyond 140m from the site provide for passage of landscape fire to enter and move through the site.
Vegetation Location	Wildfire can only approach from one direction surrounded by a suburban, township or urban area managed in a minimum fuel condition. ✓	Wildfire can only approach from two directions and the site is within a suburban, township or urban area managed in a minimum fuel condition.	Wildfire can approach from several directions although gaps within forested vegetation or are present.	Wildfire can approach from several directions and have hours or days to grow and develop before impacting and/or site is surrounded by unmanaged vegetation.
Separation	Hazard separation between extreme wildfire hazard and buildings of greater than 100m. ✓	Hazard separation between extreme wildfire hazard and buildings of 50-100m	Hazard separation between extreme wildfire hazard and buildings of 30-50m	Hazard separation between extreme wildfire hazard and buildings of <30m

ELEMENT	Low Threat		Moderate Threat		High Threat		Extreme Threat	
Vegetation flammability	Within the dominated fire direction, the fire fuel is restricted to surface, partially managed and separated through land use practises.		Within the dominated fire direction, the fire fuel is highly aerated, with significant separations (>50m) between these hazardous patches with partially managed vegetation between.	✓	Within the dominated fire direction, the fire fuel is highly aerated, with <50m between these patches with partially managed vegetation between	✓	Within the dominated fire direction, the fire fuel is highly aerated, continuous continuity vertically and horizontally with flammable species.	
Wildfire Behaviour	Extreme Wildfire behaviour at the site is not possible given the broader landscape.	✓	Extreme Wildfire behaviour at the site is unlikely given the broader landscape.		Extreme Wildfire behaviour at the site is likely given the broader landscape.		Extreme Wildfire behaviour at the site is very likely given the broader landscape.	
TOTAL		✓						
Overall Threat Rating:	Wildfire provides LOW threat to the proposed development.							

In this case, a **LOW** threat has been identified due to:

- Located within urban settlement
- More than one access or egress routes is provided from the property to a safer location which then can access the public road network with multiple access/egress routes to shelter location.
- Wildfire can only approach from one direction with limited fire size.

4 BUSH FIRE HAZARD ASSESSMENT

This section details the site assessment methodology in Appendix 1 of PBP2019 and includes the requirements of s44 of the RF Regs. It provides detailed analysis of the vegetation, slope, vegetation exclusions and downgrades to quantify the required Bush fire Protection Measures (BPMs).

4.1 FIRE DANGER INDEX

This assessment utilises Mailand Council area with a FFDI 100.

4.2 ASSESSMENT METHODOLOGY

The assessment of the vegetation, slope and other bush fire characteristics within and surrounding the site has been carried out with the aid of the following:

- Nearmap, sixmap aerial photograph interpretation.
- Kogan 6"25 laser distance finder.
- Photo theodolite application supported by contour and LIDAR DEMs terrain profiles.
- SEED Portal - Sharing and Enabling NSW Environmental Data portal.
- Reference to regional vegetation community mapping, and
- Site assessment in May 2023.

4.3 VEGETATION ASSESSMENT

In accordance with PBP 2019, an assessment of the vegetation over 140m in all directions from the building was undertaken. Consideration is provided to any clearing, re-vegetation or landscaping likely to occur to obtain the worst-case scenario and derived maximum fuel loads.

Vegetation that may be considered a bush fire hazard was identified and classification based on available fuel loads for sub-formations are provided through vegetation fuel monitoring project administered by the University of Wollongong, University of Melbourne and CSIRO Ecosystems Science and Bush fire Dynamics and Applications. The results of this research are commonly referred to as the 'NSW Comprehensive Fuel Loads'.

2nd Stream order watercourses (Strahler system - *Water Management (General) Regulation 2018*) within the 140m assessment area is identified. Vegetation is not proposed to be impacted by bushfire protection measures.

No vegetation within the 140m Assessment area is identified within the Biodiversity Values (BV) Map provided in **Appendix 4, Page 44**.

The area is not identified within the Areas of Regional Koala Significance (ARKS).

SEED Portal - Sharing and Enabling NSW Environmental Data portal and regional vegetation community mapping has been analysed to determine the vegetation in and around the development, which is illustrated in **Figure 4, page 17**.



om the SEED Portal)

4.3.1 Vegetation classification, exclusions, and downgrades
 The vegetation (DP 311/DP1031540) is no longer assessed or considered (DP 311/DP1031540).

4.3.2 Predominant Vegetation Classification
 Vegetation in and around the site is classified as PCTID: 3236 Hunter Valley Hills Wet Vine Forest which is Northern Hinterland Wet Sclerophyll Forests in accordance with the 'NSW Comprehensive Fuel Loads'.

4.4 SEPARATION ASSESSMENT

The separation between the proposed building envelope and the classifiable vegetation that creates bush fire threat is one of the significant BPMs to reduce the risk of bush fire impacting on the development. The land within the separation must conform to the standards of an Asset Protection Zone (APZ) to be accepted within the separation areas.

The separations between the classifiable vegetation and the proposed dwellings are provided in **Table 3, page 21**, illustrated in **Figure 2, page 8**.

4.5 SLOPE ASSESSMENT

This section details the site assessment methodology in Appendix 1 of PBP2019 to assess the effective slope (under classified vegetation) and site slope (slope between the vegetation and proposed development) within 100m of the proposed building envelope.

The effective and site slopes used within this assessment are provided in **Table 3 page 21**, illustrated in **Figure 5, page 18**.

4.5.1 Effective and Site Slope Assessment

The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux.

The effective slope is the slope of the ground under the hazard (vegetation). The slope between the vegetation and the proposed building envelope is the site slope. When identifying the effective and site slopes, it may be found that there are a variety of slopes covering different distances. The effective slope is the slope under the vegetation which will most significantly influence the bush fire behaviour for each aspect.

The topography of the site and surrounds has been assessed to identify the maximum slope present under the classified vegetation (hazard). Slope data has been calculated from a 1m LiDAR Digital Elevation Model (DEM). The source data sets have been captured to standards that are generally consistent with the Australian ICSM LiDAR Acquisition Specifications which require a fundamental vertical accuracy of at least 0.30m (95% confidence) and horizontal accuracy of at least 0.10m (95% confidence). The slope arrows indicated in Figure 5 represent the slope calculated across the length of the arrow utilising LiDAR data within ERSI software. These values help determine the vegetation that poses a bush fire threat and significantly influences fire behaviour. LiDAR DEMs terrain profiles to determine the slope of the potential fire runs towards the site.



Figure 5 LiDAR 1m DEMS slope analysis

4.6 SHIELDING

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 rating. An elevation is deemed to be not exposed to the source of bush fire attack if all the straight lines between that elevation and the source of bush fire attack are obstructed by another part of the building.

The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs. The construction requirements for a shielded elevation shall not be less than that required for BAL-12.5 unless the building has been assessed as being BAL-LOW. The reduced construction requirements do not apply where any elevation is BAL-FZ.

4.7 WILDFIRE GROWTH

An analysis of the size and shape of the classifiable vegetation in and around the site has determined no Short Fire Run (SFR) or Restricted Head Growth (RHG) considerations within this assessment.

4.8 FLAME LENGTH

Contemporary research illustrates that flame length ground attachment is not possible at slopes below horizontal and below 15 degrees and has not been considered further within this assessment given that the three transects assessed are all less than 15 degrees.

Further discussion of contemporary flame length research appears below:

Weise and Biging (1996) research Byram's original equation relating fireline intensity to flame length overestimated flame length.

The 'trend' [redacted] es and hot plume attaching to the bottom surface [redacted] me and hot plume flow characteristics depend [redacted] the surface at 10 and 20 degrees, although a distinct [redacted] ed to the surface at 30 degrees which gave rise [redacted] Drysdale and Macmillan (1992) and Wu *et al.* (2000) [redacted] en slopes exceed 15° angle and ground attachment [redacted] face.

Edgar *et al.* (2015b) [redacted] u *et al.* (2000) of a threshold angle of inclination [redacted] laminar flow regime that predominantly determines [redacted] s around 24 to 26 degrees. Edgar *et al.* (2015b) [redacted] e within tunnels of greater inclination, indicating [redacted] e degrees, although this disruption did not impact the laminar flow [redacted] Edgar *et al.* (2016) [redacted] s that the attachment of the plume for tunnel inclinations above 24° was associated with the development of a pressure deficit in the region immediately upslope of the heat source, supporting the theory that the mechanism for flame attachment of the plume arises due to an imbalance between the upslope and downslope entrainment of air into the plume heat source and is independent of the convective intensity of the plume. Edgar *et al.* (2016) reported distinctly different plume behaviour depending on whether the trench was inclined above or below the critical angle of 24°.

4.9 OTHER METHOD 2 INPUTS

Elevation of Receiver

Elevation of Receiver is the height of the body that received the radiant heat flux. Within bushfire, we are concerned with the most vulnerable element of the building to a bushfire event which is glazing on windows and doors. For this reason, the elevation of the receiver for a single-story building is at the centre point of standard windows at 1.8m, and for a two-story building is 4.5m. If the exposed elevation is elevated, but not a second storey, an estimate of the centre of the exposed glazing has been undertaken.

Heat of Combustion

Heat of Combustion (HoC) is an important characteristic in the simulation of wildfires. It is frequently used in the assessment of fuel flammability and is a key input to calculate fire-line intensity which provides for flame length calculations. Despite the variability of natural fuels, HoC is considered a constant. Research since the development of the Method 2 calculations illustrates that fuel moisture content has a significant

impact on the HoC and argues that lowering the current default heat of combustion of 18600 kJ/kg in forest fire behaviour models could be considered. In this case default heat of combustion of 18600 kJ/kg is applied.

Flame Emissivity

AS3959:2018 indicates a nominal flame emissivity of 0.95 is justified, as the bush fire flames under design fire weather scenarios are generally optically thick ($\epsilon \approx 1$). The predicted flame emissive power is extremely sensitive to flame temperature. The selection of the nominal flame temperature for calculation is critical to make sure that the construction standard determined with this flame temperature together with other input parameters can provide an adequate bush fire construction level. In this case nominal flame emissivity of 0.95 is applied.

Moisture Factor

Fuel moisture factor is only used in the Marsden–Smedley and Catchpole (1995) fire model for Tussock Moorland and is default to 5. This input has no effect on fire modelling calculations in other vegetation and hence is not applicable to this study.

Ambient Temperature and Relative Humidity

The default value for ambient air temperature during worst-case scenario fire weather conditions defaults to 35°, or when converted to Kelvin is 308K. The default value for Relative Humidity is 25%. Worst case scenario fire weather conditions in NSW are generally from the North-west which have high temperatures and low relative humidity. For bush fire threats from directions other than the north, north-west, and west, the ambient temperature and relative humidity can significantly change, especially in coastal environments.

Outcomes of the Bushfire Attack Level assessment implementing (Method 2 AS3959:2018) are outlined in **Table 3, page 21.**

Table 3 Outcomes for the property with respect to Bush fire Hazard Assessment (Method 2 AS3959:2018)

Elements	Method (unit)	Fire Run 1
Vegetation	NSW Comprehensive Fuel Loads	Northern Hinterland WSF
Provided Separation	Site -Laser finder (m)	106m
Site slope	Site visit – Theodolite (°)	3 deg down
Effective slope	Site visit – Theodolite (°)	3 deg down
Ele		default
F		1090
U		No
F		100
H		18600
F		0.95
N		5
A		308
R		25
		<26m
	Separation to Achieve BAL29	26 -<34m
	Separation to Achieve BAL19	34 -<46m
	Separation to Achieve BAL12.5	46 -<61m
	Separation to Achieve 10kW/m²	70m
	Bush fire Attack Level (BAL)	BAL - LOW

5 ADDITIONAL S. 45 REQUIREMENTS

S. 45 of the RF Reg indicates the assessment requirements for s 100B RF Act developments to obtain a bush Fire Safety Authority. This section illustrates the remaining elements identified within S. 45 of the RF Reg that are not covered within bush fire hazard assessment process (section 3 and 4 of this report) or within the performance criteria of PBP 2019 (section 6 of this report).

5.1 CL (2) (E) AND (F) S.45 RF REGS - THREATENED SPECIES, POPULATIONS AND COMMUNITIES

A search on the NSW Government Central Resource for Sharing and Enabling Environmental Data for significant environmental values was completed.

The search identified no Critical Endangered Ecological Communities (CEEC) or species listed under the *Biodiversity Conservation Act 2010*.

The results of the search are provided in **Appendix 3, page 43**.

There were

No vegetation within the 140m Assessment has been identified within the Biodiversity Values (BV) Map provided in Appendix 4 Page 44.

A search of the Australian Herpetological Information System (AHIMS) was completed on the 4th May 2024. No species were identified within the development area.

The outcome

There were

5.2 CL (2) (G) ADDITIONAL BUSH FIRE ASSESSMENT

The capacity of nearby public roads to handle increased volumes of traffic when a bush fire emergency occurs.

The surrounding public road system is two-way, sealed with multiple routes to safer places away from the bush fire threat. This designed will be able to accommodate the elevated level of traffic created by this development.

Whether or not nearby public roads that link with the fire trail network have two-way access.

No linkages between the public road system and fire trails exist within the assessment area.

The adequacy of sprinkler systems and other fire protection measures to be incorporated into the development.

The design of the building has been assessed by Escape Fire (**Appendix 8, page 59**) and certified Fire sprinklers. Extinguishers, detection, and warning system are in accordance with the NCC for Class 3 buildings. There are no bushfire spray systems or fire protection measure proposed outside the performance criteria for SFPP.

Registered fire trails on the property.



No registered fire trails are located on the property.


6 BUSHFIRE ASSESSMENT AND PERFORMANCE MEASURES

This section assesses Bushfire Performance Measures (BPMs) for the proposed development at 27 & 29 Stronach Avenue, East Maitland, NSW in consideration of the acceptable solutions required for each performance criteria within PBP 2019. Outcomes are outlined in Table 4, below. Where acceptable solutions are not met details of the performance-based solution are provided.

Table 4 Planning for bush fire protection for Section Purpose (SFPP) developments on bush fire prone lands

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION	COMPLIANCE for 27 & 29 Stronach Avenue, East Maitland, NSW
APZs	Radiant heat levels of greater than 10kW/ m ² (calculated at 1200K) will not be experienced on any part of the building.		COMPLIES - ACCEPTABLE SOLUTION The APZ is provided in accordance with Table A1.12.1.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.		COMPLIES - ACCEPTABLE SOLUTION The APZ on this site is wholly within the site boundaries and is not on land >18 degrees slope.
	APZs are managed and maintained to prevent the spread of fire to the building.	<ul style="list-style-type: none"> 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. 	COMPLIES - ACCEPTABLE SOLUTION The APZ is not wholly within the site boundaries, although complies with section 3.2 of PBP 2019.
	The APZ is provided in perpetuity.	<ul style="list-style-type: none"> APZ 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. 	COMPLIES - ACCEPTABLE SOLUTION The APZ on this site is wholly within the site boundaries. Asset Protection Zone of: <ul style="list-style-type: none"> 8.2 metres on the north-eastern elevation (or to the property boundary, which ever if furthest), 3 metres on the south-eastern elevation (or to the property boundary which ever if furthest),

			<ul style="list-style-type: none"> • 8 metres on the south-western elevation (or to the property boundary which ever is furthest), • 4.2 metres on the north-western elevation (or to the property boundary, which ever is furthest). <p>Non-combustible 2m radiant heat shield along the north-western lot boundary.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">CONSTRUCTION</p>	<p>The proposed building can withstand bush fire attack in the form of wind-blown embers, radiant heat and flame contact.</p>		<p>MADE CONDITION OF CONSENT – ACCEPTABLE SOLUTION</p> <p>The building is located outside 100m from the bush fires threat and a bush fire risk assessment is determined.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">ELECTRICITY</p>	<p>Location of electricity services limit the possibility of ignition of surrounding bush land or the fabric of buildings.</p>		<p>MADE CONDITION OF CONSENT</p> <p>All possible electricity should be placed underground.</p> <p>If overhead power supply is provided, lines are installed with short spans (30m), unless crossing gullies, gorges or riparian areas; 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.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">GAS</p>	<p>Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.</p>	<ul style="list-style-type: none"> • 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 	<p>MADE CONDITION OF CONSENT</p> <p>Any reticulated or bottled gas shall be installed and maintained in accordance with the below requirements as outlined in Table 7.4a of PBP:</p> <ul style="list-style-type: none"> • 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.

		<p>combustible material, so they do not act as a catalyst to combustion;</p> <ul style="list-style-type: none"> • Polymer-sheathed flexible gas supply lines are not used; and • Above-ground gas service pipes are metal, including and up to any outlets. 	<ul style="list-style-type: none"> • Polymer-sheathed flexible gas supply lines are not used; and • Above-ground gas service pipes are metal, including and up to any outlets.
<p>LANDSCAPING</p>	<p>Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignition.</p>		<p>CONDITION OF CONSENT</p> <p>A Landscaping plan is required to illustrate:</p> <ul style="list-style-type: none"> • A non-combustible 2m radiant heat shield along the north-western lot boundary. • Compliance with APZ standards within Appendix 4 of PBP 2019, including retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed with non-combustible materials, and a minimum 1-metre-wide area (or to the property boundary where setbacks are less than 1 metre), suitable for pedestrian traffic, shall be provided around the immediate curtilage of the building. The canopy is limited in the immediate vicinity of the building. • Landscaping does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters). • Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do not touch or overhang buildings. • Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies. • Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown. • Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter) • Avoid climbing species to walls and pergolas. • Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building.

			<ul style="list-style-type: none"> • Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and • Low flammability vegetation species are used.
ACCESS (GENERAL) REQUIREMENTS)	Firefighting vehicles are provided with safe, all-weather access to structures and hazardous vegetation.	<ul style="list-style-type: none"> • SFPP access roads are two-wheel drive, all- 	<p>COMPLIES - ACCEPTABLE SOLUTION</p> <p>In this case, where the most distant external part of the dwelling is less than 70m unobstructed path from a public road with a speed limit <70km/hr, no bush fire access provisions are required.</p>
	The capacity of access roads is adequate for firefighting vehicles	<p>Firefighting vehicles (up to 25 tonnes), bridges and causeways are to clearly indicate load rating.</p>	<p>COMPLIES - ACCEPTABLE SOLUTION</p> <p>In this case, where the most distant external part of the dwelling is less than 70m unobstructed path from a public road with a speed limit <70km/hr, no bush fire access provisions are required.</p>
	There is appropriate access to water supply	<ul style="list-style-type: none"> • 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. 	<p>COMPLIES - ACCEPTABLE SOLUTION</p> <p>In this case, where the most distant external part of the dwelling is less than 70m unobstructed path from a public road with a speed limit <70km/hr, no bush fire access provisions are required.</p>

PERIMETER ROADS	<p>Perimeter 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.</p>	<ul style="list-style-type: none"> • 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. 	<p>N/A Perimeter road requirements facilitated by the surrounding public road system.</p>
NON-PERIMETER ROADS	<p>Non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.</p>	<p>[REDACTED]</p> <ul style="list-style-type: none"> • 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 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. 	<p>[REDACTED] perimeter road not proposed.</p>

WATER SUPPLIES	Adequate water supplies is provided for firefighting purposes in installed and maintained.	<ul style="list-style-type: none"> • Reticulated water is to be provided to the development where available, OR • A 10,000 litres minimum static water for firefighting purposes is provided for each occupied building where no reticulated water is available 	<p>COMPLIES - ACCEPTABLE SOLUTION</p> <p>Reticulated water supplied for firefighting purposes.</p>
	Water supplies are located at regular intervals. The water supply is accessible and reliable for firefighting operations		<p>COMPLIES - ACCEPTABLE SOLUTION</p> <p>hydrant is located directly in front of the proposed development lot on Stronach Avenue (Figure 2, page 8). Access to this supply is readily accessible and easily located to assist in fire operations.</p> <p>proposed development is in a subdivision that does not have a road. This report has not tested or determined if the fire flow and pressures to comply with Table 2.2 of AS 2419.1:2017. This report has not confirmed a ring main system for water.</p>
	Flows and pressure are appropriate		<p>report has not tested or determined if the fire hydrant flow and pressures to comply with Table 2.2 of AS 2419.1:2017.</p>
	The integrity of the water supply is maintained.	<ul style="list-style-type: none"> • All above-ground water service pipes are metal, including and up to any taps. 	<p>MADE CONDITION OF CONSENT</p> <p>All above-ground water service pipes are metal, including and up to any taps.</p>
	Water supplies are adequate in areas where reticulated water is not available	<ul style="list-style-type: none"> • 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. 	<p>N/A</p> <p>Reticulated water supplied for firefighting purposes.</p>

		<ul style="list-style-type: none"> • 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 	
EMERGENCY MANAGEMENT	<p>A Bush Fire Emergency Management and Evacuation Plan is prepared.</p>	<p>installed in accordance with the relevant clauses of AS 2441:2017 Installation of fire hose reels.</p> <ul style="list-style-type: none"> • Bush Fire Emergency Management and Evacuation Plan is prepared consistent with the: <ul style="list-style-type: none"> ○ 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). 	<p>MADE CONDITION OF CONSENT</p> <p>There are no bush fire emergency procedures for the proposed development. A Bush Fire Emergency Management and Evacuation Plan is prepared that complies with the requirements of Table 6.8d within PBP2019 prior to the issuing of an occupation certificate. The Bush Fire Emergency Management and Evacuation Plan shall:</p> <ul style="list-style-type: none"> • Be provided to the Local Emergency Management Committee for its information prior to occupation of the development. • Be consistent with the NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan. • Be consistent with Australian Standard AS 3745:2010 Planning for emergencies in facilities; and

		<ul style="list-style-type: none"> • The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants. <p><i>Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be</i></p>	<ul style="list-style-type: none"> • A Emergency Planning Committee is established to consult with staff in developing and implementing an Emergency Procedures Manual. • 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. <p>Consider the amount of travel likely to be generated during an emergency evacuation; the capacity of the broader road network to support safe emergency evacuation; limitations/constraints on the road system; and management of potential traffic conflicts (such as emergency vehicles versus evacuating members of the public).</p>
	<p>Appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.</p>	<p>and an annually emergency evacuation is conducted.</p>	<p>CONDITION OF CONSENT</p> <p>There are no bush fire emergency procedures for the proposed development. The Bush Fire Emergency Management and Evacuation Plan shall:</p> <ul style="list-style-type: none"> • A Emergency Planning Committee is established to consult with staff in developing and implementing an Emergency Procedures Manual. • 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.

7 CONCLUSION AND RECOMMENDATIONS

An assessment in accordance with Appendix 1 of PBP2019 has been undertaken implementing the detailed assessment pathway described in Appendix B of AS3959:2018. This BFAR identifies the development (building envelope) is > 100m from the bush fire threat vegetation identified within the Bushfire fire prone land map.

In accordance with the Bushfire Prone Land Map and Planning for Bushfire Protection the risk from bushfire is so low that specific bushfire construction and planning provisions are not warranted.

Although specific bushfire construction and planning provisions are not warranted the client wishes to apply reasonable protection measures. This bushfire assessment report has determined the following recommendations:

Asset Protection Zone

At the commencement of building works and in perpetuity the property around the proposed development shall be maintained as an inner protection area (IPA) as outlined within Appendix 4 of Planning for Bush Fire Protection 2019 and the NSW RFS document Standards for asset protection zones to a distance of:

- 8.2 metres on the north-eastern elevation (or to the property boundary, which ever if furthest),
- 3 metres on the south-eastern elevation (or to the property boundary, which ever if furthest),
- 8 metres on the south-western elevation (or to the property boundary, which ever if furthest),
- 4.2 metres on the north-western elevation (or to the property boundary, which ever if furthest).

Landscaping

A Landscaping plan is required to illustrate:

- In accordance with PBP2019,
- If fencing, retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed of non-combustible materials,
- A minimum 1-metre-wide area (or to the property boundary where the setbacks are less than 1 metre), suitable for pedestrian traffic, must be provided around the immediate curtilage of the building.
- Planting is limited in the immediate vicinity of the building.
- Planting does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters).
- Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do no touch or overhang buildings.
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies.
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown.
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter)
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building.
- Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and
- Low flammability vegetation species are used.

Construction

New construction must comply with section 3 and section 7 (BAL 29) Australian Standard AS3959-2018 Construction of buildings in bush fire-prone areas or NASH Standard National Standard Steel Framed Construction in Bushfire Areas – 2021 as appropriate and section 7.5 of Planning for Bush Fire Protection 2019.

Electricity services

Where possible electricity should be placed underground. If overhead power supply is provided, the consent authority shall determine vegetation management is in accordance with Energy Australia 'Vegetation Safety Clearances' (NS179, April 2002).

Gas services

Any reticulated or bottled gas shall be installed and maintained in accordance with the below requirements as outlined in Table 7.4a of PBP:

- Placed on the southern elevation of the building.
- Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side.
- Connections to and from gas cylinders are metal.
- Polymer-sheathed flexible gas supply lines are not used; and
- Above-ground gas service pipes are metal, including and up to any outlets.

Emergency Management

The Bush Fire Emergency Management and Operation Plan shall:

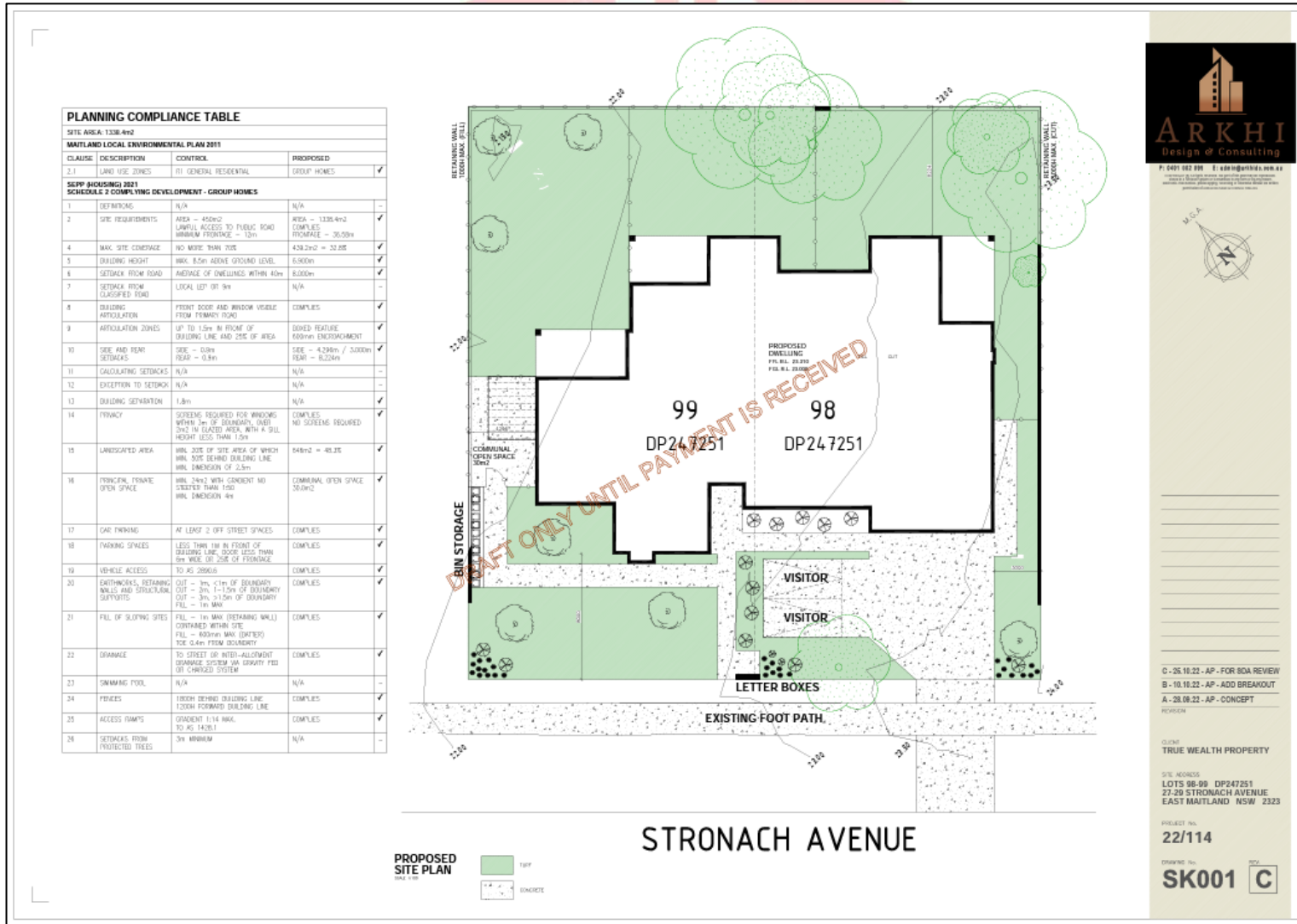
- Be consistent with the NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*.
- Be consistent with Australian Standard AS 3745:2010 *Planning for emergencies in facilities*.
- Be provided to the Local Emergency Management Committee for its information prior to occupation of the development.
- Establishes an Emergency Management Committee with responsibilities for decisions identified.
- Provides decision triggers to inform when to evacuate and all potential evacuation routes.
- Provides guidance on the appropriate management actions during elevation fire danger days.
- An appropriate refuge location should also be considered if bushfire prevents evacuation.
- Consider the amount of travel likely to be generated during an emergency evacuation; the capacity of the broader road network to facilitate safe emergency evacuation; limitations/constraints inherent in the road system; and management of potential traffic conflicts (such as emergency vehicles versus evacuating staff).
- The size and age group of the existing population within the locality and the number of other SFPP facilities within the locality.
- Provide monitoring schedules, and triggers to undertake management and maintenance of Bush fire protection measures.

8 REFERENCES

- Australian Building Codes Board (2010), *Building Code of Australia, Class 1 and Class 10 Buildings*, Housing Provisions Volume 2.
- Australian Building Codes Board (2014), *Design and construction of Community Bushfire refuges*, Building Code of Australia.
- Clarke, H., Lucas, C., Smith, P., 2012. *Changes in Australian fire weather between 1973 and 2010*, International Journal of Climatology. DOI: 10.1002/joc.3480
- Councils of Standards Australia (2018), *AS 3959:2018: Construction of Buildings in Bush fire-prone Areas*. SAI Global
- Councils of Standards Australia (2002), *AS 1596:2002: Storage and handling of LPG Gas*. SAI Global
- Councils of Standards Australia (2017), *AS 2419:2017: Fire hydrant installations System design, installation and commissioning*. SAI Global
- Douglas, M., 2017. *Property Protection from Extreme Bushfire Events under the Influence of Climate Change*. Doctor of Philosophy at the Western Sydney University, Sydney, Australia
- Dold, J. W., Zinoviev, A., 2009. Fire eruption through intensity and spread rate interaction mediated by flow attachment. *Combustion Theory and Modelling* 13(5), 763–793.
- Drysdale, D. D., Macmillan, A. J. R., 1992. Flame spread on inclined surfaces. *Fire Safety Journal*, 18(3), 245-254.
- Drysdale, D. D., Macmillan, A. J. R., Shillito, D., 1992. The King's Cross fire: Experimental verification of the 'Trench effect'. *Fire Safety Journal* Volume 18, Issue 1, 1992, Pages 75-82
- Edgar, R.A., Sharples, J.J., Sidhu, H.S., 2015. Revisiting the King's Cross Underground disaster with implications for modelling wildfire eruption. 21st International Congress on Modelling and Simulation, Gold Coast, Australia
- Edgar, R.A., Sharples, J.J., Sidhu, H.S., 2015b. Investigation of flame attachment and accelerated fire spread. PCChE Congress incorporating Chemeca, Melbourne, Victoria.
- Edgar, R.A., Sharples, J.J., Sidhu, H.S., 2016. Mining the effects of convective intensity on plume attachment in three dimensional trenches. PCChE Congress incorporating Chemeca, Adelaide, South Australia
- Elevation Foundation Spatial Data (ELVIS), ANZLIC licence committee on survey and mapping. Accessed online: <https://elevation.fsd.org.au/>
- Environmental Assessment Legislation Amendment Act (2002). Accessed online: <https://www.legislation.nsw.gov.au/#/view/act/1979/203>
- Environmental Planning & Assessment Amendment (Planning for Bush Fire Protection) Regulation 2007, accessed online: <https://www.legislation.nsw.gov.au/regulations/2014-285.pdf>
- Grumstrup, T.P., McAllister, S.S., Finney, M.A. 2017. Qualitative Flow Visualization of Flame Attachment on Slopes. 10th U. S. National Combustion Meeting Organized by the Eastern States Section of the Combustion Institute April 23-26, College Park, Maryland
- Lucas, C. 2010. *On developing a historical fire weather data-set for Australia*. Australian Meteorological and Oceanographic Journal. 60.1-14
- Minimum Vegetation Clearances for Power Lines, ISSC3 - NSW Resources and Energy - NSW Government Accessed online: <https://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/pipelines-electricity-gas-networks/electricity-networks/safety/ISSC3-guideline-for-managing-vegetation-near-power-lines.pdf>
- NSW Rural Fire Service (2018). *Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*, NSW Rural Fire Service.

- NSW Rural Fire Service (2005). *Standards for Asset Protection Zones*. NSW Rural Fire Service, Sydney.
- NSW Rural Fire Service (2019). *Comprehensive vegetation Fuel Loads, Fact sheet V8*, NSW Rural Fire Service. Sydney
- NSW Rural Fire Service (2019). *NSW RFS Fire Trail Standards*. NSW Rural Fire Service, Sydney
- NSW Rural Fire Service, *Best Practise Guidelines – Dwelling upgrades*, Accessed online: https://www.rfs.nsw.gov.au/data/assets/pdf_file/0018/4365/Building-Best-Practice-Guide.pdf
- Rural Fires Act (1997), Accessed online: <https://www.legislation.nsw.gov.au/#/view/act/1997/65>
- Rural Fires Amendment Regulation (2007), accessed online: http://www.austlii.edu.au/au/legis/nsw/num_reg/rfafsar20072007109593.pdf
- The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED Portal) NSW Government State Vegetation Type Map (SVTM)- Current Release C1.1.M1.1 (December 2022) accessed online : <https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map>
- Water Management Act (2000), accessed online: <https://legislation.nsw.gov.au/view/html/inforce/current/act-2000-092>
- Rural Fires Regulation (2013), accessed online: <https://www.legislation.nsw.gov.au/#/view/regulation/2013/488>
- Western Australian Government, (2017) *The WAPC's Guidelines for Planning in Bushfire Prone Areas (Guidelines)*, https://www.planning.wa.gov.au/dop/pub/pdf/Bushfire_Guidelines_Version_1.2_Aug2017.pdf
- Weise. D. (2000) *Properties of bushfire prone areas*. Canadian Forestry Research. V26, pg 1849-1854
- Wu, Y., H. (2000) *Properties of bushfire prone areas*. Fire Safety Journal 35(4), 391–403.

9 APPENDIX 1 DEVELOPMENT PLANS



C - 26.10.22 - AP - FOR SDA REVIEW
 B - 10.10.22 - AP - ADD BREAKOUT
 A - 23.08.22 - AP - CONCEPT
 20/20/24

CLIENT:
TRUE WEALTH PROPERTY

SITE ADDRESS:
LOTS 98-99 DP247251
27-29 STRONACH AVENUE
EAST MAITLAND NSW 2323

PROJECT NO:
22/114

DRAWING NO:
SK001 **C**

SOUTH-WEST ELEVATION

SOUTH-EAST ELEVATION

NORTH-EAST ELEVATION

NORTH-WEST ELEVATION

SECTION A-A

SECTION B-B

ARKHI
Design & Consulting
P. 0491 882 898 E. info@arkhi.com.au

M.S.A

C - 26.10.22 - AP - FOR SDA REVIEW
B - 10.10.22 - AP - ADD BREAKOUT
A - 28.08.22 - AP - CONCEPT
REVISION

CLIENT
TRUE WEALTH PROPERTY

SITE ADDRESS
LOTS 98-99 DP247251
27-29 STRONACH AVENUE
EAST MAITLAND NSW 2323

PROJECT No.
22/114

DRAWING No.
SK004

REV.
C

10 APPENDIX 2 PLATES (PHOTOGRAPHS) AND FIRE RUN

Plates 1 – 7 depict the elements in and around the site that are considered within the bush fire hazard assessment. The classified vegetation, separations, effective and site slope are identified in **Table 3, page 21** and displayed in **Figure 2, page 8**.



Plate 1 (P1) Access along Stronach Avenue



Plate 2 (P2) Entrance into property from Stronach Avenue



Plate 3 (P3)



Plate 4 (P4) Creek within the classifiable bush fire threat



Plate 5 (P5)

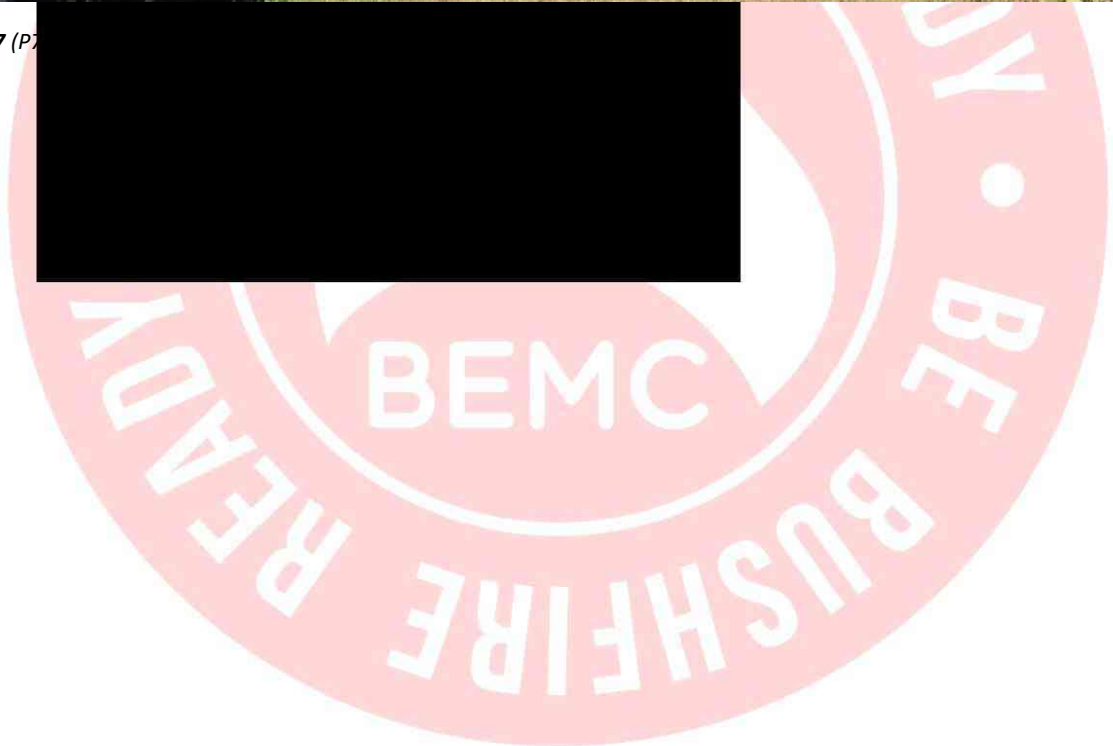
pushfire threat



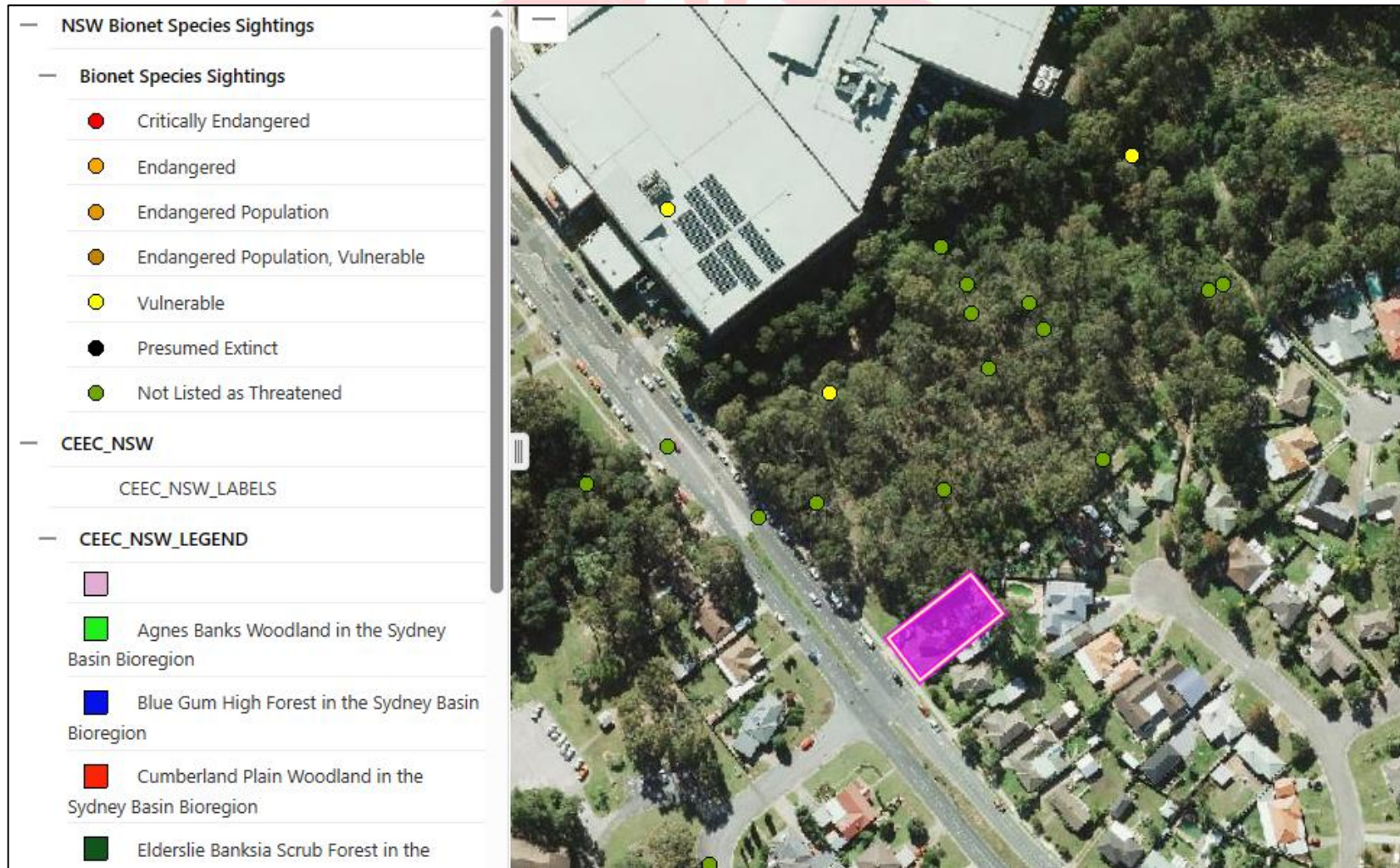
Plate 6 (P6) Effective slope of Transect 1



Plate 7 (P)



11 APPENDIX 3 NSW SHARING AND ENABLING ENVIRONMENTAL DATA



12 APPENDIX 4 BIODIVERSITY MAP

Biodiversity Values Map and Threshold Tool

The Biodiversity Offsets Scheme (BOS) Threshold is used to determine when it is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (the BAM) to assess the impacts of a proposal.

It is used for local developments (development applications submitted to councils) and native vegetation clearing not requiring development consent in urban areas and areas zoned for environmental conservation (under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017).

The Biodiversity Conservation Regulation 2017 sets out threshold levels for when the BOS applies. The threshold has two elements:

- whether the amount of native vegetation being cleared exceeds a threshold area, or
- whether the impacts occur on an area mapped on the Biodiversity Values Map.

If clearing or other impacts exceeds either trigger, the BOS applies to the proposed development.

If the BOS is not triggered, the Threatened Species Test of Significance must be used to determine if a local development is likely to significantly affect threatened species.

Proponents need to supply evidence relating to the BOS Threshold triggers and the test of significance when submitting their application to the consent authority. The report generated by this tool can be provided to indicate if your proposal triggers the BOS Threshold.

For more information go to the [Biodiversity Values Map webpage](#).

No vegetation of biodiversity value identified

13 APPENDIX 5 AHIMS SEARCH



AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : Maitland

Client Service ID : 778906

Duncan Scott-Lawson

Date: 04 May 2023

PO Box 182

Salamander Bay New South Wales 2317

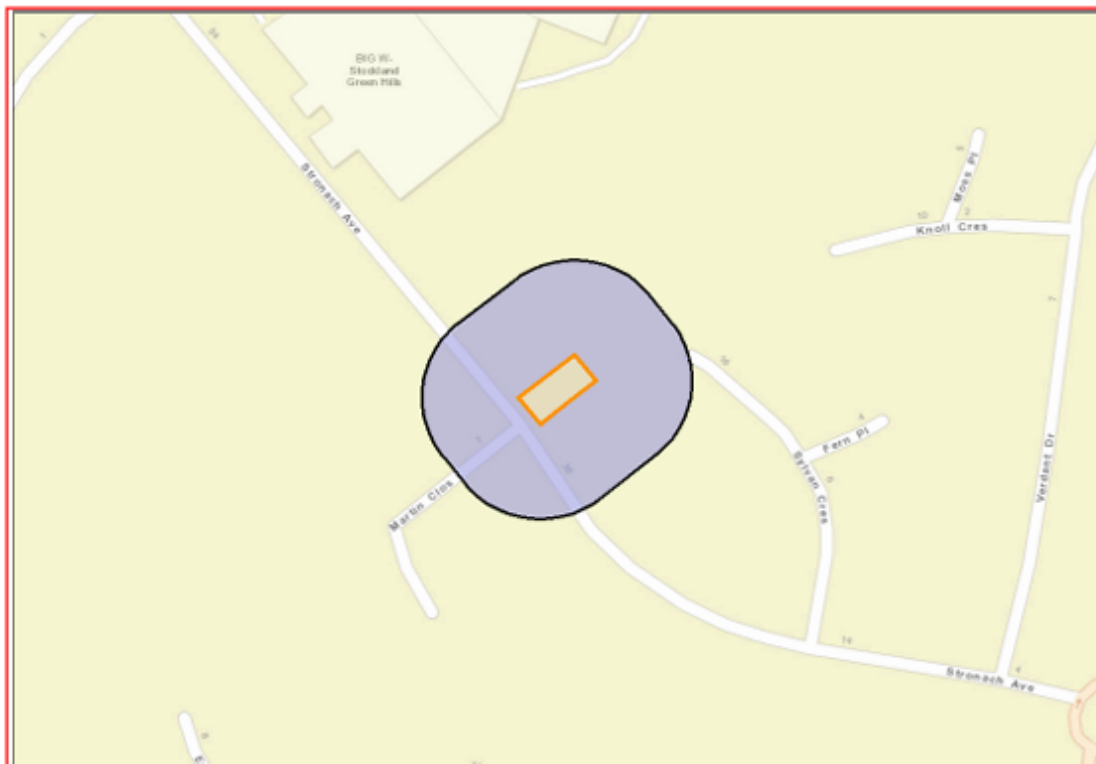
Attention: Duncan Scott-Lawson

Email: duncan@emconsultancy.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 99, DP:DP247251, Section : - with a Buffer of 50 meters, conducted by Duncan Scott-Lawson on 04 May 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

14 APPENDIX 6 BUSHFIRE PROTECTION MEASURES AND INFORMATION

The following information on building survivability and the application of Bushfire Protection Measures should be considered continually for the life of the development. These measures facilitate meeting the aims and objectives of PBP 2019 and mitigating bushfire risk and are provided to inform the client.

Why do buildings burn during bush fires?

Research has been undertaken over the last decades to analyse and determine the elements that determine the survivability of a building during a bush fire event. As the research is validated, these elements are incorporated into planning documentation that guides construction in bush fire prone areas, such as Australian Standard 3959 and NSW RES Planning for Bushfire Protection.

Research identifies the following elements that contribute to a building:

- 1.
- 2.
- 3.

Most people believe that buildings burn in a bush fire, but this is not the case. Buildings do not burn from a bush fire; they burn from ember attack; the burning firebrands and embers that are carried by the wind to the main fire front. They find weaknesses in the building's construction materials and can quickly lead to ignition. **Adjacent to the building and within the Asset Protection Zone, which provides fuel for burning embers** are critical that the Asset Protection Zones are maintained throughout the life of the property, so that wildfire is not encouraged closer to the building.

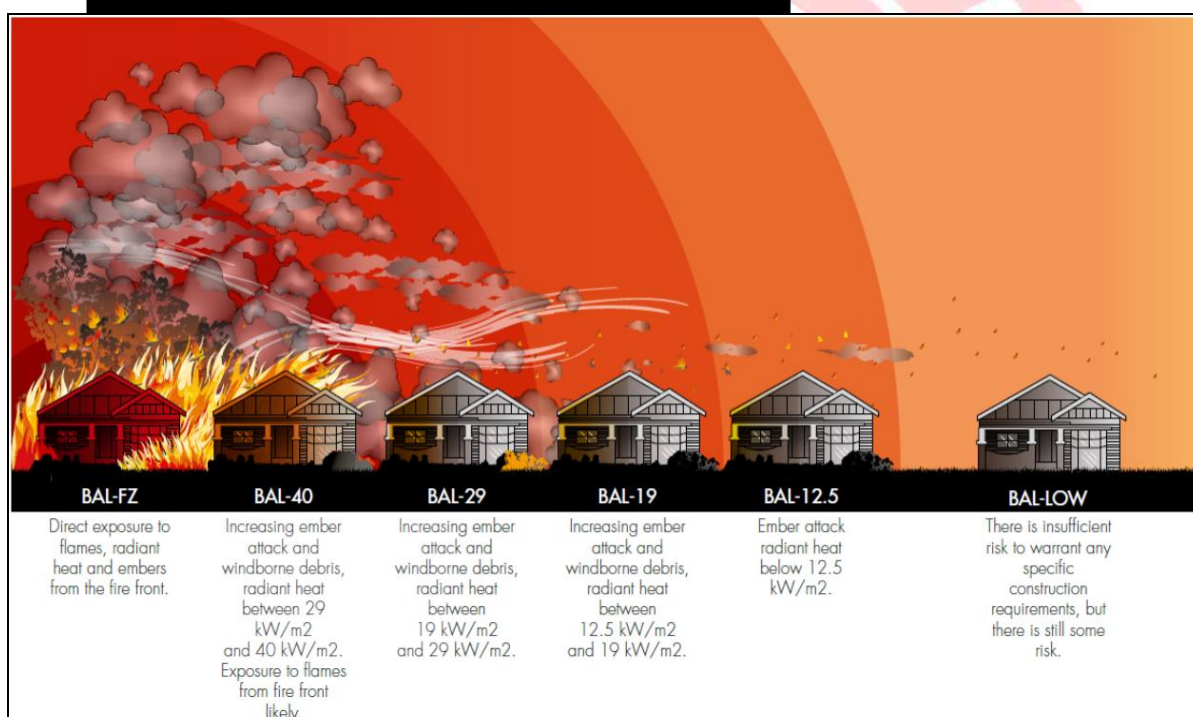
In terms of subdivision development, the research has illustrated maintaining the separations between the building and bush fire threat (known as the Asset Protection Zones (APZ)) to low flammability is critical. Elements within subdivision planning that can be incorporated are:

- Restricted landscaping and gardens within the APZ.
- Delineate the edge of the APZ through fencing, bollarding and signage to mitigate vegetation creep over time.
- Registration of the APZ within the relevant bushfire risk management plan.
- Dedication of resources to ensure ongoing maintenance.
- Non-combustible fencing associated with the APZ.
- Ensure water provisions are provided on both the bushfire threat and building sides of roads.

Australia Standard 3959 Construction of buildings in Bush fire prone areas and Bush fire Attack Level (BAL)

Bush fire Attack Level (BAL) ratings refer to the fire intensity your house is likely to be subjected to in a bush fire, expressed in terms of radiant heat. The BAL assessment forms the construction component of the bush fire assessment process. The other component is the Bush fire planning, which includes Asset Protection Zones (APZ), separation to provide defensible spaces, access, water, electricity, gas, landscaping and emergency management.

Furthermore, the measures contained in the *Australian Standard 3959 Construction of buildings in Bushfire Prone Areas* for each BAL construction level are not for fire resistance. The building will burn. The construction standards are aimed at slowing the ignition and fire spread of the building to provide adequate time to enable occupants to shelter within the building as the bushfire front passes. The degree of protection is determined by the ASBZ, the predictable nature of behaviour of fire, and extreme weather conditions. Very dangerous.



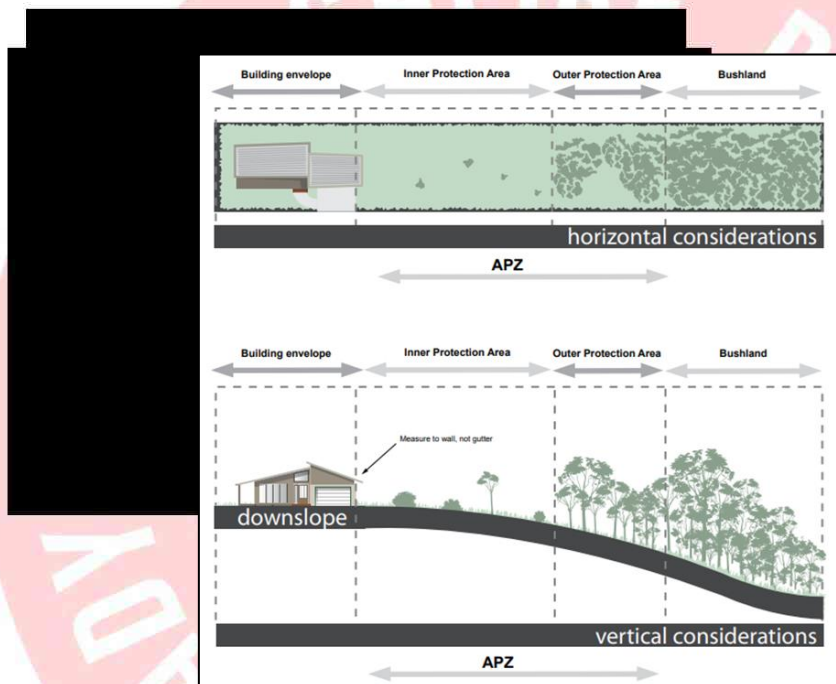
Relationship between fire behaviour and BAL (WA Guidelines for Planning in Bush fire Prone Areas, 2017)

Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance to the below standards should be undertaken on an annual basis, in advance of the fire season, as a minimum.

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 can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA) as indicated below.



Components of an APZ (Figure A4.1 - PBP 2019)

An APZ can include the following:

- Footpaths.
- Lawns.
- Discontinuous gardens.
- Swimming pools.
- Driveways.
- Unattached non-combustible garages with suitable separation from the dwelling.
- Open space / parkland; and
- Car parking.

Isolated areas of shrub and timbered vegetation are generally not a bush fire hazard as they are not large enough to produce fire of an intensity that will threaten dwellings. These areas include narrow strips of vegetation along road corridors.

Outer Protection Area (OPA)

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:

- Tree canopy cover should be less than 30%, canopies should be separated by 2 to 5m
- Shrubs should not form a continuous canopy and form no more than 20% of ground cover
- Ground cover should be less than 20% and should be free of litter with leaf and other debris should

Further requirements include ensuring vegetation creep does not occur close to buildings, as indicated below.

Gardens

All vegetation

In choosing plants to plant, choose plants that possess properties, which prevent them from being ignited, they can improve the defence of buildings by:

- Filtering out wind-driven burning debris and embers.
- Acting as a barrier against radiation and flame, and
- Reducing wind forces.

Consequently, landscaping with vegetation of the site should consider the following:

- Meet the specifications of an Inner Protection Area (IPA) detailed in PBP 2019.
- Priority given to retaining or planting species which have a low flammability and high moisture content.
- Priority given to retaining or planting species which do not drop much litter in the bushfire season, and which do not drop litter that persists as ground fuel in the bush fire season, and
- Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.
- Avoid gardens within 10m of the exterior building envelop.
- Trees and shrubs within 40m are not continuous, but instead arranged as discrete patches separated by a ground layer with low fuel hazard, such as mown grass.
- Position courtyards, gardens, and grassed areas in locations that facilitate the protection of the building.
- Install pebble/rock garden beds avoiding the use of mulch and wood chip.

Consideration should be given to vegetation fuel loads present on site. Careful thought must be given to the type and physical location of any proposed site landscaping. **Inappropriately selected and positioned vegetation has the potential to 'replace' any previously removed fuel load.**

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered. The below list of well know ground fire-retardant plants is intended as a guide only, check with your local council for information more specific to your area.

- *Lomandra longifolia*
- *Lomandra hystrix*
- *Anigozanthos* hybrids
- *Agapanthus orientalis*
- *Liriope muscari*
- *Carpobrotus glaucescens*
- *Casuarina glauca*
- *Ajuga*

Strategic (trees and shrub species) can act as 'windbreaks' by reducing the density of embers attacking a building. It is critical that this vegetation is:

- On flat ground place >30m from the building (ideally 40m forming the outer perimeter of the IPA).
- >20m separation from the hazardous vegetation.
- Located on the side of the bush fire hazard.
- No gardens of shrubs under the trees.
- Shrub patches no greater than 10m².

The below list of well know fire-retardant trees and shrubs is intended as a guide only, check with your local council for information more specific to your area:

- *Melia azederach* (Cape Lilac)
- *Brachychiton acerifolius* (Flame tree)
- *Magnolia grandiflora*
- *Pyrus* (most ornamental pears)
- *Magnolia* Little Gem
- *Ulmus chinensis* (Chinese Elm)
- *Acacia howitii*
- *Cercis* (Judus Tree)
- *Acmena smithii* (Lilypily)
- *Prunus* (all including ornamental)
- *Cupaniopsis anacardiopsis* (Tuckeroo)
- *Malus* (apple trees)
- *Eleocarpus*

- *Mullberry*
- *Citrus trees*
- *Loquat*
- *Arbutus Quercus* (only the deciduous oak trees)
- *Feijoa*
- *Gleditzia*
- *Ficus* (all including edible)
- *Aloe* (all)
- *Correa*
- *Acacia iteaphyla*
- *Scaevola crassifolia*
- *Viburnum tinus*
- *Atriplex* (saltbush)



- *Senna* (Silver Cassia)

Recent post-fire research from the 2019/20 bushfire season suggests greenness factor (the extent to which plants are actively growing) had an impact on building survivability to a bushfire, indicating that maintained green grasses and landscape watering features are beneficial during a bushfire.

It is essential that any vegetation and landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

Landscaping features within the APZ

A combination of hard (materials) and soft (design) landscaping will benefit the survivability of a building during a bushfire event. The type, quantity and condition of fuel has a very important effect on bushfire behaviour in proximity to a building. Poorly located vegetation that burns readily may expose a house to increased levels of radiant heat and flame contact.

- Non-flammable features such as tennis courts, swimming pools, dams, patios, driveways or paths should be incorporated into the proposal, especially on the northern and western sides of the proposed building.
- Remove other flammable objects from around the house. These include sheds, caravans, outdoor furniture, barbecues, gas bottles, wood piles and organic mulch.
- Avoid flammable mulches within the APZ. Alternatives include gravel, scoria, pebbles, shells or recycled crushed bricks.
- [REDACTED] that can be relocated in the summer.
- [REDACTED] 10m from building.
- [REDACTED] earth, stone, concrete and
- [REDACTED] heat, direct flame contact and
- [REDACTED] ten mound provide an effective
- [REDACTED] non-combustible materials.
- [REDACTED] the building. Do not place garden
- [REDACTED] der windows.
- [REDACTED] ous canopy and are separated by

Further information can be found here - [Landscaping for bushfires](#)

Electric Vehicles (EVs)

EVs are an ever-growing part of the transport environment with government aims of EV vehicles dominating throughout the 2030's. There are a variety of different technologies, battery types, and chemistries in vehicles, e-scooter and e-bikes creating complexity on the risk of 'thermal runaway'.

Thermal runaway is an unstable chemical process that begins when heat generated within a battery exceeds the amount of heat that is dissipated to its surroundings, which can lead to the battery catch fire. EV batteries tend to put out toxic fumes resulting in suppression difficulties.

Although the chances of batteries catching fire is relatively small <0.1%, approximately 1/3rd of fires occur during charging. the location of residential parking of Plug-in Hybrid Electric Vehicles (PHEVs) vehicles should be considered when planning inconsideration of occupied buildings and extinguishment requirements.

Having a smoke/heat alarm, a F-500 (class A, B and F) Lithium-Ion Battery fire extinguisher in an open-air charging station (unenclosed building) that is location >6m from any building or flammable vegetation will significantly mitigate risk of a EV fire spreading.

Further information can be obtained at: <https://www.evfiresafe.com/>

Bushfire Emergency / Survival Plan

No matter how big or small the development is within a bush fire prone area, a bush fire plan is critical to preparing the property in the event of a bush fire. To ensure appropriate measures are taken, the worst-case scenario bush fire behaviour should be used to determine the course of action.

There is extreme noise, smoke, heat, and wind during the passing of a bush fire front under worst-case conditions. Vision, hearing, breathing, and communication are significantly affected during this period.

State bush fire authorities have established kits to help residential and small property owners to develop appropriate plans to plan and prepare for bush fire events. In NSW Bush fire survival Plans can be accessed from <https://www.rfs.nsw.gov.au/plan-and-prepare/bush-fire-survival-plan>.

The principal elements of the Bush fire survival Plans are:

- Know the fire risk in your area.
- Know the fire risk in your area.
- Act on the fire risk in your area.
- Know the fire risk in your area, frequency, and TV.
- Prepare for the fire risk in your area.
- Leave your property if necessary.
 - Know what to take there, what will I take, who will
 - Know what are the signal to start defending
 - Know what to do when crossing of the fire front, do all
 - Know what equipment, develop action
- [REDACTED]

Furthermore, knowledge of escape routes (generally the public road system around your dwelling), refuges and location of any nearby Neighborhood Safer Places is critical knowledge prior to a bush fire event.

A bushfire emergency management and evacuation plans are prepared consistent with Australian Standard AS 3745:2010 Planning for emergencies in facilities. State agencies also have developed guidelines to facilitate the development of the documents and other Australian Standards are relevant for different development type. Bushfire emergency management and evacuation plans should be complemented with a Bushfire Management Plan (BMP).

A simple 4 step process can be undertaken to develop a basic bushfire emergency survival plan:

DISCUSS

STEP 1

DISCUSS WHAT TO DO IF A BUSH FIRE THREATENS YOUR HOME



Many households find that having a discussion over dinner works best as everybody is together and focussed.

[Download the Step 1 discussion guide \(PDF, 985.3 KB\).](#)

PREPARE

STEP 2

PREPARE YOUR HOME AND GET IT READY FOR BUSH FIRE SEASON

There are simple things you can do around your home to prepare it for a bush fire, like keeping the grass low and having a cleared area around your home.

[Download the Step 2 checklist \(PDF, 595.5 KB\).](#)

KNOW

STEP 3

KNOW THE BUSH FIRE ALERT LEVELS

If there is a fire in your area you will find its alert level on the NSW RFS website and in the 'Fires Near Me' app. You need to keep track of the alert level so you know what you should do.

[Download Step 3 \(PDF, 166.1 KB\).](#)

KEEP

STEP 4

KEEP ALL THE BUSH FIRE INFORMATION NUMBERS, WEBSITES AND THE SMARTPHONE APP

In a bush fire, it's important that you stay up to date on conditions in your area.

[Download Step 4 \(PDF, 219.1 KB\).](#)



Bushfire Management Plan

No matter how big or small the development is within a bushfire prone area, a bushfire plan is critical to preparing the property in the event of a bushfire. To ensure appropriate measures are taken, the worst-case scenario bushfire behaviour should be used to determine the course of action.

State bushfire authorities have established kits to help residential and small property owners to develop appropriate plans to plan and prepare for bushfire events. These can be accessed by contacting your local fire authority.

For larger development such as industrial, commercial and developments that accommodate vulnerable people, more comprehensive emergency management requirements and procedures should be developed.

At a minimum, the Bushfire Protection Measures (location, access, water, and construction standards) should be used to reduce the risk from bushfire to an acceptable level for the property to ensure current occupants are aware of the risks.

Further measures for fire suppression operations, such as:

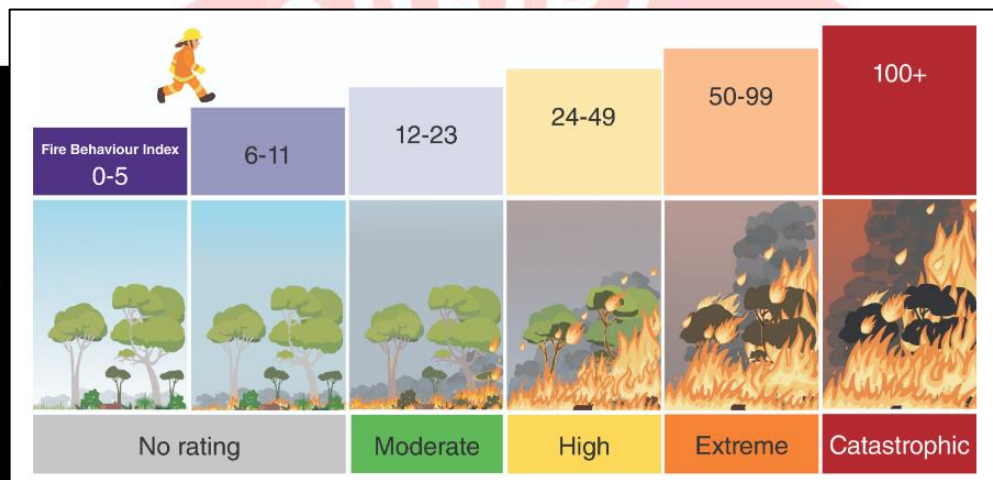
- 24-hour emergency contact.
- Identification of built, natural and cultural assets in and around the site.
- Emergency escape routes, refuges, and location of any nearby Neighbourhood Safer Places.
- Location of Fire Management Zone, specifically Asset Protection Zones.
- Location of hazards (Physical, Chemical and Electrical) that will impact on fire-fighting operations and procedures to manage identified hazards during fire-fighting operations.
- Aviation assets (helipads and aviation water supplies) and risks (powerlines).
- Fire history in and around the site, and
- Schedule of on-ground works and review and updating schedule.

Updated Australian Fire Danger Rating System

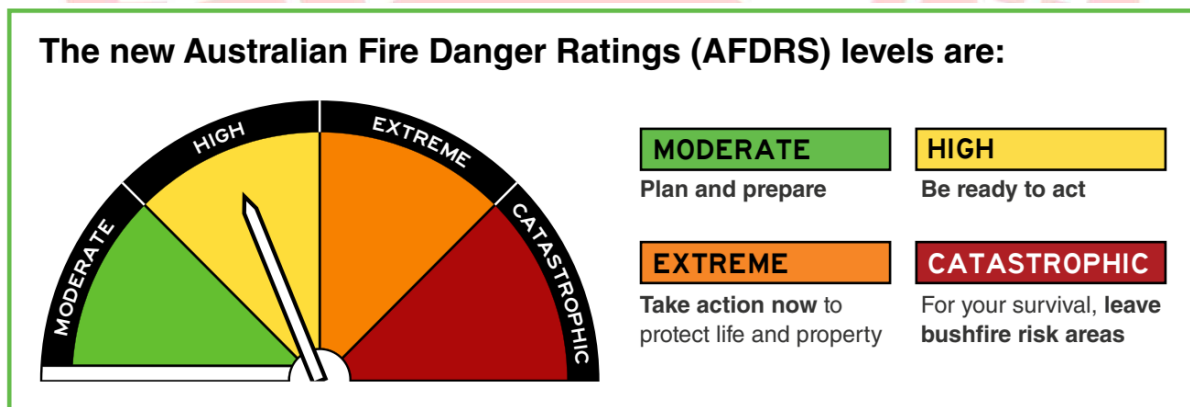
The principal objective of the new Australian Fire Danger Rating System (AFDRS) is to implement a more accurate and nationally consistent system that will enable improved decision-making by response agencies and industry and provoke the desired community response to messaging to improve public safety.

The AFDRS uses the latest scientific understanding about weather, fuel and how fire behaves in different types of vegetation to improve the reliability of fire danger forecasts. This strengthens the ability of those working in emergency services to be better prepared, make improved decisions, and provide better advice to the community.

It is aimed at a simplified, action-oriented Fire Danger Rating System.



Accessed from AFAC: <https://www.afac.com.au/initiative/afdrs/afdrs-fags>



Accessed from AFAC: <https://www.afac.com.au/initiative/afdrs/afdrs-fags>


MODERATE: *Plan and Prepare* - Have a plan and be ready to act if a fire starts.

HIGH: *Be ready to act* - Be alert for fires in your area and be ready to leave or be ready to defend.

EXTREME: *Take action* - Act before a fire starts.

CATASTROPHIC: *Leave high risk areas* - Protect your life, leave early.

15 APPENDIX 7 METHOD 2 OUTPUTS

 NBC Bushfire Attack Assessment Report V4.1 <small>AS3959 (2018) Appendix B - Detailed Method 2</small> Print Date: 24/09/2023 Assessment Date: 24/09/2023					
Site Street Address:	27 & 29 Stronach Avenue, East Maitland				
Assessor:	Duncan Scott-Lawson; BEMC P/L				
Local Government Area:	Maitland				
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:	Fire Run 4				
Vegetation Information					
Vegetation Type:	Northern Hinterlands WSF (Grassy)				
Vegetation Group:	Wet Sclerophyll Forests (Grassy)				
Vegetation Slope:	3 Degrees				
Vegetation Slope Type:	Downslope				
Surface Fuel Load(t/ha):	20				
Overall Fuel Load(t/ha):	33.1				
Vegetation Height(m):	0.9				
	Only Applicable to Shrub/Scrub and Vesta				
Site Information					
Site Slope:	3 Degrees				
Site Slope Type:	Downslope				
Elevation of Receiver(m):	default				
APZ/ Separation(m):	106				
Fire Inputs					
Veg./Flame Width(m):	100				
Flame Temp(K):	1200				
Calculation Parameters					
Flame Emissivity:	95				
Relative Humidity(%):	25				
Heat of Combustion(kJ/kg)	18600				
Ambient Temp(K):	308				
Moisture Factor:	5				
FDI:	100				
Program Outputs					
Level of Construction:	BAL LOW				
Peak Elevation of Receiver(m):	5.91				
Radiant Heat(kW/m2):	4.71				
Flame Angle (degrees):	82				
Flame Length(m):	23.16				
Maximum View Factor:	0.058				
Rate Of Spread (km/h):	2.95				
Inner Protection Area(m):	75				
Transmissivity:	0.731				
Outer Protection Area(m):	31				
Fire Intensity(kW/m):	50483				
BAL Thresholds					
BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m): 26	34	46	61	70	6

16 APPENDIX 8 CLASS 3 NCC FIRE CERTIFICATION



Escape Fire Pty Ltd
 ABN 32 639 443 539
 5/4 Gundah Rd
 Mt Kuring-gai, NSW, 2080
 Ph: 1300 ESCAPE
 1300 372 273
 PO Box 371
 Berowra Heights, NSW, 2082
 www.escapefire.com.au

18 May 2023

Principal Certifying Authority

Dear Sir,

Re: CERTIFICATE OF DESIGN FIRE SERVICES
 SUBJECT PREMISES

27 STRONACH AVE
 EAST MAITLAND, NSW

Pursuant to the provisions of Clause A2.2 of the Building Code of Australia, I hereby certify that the design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, the relevant fire safety engineering report, the Environmental Planning and Assessment Regulation, relevant Australian Standards.

The Design as represented by the CC Drawings is consistent with the approved Development Application Design Plans.

In particular the design is in accordance with the following:

Service	BCA / Australian Standard
1. Fire Sprinkler System	NCC 2019 E1.5 & AS2118.4-2012
2. Fire Extinguishers & Blankets	NCC 2019 E1.6 & AS2444-2001
3. Fire Detection and Alarm Systems	NCC 2019 E2.2a & AS1670.1-2018
4. Building Occupant Warning System	NCC 2019 E2.2a & AS1670.1-2018

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the design systems comply with the above.

The components relating to the discipline and scope of work identified above:

- Has been assessed by the designers below who are properly qualified to do so.
- Has been designed in order to:
 - Meet at least the minimum applicable requirements of the NCC 2019;
 - Meet at least the minimum requirements of the relevant Australian Standards.
 - Be capable of performing to a standard not less than the required.
 - The information contained in this certificate is, to the best of my knowledge, true and accurate.

Full Name of Designer: Jacob Russo [Wet Fire]

Service	BCA / Australian Standard
1. Fire Sprinkler System	NCC 2019 E1.5 & AS2118.4-2012

Qualifications: 20 years experience in the Fire Protection Industry,
 FPAS F015456D
 Fire System Design – Fire Sprinkler Systems

Address of Designer: 3/65 Sydenham Rd, Marrickville NSW 2204

Business Telephone No: 1300 372 273

SERVICING YOUR ESSENTIAL FIRE SAFETY MEASURES



Email: jake.cardinalfirerusso@gmail.com

Name of Employer: Cardinal Fire Pty Ltd

Signed:

I possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Drawing No	Drawing Title	Rev
F-03	Fire Sprinkler System – Ground	B
F-04	Fire Sprinkler System – Level 1	B
F-06	Fire Sprinkler System – Schematic & Design Notes	B

Full Name of Designer: Wayne Rose [Dry Fire & Portables]

Service BCA / Australian Standard

2. Fire Extinguishers & Blankets NCC 2019 E1.6 & AS2444-2001
3. Fire Detection and Alarm Systems NCC 2019 E2.2a & AS1670.1-2018
4. Building Occupant Warning System NCC 2019 E2.2a & AS1670.1-2018

Qualifications: 30 years experience in the Fire Protection Industry
 FPAS F023962D
 Fire System Design – Fire Detection & Alarm Systems

Address of Designer: 5/4 Gundah Road, Mt Kuring-gai, NSW 2080

Business Telephone No: 1300 372 273

Email: waynerose@escapefire.com.au

Name of Employer: Escape Fire Pty Ltd

Signed:

I possess Indemnity Insurance to the satisfaction of the building owner or my principal.

Drawing No	Drawing Title	Rev
F-00	Fire Services Title Page	B
F-01	Fire Detection System – Ground	B
F-02	Fire Detection System – Level 1	B
F-05	Fire Detection System - Schematic	B

Kind Regards,
 Wayne Rose
 [Director]

Escape Fire Pty Ltd

SERVICING YOUR ESSENTIAL FIRE SAFETY MEASURES

17 APPENDIX 9 COMPLIANCE AND APPROVAL STRATEGY



Bush Fire Design, Compliance and Approvals Strategy

Development 29-27 Stronach Avenue East Maitland

Prepared for True Wealth Property

Date Prepared - 13 June 2023



David Boverman

CEO & Principal Advocate/Consultant

Helping Hands Planning & Design PTY LTD, ABN [51664697885](https://abn.gov.au/51664697885)

Quality Assurance & Document Control

This document has been prepared consistent with the spirit of the ISO 9000 Standards Series¹. Accordingly, the below quality assurance and development control are provided, noting the row for 'Approved' has been omitted due to the fact that this would be an authorised person whose role would be limited to certifying that the previous certification steps were in fact undertaken (i.e., the role of 'Approved' does not involve content or technical review/approval, just process approval).

Quality Assurance				
Role	Name	Signed	Date	Version
Author ²	David Boverman		13/06/2023	Final draft
Reviewed ³	Duncan Scott-Lawson		13/06/2023	Final draft

Document Control			
Version	Author	Date	Notes
Version 0.1	David Boverman	13/06/2023	Preliminary draft for review by BEMC Pty Ltd & client
Version 1.0	David Boverman		Final Draft

¹ "ISO 9000 is defined as a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements needed to maintain an efficient quality system. They are not specific to any one industry and can be applied to organizations of any size. ISO 9000 can help a company satisfy its customers, meet regulatory requirements, and achieve continual improvement. It should be considered to be a first step or the base level of a quality system" (<https://asq.org/quality-resources/iso-9000>).

² 'Author' denotes the person who drafted this document.

³ 'Reviewed by' denotes the person undertaking a review for readability and technical content.

Executive Summary

This *Bush Fire Design, Compliance, and Approvals Strategy (Strategy)* presents the design, compliance, and approvals strategy for a proposed two storey group home used for disability care, understood to be over two lots comprising four-two bedroom and two one-bedroom units, with an additional two units dedicated for carers who will be working twenty-four hours a day, seven days a week. The development is intended for use by clients of the National Disability Insurance Scheme (NDIS).

It also provides an analysis of the strategy that demonstrates that although the proposed development would fall under section 100B of the *Rural Fires Act 1997* (section 100B) because the proposed building footprint is located on land considered to be Bush Fire Prone (the Buffer in this case)⁴, the proposed design would be appropriate and acceptable due to the proposed development being located in a lower bush fire hazard/risk suburban type area.

Of importance is that section 45 of the *Rural Fires Regulation 2022* clearly acknowledges that proposals need not comply with PBP-2019 as long as the Commissioner RFS is satisfied with the design and associated bush fire protection measures put forth, noting the intent was, and continues to be, to allow such proposals to proceed even though they do not comply with the *Performance Criteria* or the *Acceptable Solutions*⁵ (please refer to section 45(2)(h) of then *Rural Fires Act 2022*, reproduced in *Appendix E: Rural Fires Regulation 2022 Section 45*).

Although previous assessment has identified that the proposed project would not comply with the requirement to provide asset protection zones (APZ) satisfying the 10kWsqm criteria within *Planning for Bush Fire Protection 2019* (PBP-2019), the low bush fire hazard/risk profile of the community and locale justifies a design approach that would be based on providing building bush fire protection appropriate to, and consistent with, the associated bush fire risk.

The land immediately to the north is not mapped Bush Fire Prone, yet would not fall under any of the 'Low threat vegetation - exclusions' in PBP-2019, as it is in the order of approximately 4.5ha in area and of forest vegetation.

It is important to note that although the proposed building will be over two lots, it has been stated no subdivision is required nor proposed, as the project is understood to be undertaken under a Commonwealth context which would allow for building over two lots without subdivision.

This *Strategy* will be submitted to the NSW Rural Fire Service (NSW RFS) via a vis the Built & Natural Environment Advice Request Service (BNE Advice Request Service) in order to seek NSW RFS support for the same. In so doing, a request will be included that the Director Built & Natural Environment concur with any advice and/or conditions received in the response⁶.

This *Strategy* may be included with the development application (DA) as a stand-alone document that would serve to provide Council confidence in moving forward processing the development application on non-bush fire matters while support from the NSW RFS is sought via a vis the BNE Advice Request Service.

⁴ It is understood that the development approvals pathway for this development would normally be vis a vis the *State Environmental Planning Policy (Housing) 2021, Part 5 Housing for seniors and people with a disability*, but due to the fact that it is located on land considered Bush Fire Prone legislatively, a development application and consent will be submitted and sought from Council.

⁵ This is based on the Policy Position when I oversaw the same as Manager Development Planning & Policy with the NSW RFS, a position I vacated 30 March 2023.

⁶ Formal power and authority to make such decisions is considered to ultimately rest with the Commissioner RFS. (section 100B of the *Rural Fires Act* and 4.14 of the *Environmental Planning and Assessment Act*) Through Delegated Authority, authorised officers can apply those Policy/Technical Positions, methods of assessment, and the like, conditional on being consistent with those endorsed by the Commissioner RFS, or his representative, Director Built & Natural Environment.

Table of Contents

<i>Quality Assurance & Document Control</i>	2
<i>Executive Summary</i>	3
<i>Project Description</i>	5
General.....	5
Proposed Design.....	5
<i>Regulatory Framework</i>	5
<i>Design, Compliance & Approvals Strategy/Process</i>	5
Analysis & Discussion	5
Approvals	6
<i>Conclusion</i>	6
<i>Appendix A: Project Location Aerial & Information</i> <i>(https://duckduckgo.com/?q=27+stronach+ave+maitland&t=h_&ia=web&iaxm=maps)</i>	7
<i>Appendix B: Regulatory Context - Bush Fire Prone Land Mapping Information (PREPARED FOR DAVID BOVERMAN JUNE 2023 MECONEMOSAIC.A)</i>	8
<i>Appendix C: Building Footprint and Planning Compliance Table</i>	11
<i>Appendix D: Rural Fires Act 1979 Section 100B</i>	12
<i>Appendix E: Rural Fires Regulation 2022 Section 45</i>	13
<i>References</i>	15

Project Description

General

The proposed development is located at 27-29 Stronach Avenue East Maitland and is a two-storey group home used for disability care, understood to be over two lots comprising four-two bedroom and two one-bedroom units, with an additional two units dedicated for carers who will be working twenty-four hours a day, seven days a week. The development is intended for use by clients of the National Disability Insurance Scheme (NDIS).

The proposed development is located on Bush Fire Prone Land considered a Special Fire Protection Purpose Development, or SFPP, under section 100B of the *Rural Fires Act* (section 100B, please refer to *Appendix D: Rural Fires Act 1979 Section 100B*).

Although the land immediately to the north is not mapped Bush Fire Prone on the current BFPLM, it does not fall under any of the 'Low threat vegetation – exclusions' in PBP-2019 (it is in the order of approximately 4.5ha in area and of forest vegetation). Notwithstanding, it is understood this area is part of a larger site that has been developed for retail/shopping, and that it would be part of future plans to develop accordingly.

The current Bush Fire Prone Land Map (BFPLM) indicates that the portion of the site in question that is Bush Fire Prone is limited to approximately twenty five percent (25%), and the bush fire hazard/risk profile is relatively low due to the suburban nature of the community and surrounds (please see *Appendix A: Project Location Aerial & Information* (https://duckduckgo.com/?q=27+stronach+ave+maitland&t=h_&ia=web&iaxm=maps), *Appendix B: Regulatory Context - Bush Fire Prone Land Mapping Information (PREPARED FOR DAVID BOVERMAN JUNE 2023 MECONEMOSAIC.A)*, and *Appendix C: Building Footprint and Planning Compliance Table*).

Proposed Design

The building is proposed to be built to BAL-29 Construction consistent with the provisions for the same in AS3959:2018 *Construction of buildings in bushfire-prone areas* (AS3959).

All other aspects of the design are proposed to comply with PBP-2019.

Regulatory Framework

It is understood that the development approvals pathway for this development would normally be via a vis the *State Environmental Planning Policy (Housing) 2021, Part 5 Housing for seniors and people with a disability*, but due to the fact that it is located on land considered Bush Fire Prone legislatively, a development application and consent will be submitted and sought from Council.

Accordingly, the approvals pathway will require issuance of a Bush Fire Safety Authority from the NSW RFS and associated General Terms of Approval (GTA).

Design, Compliance & Approvals Strategy/Process

Analysis & Discussion

The legislative and regulatory framework from construction, bush fire risk, and associated land-use planning perspectives addressed in this *Strategy* is comprised of compliance with the understood policy intent of section 100B and a qualitative analysis/assessment of the bush fire hazards and associated risks involved.

Section 45 of the *Rural Fires Regulation 2022* clearly acknowledges that proposals need not comply with PBP-2019 as long as the Commissioner RFS is satisfied with the design and associated bush fire protection measures put forth, noting the intent was, and continues to be, to allow such proposals to proceed even though they do not comply with the *Performance Criteria* or the *Acceptable Solutions*⁷ (please refer to section 45(2)(h) of the *Rural Fires Act 2022*, reproduced in *Appendix E: Rural Fires Regulation 2022 Section 45*).

Because this approach hinges on the NSW RFS 'Policy Position' and interpretation of what would be considered 'lower bush fire hazard/risk' for a suburban locale, concurrence from the Director Built & Natural Environment, the first level of NSW RFS Executive who can speak on behalf of the Commissioner RFS on such

⁷ This is based on the Policy Position when I oversaw the same as Manager Development Planning & Policy with the NSW RFS, a position I vacated 30 March 2023.

legislative matters/interpretations of this nature⁸, will be formally sought via a vis the BNE Advice Request Service.

Accordingly, the request will also seek that the response from the NSW RFS be considered a Bush Fire Safety Authority and associated GTA's under section 100B, as appropriate.

Approvals

If formal advice provided via the BNE Advice Request Service confirms support for the above-stated *Strategy*, said advice may be sufficient for submission to Council as consultation with the NSW RFS under section 100B assuming a Bush Fire Safety Authority and associated GTA's are issues in response..

Should advice come back resulting in the need for further assessment then the performance-based design brief process will ensue to address any issues.

It is important to note that it although the proposed building will be over two lots, it has been stated no subdivision is required nor proposed, as the project is understood to be undertaken under a Commonwealth context which would allow for building over two lots without subdivision.

Conclusion

The strategy adopted demonstrates that the proposed development, land use, and building design is appropriate and acceptable in terms of section 100B due to the lower bush fire risk associated with the development site and its being located in a lower bush fire hazard/risk suburban type setting.

The NSW RFS BNE 'Advice Request Service' will be utilised towards obtaining formal support, by a Delegated Officer with authority to do so, for the adopted approach, consistent with the understood policy/technical Positions held by the relevant NSW RFS Executives for and on behalf of the Commissioner RFS.

This *Bush Fire Design, Compliance, and Approvals Strategy* forms the basis for ensuing assessment of the proposed development consistent with the processes currently available which the NSW RFS has had in place since August 2019.

If required, any ensuing performance-based approach will also be consistent with that endorsed by FPA Australia and required for accreditation of Bushfire Planning & Design (BPAD) Level 3 Consultants in being recognised by the NSW RFS to undertake and certify performance-based design and assessment for compliance with PBP⁹.

⁸ Formal power and authority to make such decisions is considered to ultimately rest with the Commissioner RFS. (section 100B of the *Rural Fires Act* and 4.14 of the *Environmental Planning and Assessment Act*) Through Delegated Authority, authorised officers can apply those Policy/Technical Positions, methods of assessment, and the like, conditional on being consistent with those endorsed by the Commissioner RFS, or his representative, Director Built & Natural Environment.

⁹ Although the *Building Code of Australia* now follows the Performance-based Design Brief process in the *Australian Fire Engineering Guidelines (2021)*, the principal regulatory guideline, *Planning for Bush Fire Protection*, currently references the *International Fire Engineering Guidelines (2005)*, noting the processes contained in each are considered to be fundamentally identical from a pragmatic perspective. The stated standards required for BPAD Level 3 accreditation are based on my professional work with FPA Australia including participating on the Peer Review Interview Panel processes, as well as documented in the '*Bushfire Planning & Design Accreditation Scheme New South Wales Handbook*' (2020). Please note this approach has been stated to have been taught since the early days of the Bush Fire Protection (i.e., the Bushfire Planning & Design) Course at the then University of Western Sydney (currently Western Sydney University).