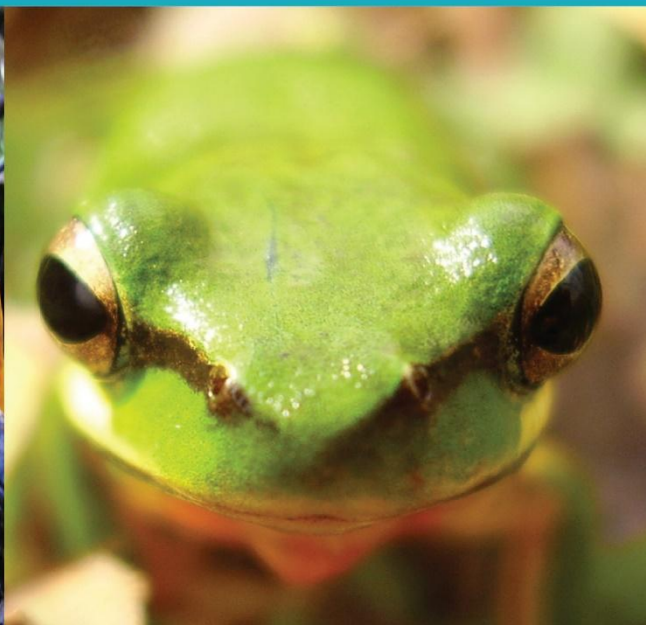




# TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



## BUSHFIRE PROTECTION ASSESSMENT

Proposed industrial subdivision

(Class 5-8)

Lot 3 DP 868761, 120 Old Pittwater Road, Brookvale

Under Section 100B of the Rural Fires (RF) Act 1997

28 October 2025  
(REF:CEN03.2BF)



## BUSHFIRE PROTECTION ASSESSMENT

Proposed industrial subdivision (Class 5-8)

Lot 3 DP 868761, 120 Old Pittwater Road, Brookvale

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Date:	28/10/25
File:	CEN03.2BF
Version:	2.0 FINAL



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*The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy; the location of all mapped features is to be confirmed by a registered surveyor. This report has been produced in accordance with the PRACTICE NOTE - Use of Generative Artificial Intelligence (Gen AI) dated 28 November 2024.*

## EXECUTIVE SUMMARY

*Travers bushfire & ecology (TBE)* has been engaged to prepare a Bushfire Protection Assessment for the proposed industrial subdivision to an area of existing commercial and industrial businesses, located at Lot 3 DP 868761, 120 Old Pittwater Road, Brookvale.

The proposed development is identified as being in a non-SFPP development, which is detached from the existing development onsite. The proposed development will be assessed under s100B of the *Rural Fires Act 1997 (RF Act)*, as it is a proposed subdivision on bushfire prone land and the development will require the NSW Rural Fire Service (RFS) to issue a Bush Fire Safety Authority (BFSA). The proposed development is an industrial subdivision intended solely for non-residential, non-habitable land uses, with no capacity for Special Fire Protection Purposes (SFPP) however the zoning would permit a dwelling on any lots created.

Lot C is a concept-built form only and will require a detailed built form DA before construction. The indicative-built form on Lot A and B is indicative only and will also be subject to a detailed built form DA and therefore subject to further bushfire reporting for each DA documentation (see Figure 1-3). This assessment is for the industrial subdivision of Lot C and associated earthworks.

*Planning for Bush Fire Protection 2019 (PBP)* dictates that the subsequent extent of bushfire attack that can potentially impact a non-SFPP building should not exceed a radiant heat flux of 29kW/m<sup>2</sup> for Class 5 to 8 buildings. This rating assists in determining the size of the appropriate Asset Protection Zone (APZ) by providing the necessary defendable space between hazardous vegetation and a building and the appropriate construction requirements.

This assessment has found that bushfire can potentially affect the proposed development from forest vegetation to the south, south-west and west of the proposed development. APZ setbacks do not conform with BAL-29. The forest vegetation to the west is the major threat, and proposed buildings (warehouses) have been assessed as being in BAL-FZ. The proposed plans illustrate a retaining wall along the western aspect of the development. This is recommended to be a 2m high non-combustible fence line and will act as a radiant heat barrier to reduce the bushfire threat from the west. Flamesol models have been included and fuel loads from *PBP* have been used. The buildings along the western portion are still regarded as BAL-FZ and construction standards will apply. A Type A construction from NCC 2022, Specification 5 is to be applied for buildings facing the fire front to the west.

This has the potential to result in future buildings on Lot C being exposed to potential radiant heat, flame contact and ember attack. Lot A and B are subject to ember attack. As a result, *TBE* proposes the following combination of bushfire measures:

**Recommendation 1** – The development including identified APZs is as generally indicated on the attached SCHEDULE 1- Plan of Bushfire Protection Measures and section 2.5 of this report.

**Recommendation 2** – The proposed industrial subdivision is to consider design changes to conform and ensure compliance with BAL-29 (increasing setback from building envelope to forest vegetation to the west and south-west) or additional construction standards are required such as non-combustible sarking, ember protection (i.e. roller door sealing) and external cladding, as per BAL-FZ provisions. No windows to be facing the western aspect. A Type A construction from NCC 2022, Specification 5 is to be applied for buildings facing the fire front

to the west. A 60/60/60 external fire rated walls should be incorporated. A fire sprinkler system may also be considered desirable.

**Recommendation 3** – A 2m non-combustible fence to the south-west and western portions of the proposed industrial subdivision to be implemented to act as a radiant heat barrier. This is recommended to sit where the building line is proposed.

**Recommendation 4** – All areas of the site that are identified building areas and APZs must be maintained as an IPA for the lifetime of the development.

**Recommendation 5** – Preparation of a Bushfire Emergency and Evacuation Plan (BEEP) and an upgrade to the site's Bushfire Management Plan (BMP) to ensure APZ maintenance.

**Recommendation 6** – Water, electricity and gas supply is to comply with Section 7.4 of *PBP*.

## GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
APZ	asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2018</i>
BAL	<i>bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BEEP	Bushfire Emergency & Evacuation Plan.
BFSA	Bush fire safety authority
EP&A Act	<i>Environmental Planning &amp; Assessment Act 1979</i>
FDI	Fire Danger Index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	<i>National Construction Code</i>
OPA	outer protection area
PBP	<i>Planning for Bush Fire Protection 2019</i>
RF Act	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
TBE	<i>Travers bushfire &amp; ecology</i>

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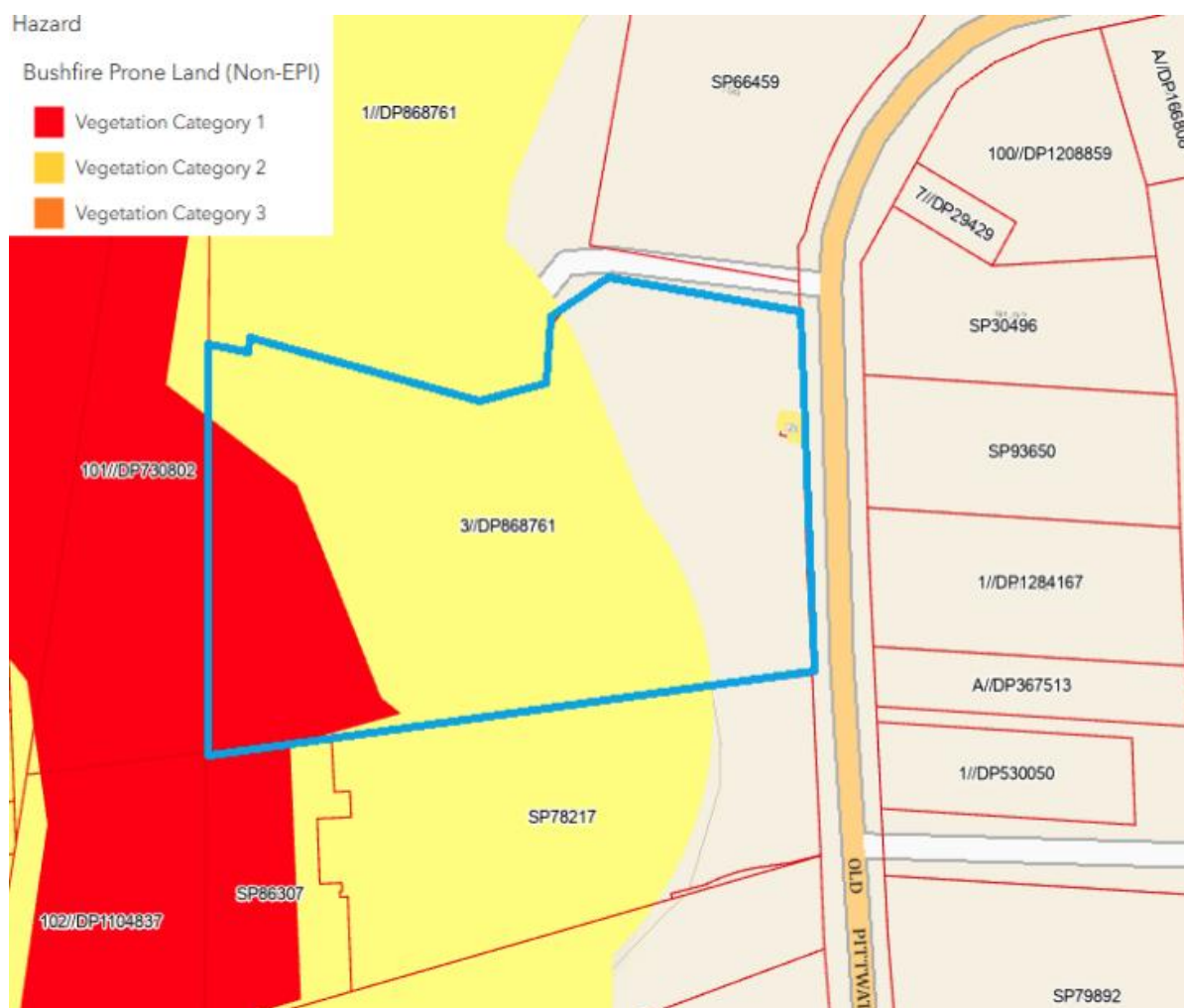
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# 1. INTRODUCTION

*Travers bushfire & ecology (TBE)* has been engaged by Centennial to undertake a bushfire protection assessment for the proposed industrial subdivision located at 120 Old Pittwater Road, Brookvale. The proposed development site is identified as being located on Bush Fire Prone Land (BFPL) mapped by Northern Beaches Council (Refer Figure 1-1).

Lot C is a concept-built form only and will require a detailed built form DA before construction. The indicative-built form on Lot A and B is indicative only and will also be subject to a detailed built form DA and therefore subject to further bushfire reporting for each DA documentation (see Figure 1-3). This assessment is for the residential subdivision of Lot C and associated earthworks.

The proposed development is considered to be an a non-SFPP development. The proposed development will be assessed under s100B of the Rural Fires (RF) Act 1997. The development will require the NSW RFS to issue a Bush Fire Safety Authority (BFSA) and it is a subdivision on bushfire prone land mapping. *Chapter 8 of Planning for Bush Fire Protection 2019 (PBP)* will apply to this assessment. The proposed development is an industrial subdivision intended solely for non-residential, non-habitable land uses, with no capacity for Special Fire Protection Purposes (SFPP).



**Figure 1-1 – Bushfire prone land map**

(Source: SEED dated: 18/08/2025)



An inspection of the proposed development site and surrounds was undertaken by Jess Bowditch on 6 August 2025 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of potential bushfire hazards and risks were also undertaken.

## 1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the development;
- undertake a bushfire attack assessment in accordance with *PBP*;
- provide advice on bush fire protection measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues; and
- review the potential to carry out hazard management over the development site.

## 1.2 Site description

The development site is owned by Centennial and is situated off Old Pittwater Road, in Brookvale.

The existing structures include outdoor carparks, a Woolworths docking area, warehouses and commercial businesses. The proposed development will be adjacent to an existing rooftop carpark. The surrounding bushland sits to the west and south-west and is predominantly forest.



**Figure 1-2 – Aerial appraisal**

(Source: Nearmap Aerial Photography, accessed: 18/08/2025)

## 1.3 Project background

The site is known as 120 Old Pittwater Road and legally referred to as Lot 3 DP 868761. The site has a total area of 2.1ha. The subject site contains existing commercial and industrial usage, such as Woolworths, a café and warehouses.

The proposed built form is conceptual only for council requirements and there are plans to excavate and remove trees to the rear (west) of the proposed Lot C to provide more usable site area. The subject site is currently zoned as E4 - General Industrial in the Northern Beaches Council area, under the Warringah Local Environmental Plan (LEP) 2011. The site currently has existing car parking and buildings within the lot. There will be a separate DA to be submitted in the same lot for a proposed single industrial building.

Land Eco Consulting prepared a threatened species report in April 2025 for the proposed development. A series of ecological surveys were undertaken during 2024 and 2025, such as microbat, flora, amphibian and reptile surveys. These surveys were completed following a preliminary ecological survey which concluded that the proposed development would likely trigger the NSW Biodiversity Offset Scheme (BOS), thus a 'Biodiversity Development Assessment Report' (BDAR) that addresses the Biodiversity Assessment Method and the retiring of Biodiversity Offset Credits would be required.

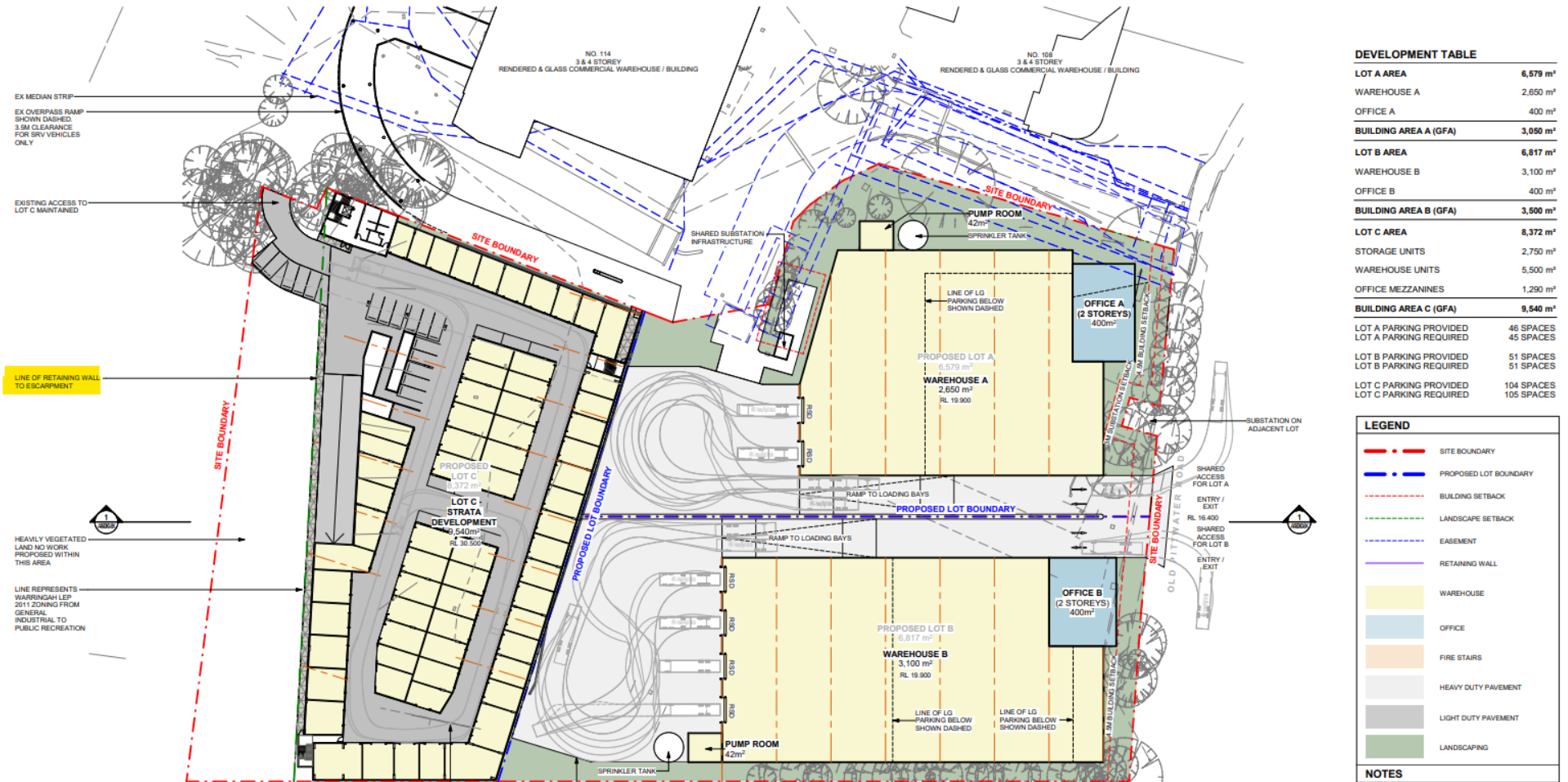


Figure 1-3 – Concept built plans

(Source: (Source: Reid Campbell, DA 120 Old Pittwater Road, Brookvale, LOT C STRATA SCHEME – GROUND LEVEL, Issue B dated 29.08.25)



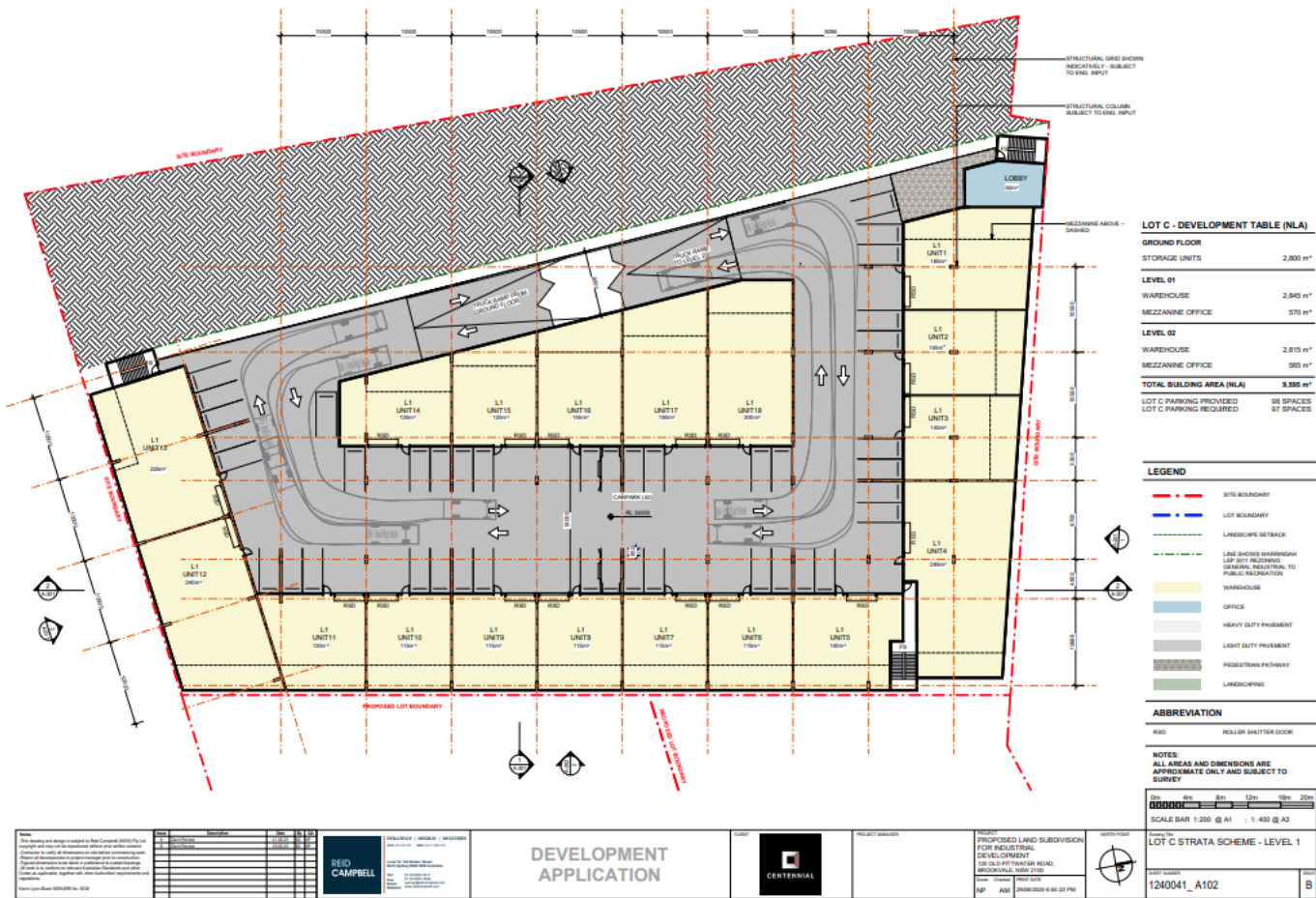


Figure 1-4 – Concept built plans

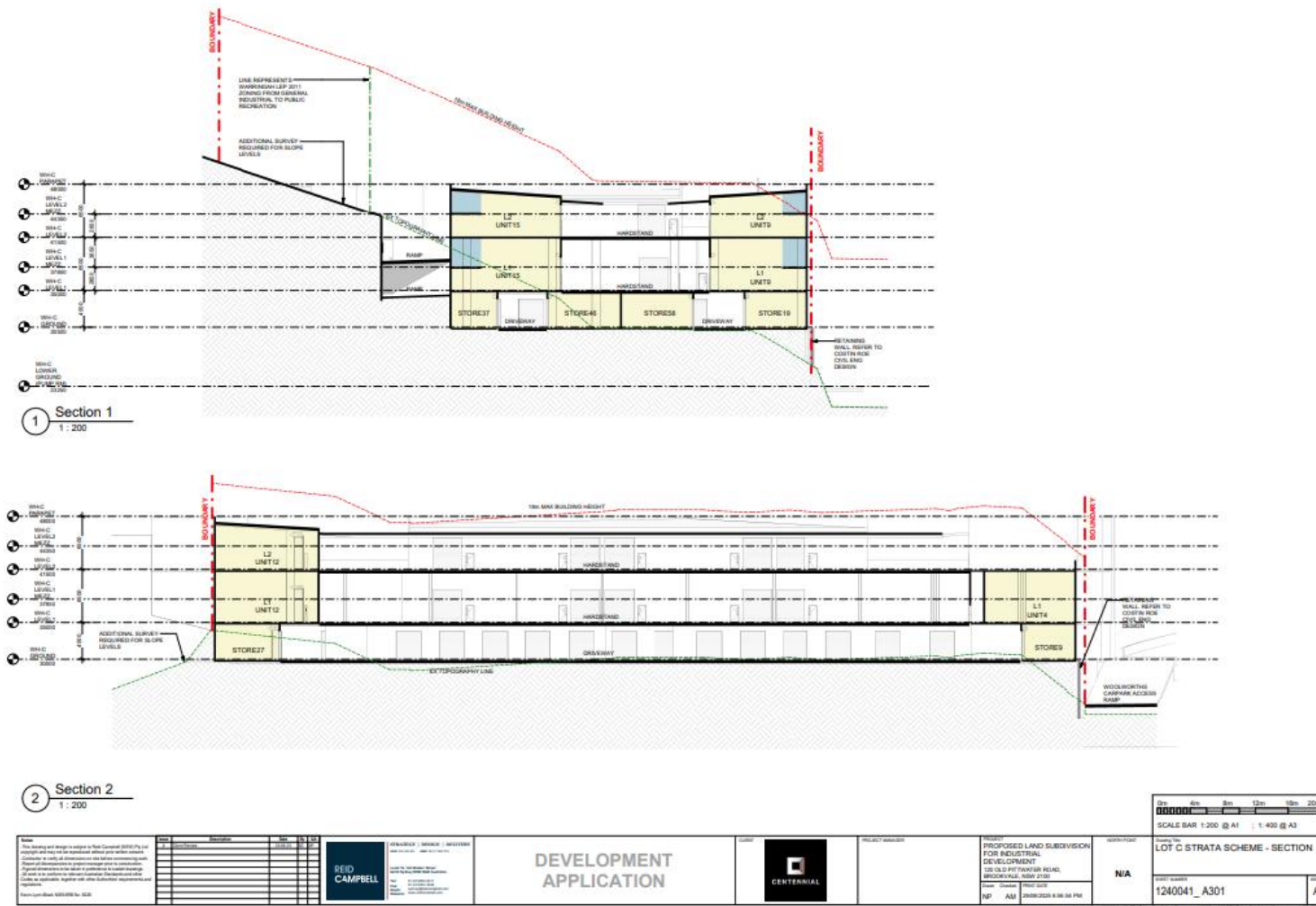
(Source: Reid Campbell, DA 120 Old Pittwater Road, Brookvale, LOT C STRATA SCHEME – GROUND LEVEL, Issue B dated 29.08.25)



Figure 1-5 – Concept built plans

(Source: Reid Campbell, DA 120 Old Pittwater Road, Brookvale, LOT C STRATA SCHEME - LEVEL 1 Issue B dated 29.08.25)



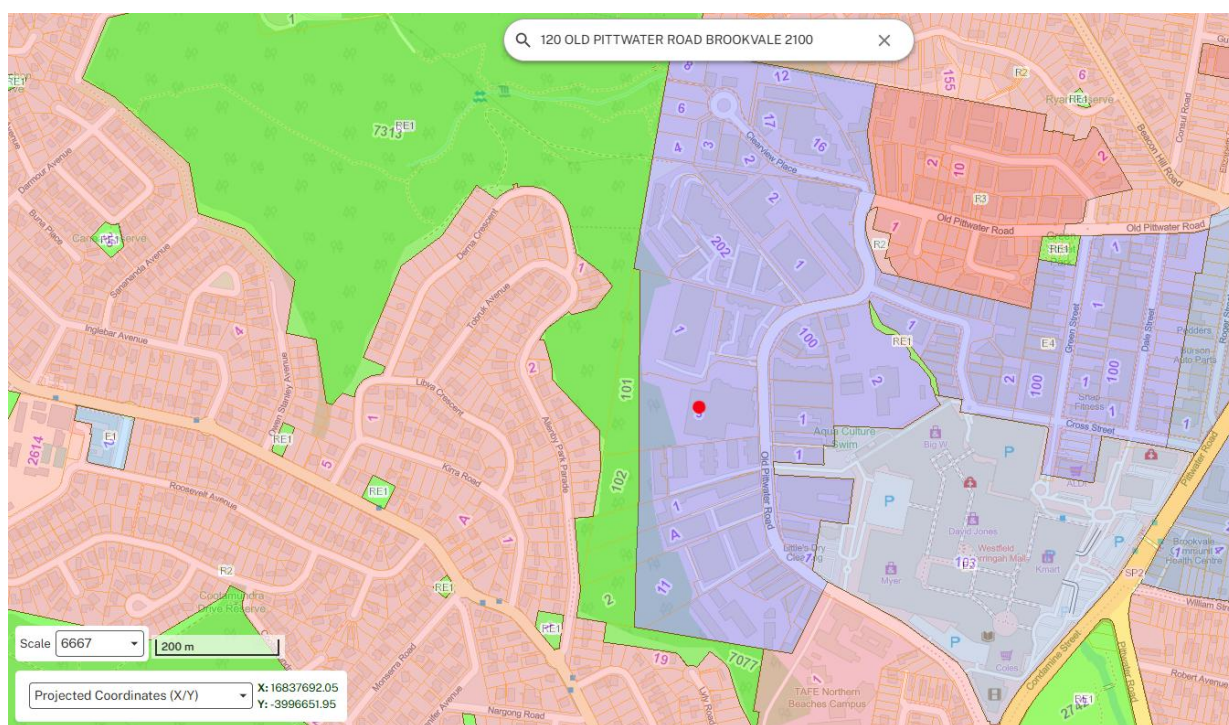


**Figure 1-6 – Concept built plans**

(Source: Reid Campbell, DA 120 Old Pittwater Road, Brookvale, LOT C STRATA SCHEME - LEVEL 2 Issue B dated 29.08.25)

## 1.4 Legislation and planning instruments

Is the site mapped as bush fire prone?	Yes. (Refer to Figure 1-1).
Proposed development type	Industrial subdivision E4 – General Industrial
Is the development considered integrated for the purposes of Section 100B of the <i>Rural Fires Act 1997</i> ?	No – but industrial purpose only. Excluded by RF Regulations. CI 46(h) subdivision of land used or proposed to be used for industrial purposes on which the erection of a dwelling related to the industrial use of the land, for example, a manager's residence, is permitted.
Is the proposal located in an Urban Release Area as defined under Clause 273 of the EP&A Regulations?	No.
Does the proposal rely on a performance solution?	No – implementation of a radiant heat barrier of 2m along the western aspect using <i>PBP</i> DTS fuel loads - <i>Table A1.12.8</i> as an additional mitigation measure. Buildings along western aspect remains in BAL-FZ. Type A construction standards as per NCC 2022 are required.



**Figure 1-7– Zoning**

(Source: SEED, dated:24/09/2025)

### **1.4.1 Warringah Local Environmental Plan 2011**

The subject-site is generally zoned as E4- General Industrial as per the *Warringah LEP 2011*. In accordance with the LEP, the provisions of the current zoning comply with the proposed development. Warehouses are permitted with consent under the current zoning.

### **1.4.2 Buildings of Class 5 to 8 under the NCC**

Under the building classification system within the *NCC*, class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities.

The *NCC* does not provide for any bush fire specific performance requirements for these particular classes of buildings. As such *AS 3959* and the *NASH Standard* are not considered as a set of deemed to satisfy provisions, however compliance with *AS 3959* and the *NASH Standard* must be considered when meeting the aims and objectives of *PBP*.

Whilst bush fire is not captured in the *NCC* for class 5 in the *NCC* for class 5 to 8, the following objectives will be applied in relation to access, water supply and services, and emergency and evacuation planning:

- *to provide safe access to/ from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;*
- *to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;*
- *to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and*
- *provide for the storage of hazardous materials away from the hazard wherever possible.*

The general fire safety construction provisions of the *NCC* are taken as acceptable solutions however construction requirements for bush fire protection will need to be considered on a case-by-case basis. In this case, additional construction materials may be required (see Section 4).

### **1.4.3 Planning for Bushfire Protection (PBP) 2019**

#### **Commercial and industrial development**

Commercial and industrial development on BFPL is generally captured by S4.14 of the *EP&A Act*. Clause 46(h) excludes “*subdivision of land used or proposed to be used for industrial purposes on which the erection of a dwelling related to the industrial use of the land, for example, a manager's residence, is permitted*” from the requirement for a bush fire safety authority. A suitable package of BPMs should be proposed commensurate with the assessed level of risk to the development. The scale of the development and numbers of people likely to be occupying the building will be directly relevant to the BPMs proposed.

The provisions within Chapter 7 of *PBP* for residential infill developments should be used as a base for a commercial and industrial development's package of measures. Each development will be assessed on its own merits. The *NCC* provides suitable construction solutions (FRLs) based on Type A construction and the fire source features that apply to the buildings.

## 1.5 Environmental and Aboriginal heritage constraints

Submission requirements require the following environmental and heritage considerations that have the potential to be a constraint for implementing APZs within the site and may require further assessments before construction proceeds within the site:

- identification of any significant environmental features on the property;
- the details of any threatened species, population or ecological community identified under the *Biodiversity Conservation Act 2016 (BC Act)* that is known to the Applicant to exist on the property;
- the details and location of any Aboriginal object (within the meaning of the *National Parks and Wildlife Act 1974*) or Aboriginal place (within the meaning of that Act) that is known to the Applicant to be situated on the property.

The following database sources were reviewed to determine whether any environmental and Aboriginal heritage constraints were present within the proposed site:

**Table 1-1 – Environmental and heritage information**

Potential Constraint	Database
Aboriginal Heritage significant sites and places	Aboriginal Heritage Information Management System (AHIMS)
Threatened Ecological Communities (TECs)	Threaten Ecological Communities Greater Sydney Dataset (NSW SEED Portal)
Threatened Species (flora and fauna)	NSW BioNet Species Sightings Data Collection (NSW SEED Portal)
Watercourses	NSW Hydrography Dataset (NSW SEED portal)

Searches of each database used a 50m buffered area from the site boundaries to identify features. A basic search of the AHIMS data identified no-known significant Aboriginal sites or places.

There are no current recorded threatened ecological communities or watercourses within or in proximity to the subject-site. The western and south-western portion of the subject site contains intact, remnant native vegetation.

It is expected that due to the proposed site works, any potential environmental issues will be resolved and do not represent a constraint to the implementation of bush fire protection measures.



## 2. BUSHFIRE THREAT ASSESSMENT

In order to complete a bush fire attack assessment and determine the required minimum APZ setbacks for a development, an assessment of the vegetation and the effective slope within the vegetation is required. The climatic region and fire history of the region are also considered.

### 2.1 Fire history

A fire history search of the development site and its surrounding areas was conducted using the NSW National Parks and Wildlife Services (NPWS) 'NPWS Fire History- Wildfires and Prescribed Burns' database within the NSW SEED Portal.

There have been no-known fires to directly affect the site itself. The majority of wildfire activity was recorded to the north and south-east of the subject site. The closest wildfire was approximately 400m away from the subject site in 2005-06 in Allenby Park. (Refer to Figure 2-1).

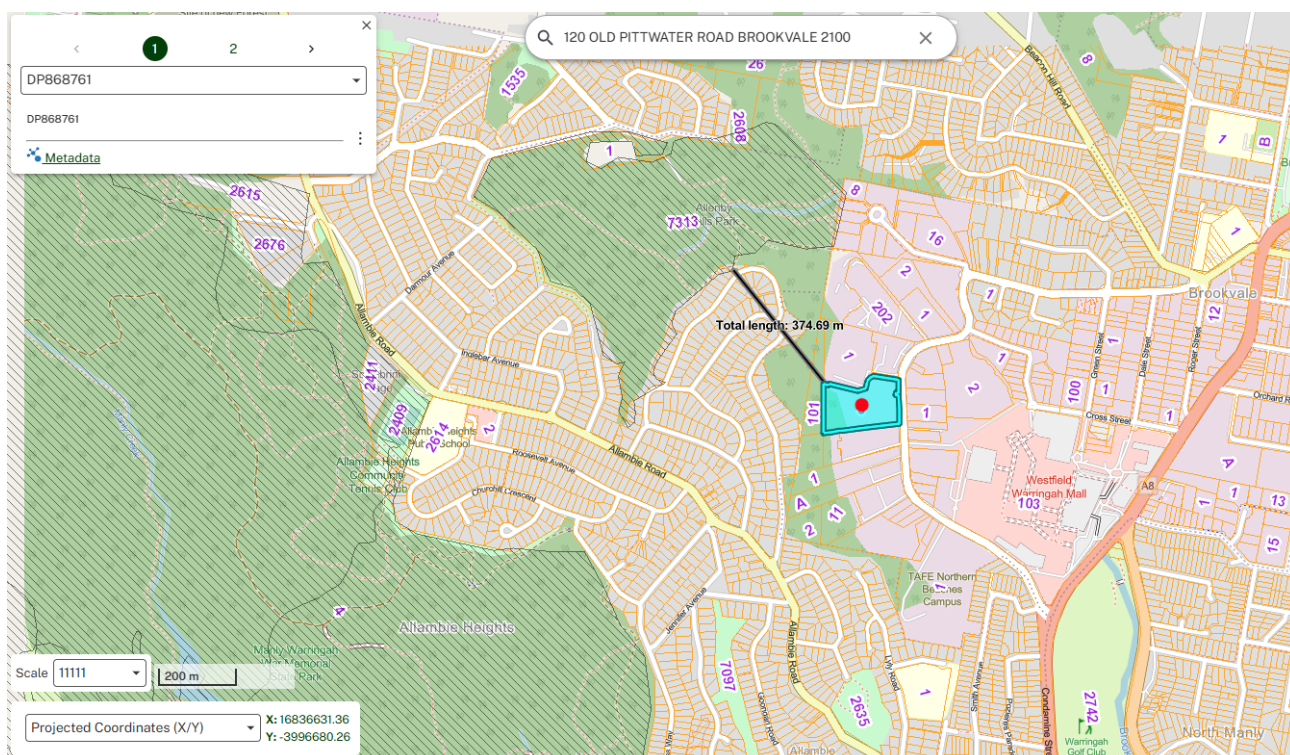


Figure 2-1 – Site fire history

(Source: SEED, dated: 24/09/2025)



## 2.2 Predominant vegetation

*PBP* requires the identification of the predominant vegetation formation in accordance with David Keith (2004) when using the simplified acceptable solutions in *PBP*. The vegetation is calculated for a distance of at least 140m from a proposed development footprint. The identified vegetation within 140m of the proposed development location was identified from the Geocortex viewer within the NSW SEED Portal which includes layers relating to NSW BioNet PCT sites and NSW State Vegetation Mapping. The vegetation formations were then assessed in light of *Figure A1.2* of *PBP* after a site visit. The predominant vegetation within 140m of the proposed development is shown in table 2-1.

**Table 2-1 – Predominant vegetation**

Vegetation community	Vegetation classification	Vegetation formation	PBP classification
Hunter Coast Lowland Apple-Bloodwood Forest (PCT 3582)	Sydney Coastal Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	Forest
Hunter Coast Foothills Apple Forest (PCT 3581)	Sydney Coastal Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrubby sub-formation)	Forest
Hunter Coast Foothills Apple-Ironbark Grassy Forest (PCT 3432)	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Forest

Photos of the vegetation and surrounding use within the 140m assessable area are shown within Figures 2-2 to 2-7 below. The predominant vegetation surrounding the subject site is Forest formation.

*PBP* acceptable solutions fuel loads have been adopted for this assessment.



Figure 2-2 – Existing buildings neighbouring site – industrial usage



Figure 2-3 – Existing buildings neighbouring site – industrial usage





Figure 2-4– Surrounding vegetation – south-east



Figure 2-5 – Surrounding vegetation – south





Figure 2-6 – Existing buildings – neighbouring site – industrial usage

## 2.3 Effective slope

The effective slope has been assessed for up to 100m from the development site. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

In general, the site displays a general downslope topography. The proposed site is generally flat itself; however, the western forest vegetation displays a downslope from the existing carparks. To the south, the topography demonstrates a steeper downslope outside of the site boundary, opposite existing buildings. The effective slope for the predominant vegetation in the 140m assessable area is described in detail within Table 2-2 below.

## 2.4 Climatic region

The site is located within the Northern Beaches LGA which is found within the broader Greater Sydney Fire Weather Region. The relevant fire weather is assessed as being set at a Fire Danger Index (FDI) of 100.

## 2.5 Bushfire attack assessment

Table 2-1 provides a summary of the bushfire attack assessment based non-SFPP types of development and the methodologies used. The following assessment has determined the minimum APZ setbacks via Table A1.12.2 (*non-SFPP*) of *PBP*.

The APZs are required to be wholly within the site's boundaries and should not rely on being on adjoining land. APZs can extend beyond a site's boundaries in cases where structures or features of a landscape are considered permanent and act as barriers against fire spread. Examples are road carriageways, footpaths, urban landscapes or land with vegetation that is considered managed.

The minimum APZ setback required for a non-SFPP development (class 5-8 buildings) must ensure buildings are not exposed to a radiant heat flux exceeding 29kW/m<sup>2</sup> which satisfies a BAL-29 rating. The radiant heat flux exposure was modelled using the Flamesol calculator with the 2m high fence/radiant heat barrier in place (see Figures 2.8 - 2.11 below).

**Table 2-2 – Bushfire attack assessment**

Aspect	Vegetation formation	Effective slope	Minimum APZ required for non-SFPP development (<29kW/m <sup>2</sup> )	APZ provided	BAL rating	Comments
North	Managed lands (Existing carparks/commercial area)	N/A	N/A	N/A	N/A	To the north of the proposed industrial subdivision is existing carpark/commercial building area.
East	Managed lands (Existing carparks/commercial area)	N/A	N/A	N/A	N/A	To the east of the proposed industrial subdivision is existing carpark/commercial building area.
South	Managed lands (Existing carparks/commercial area)	N/A	N/A	N/A	N/A	To the south of the proposed industrial subdivision is existing carpark/commercial building area.
South-west*	Forest	15.38°	56m	23m	BAL-FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-8)



Aspect	Vegetation formation	Effective slope	Minimum APZ required for non-SFPP development (<29kW/m <sup>2</sup> )	APZ provided	BAL rating	Comments
West*	Forest	12.87°	45m	14m	BAL-FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-9)
West*	Forest	9.12°	36m	24m 25m	BAL FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-10– using 24m)
West*	Forest	11.86°	45m	27m	BAL - FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-11).

Aspect	Vegetation formation	Effective slope	Minimum APZ required for non-SFPP development (<29kW/m <sup>2</sup> )	APZ provided	BAL rating	Comments
West*	Forest	14.80°	45m	21m	BAL-FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-12).
West*	Forest	8.45°	36m	22m	BAL-FZ*	The current setback does not meet BAL-29 and is considered as BAL-FZ. The implementation of a 2m radiant heat barrier using Flamesol model has been added, however does not comply with BAL-29. (see Figure 2-13).

\*Proposed 2m non-combustible fence/radiant heat barrier\*

In summary, the main threat of bush fire to the development is from the forest vegetation from the southwest and west. The vegetation to the east and north has been assessed as managed lands, as it consists as existing carparks, commercial and industrial usage, such as warehouses. Based on the proposed development, the minimum APZs from the forest vegetation to the west does not meet BAL-29, and the proposed warehouses on the west are in BAL-FZ. Proposed carparking area in the north-west are situated within the APZ (minimum 36m) and this is deemed suitable.

The proposed plans illustrate a retaining wall along the western aspect of the development. This is recommended to be a 2m non-combustible fence and will act as a radiant heat barrier to reduce the bushfire threat to the west. Flamesol, 'Radiant Heat: Method 2' calculator has been used in the below figure to illustrate if the BAL can be decreased with this mitigation measure. Fuel loads from *PBP Table A1.12.8* have been applied. However, the models demonstrate that the radiant heat shield does not change the BAL, and the industrial buildings on the western portion are in BAL-FZ.

Brookvale

Radiant Heat Barrier calculator - AS3959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	7.62 km/h
Vegetation Classification	Forest	Flame length	53.92 m
Understorey fuel load	22 t/ha	Flame angle	1 °
Total fuel load	36.1 t/ha	Panel height	0.9399999999999999 m
Vegetation height	n/a	Elevation of receiver	0.47 m
Effective slope	15.38 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	142,299 kW/m
Distance to vegetation	23 m	Transmissivity	1
Flame width	100 m	Viewfactor	1
Windspeed	n/a	Radiant heat flux	76.03 kW/m <sup>2</sup>
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0419
Flame temperature	1,090 K	Adjusted viewfactor	0.958
Actual barrier height	2 m	Adjusted radiant heat flux	72.84 kW/m <sup>2</sup>
		Bushfire Attack Level	BAL-FZ

Figure 2-7 – Radiant heat barrier - ~23m from forest vegetation – south west

Calculated October 13, 2025, 7:12 pm (RHBC v.1.4)

**Brookvale**

Radiant Heat Barrier calculator - AS3959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	6.41 km/h
Vegetation Classification	Forest	Flame length	46.03 m
Understorey fuel load	22 t/ha	Flame angle	1 °
Total fuel load	36.1 t/ha	Panel height	0.8 m
Vegetation height	n/a	Elevation of receiver	0.4 m
Effective slope	12.87 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	119,670 kW/m
Distance to vegetation	14 m	Transmissivity	1
Flame width	100 m	Viewfactor	1
Windspeed	n/a	Radiant heat flux	76.03 kW/m²
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0704
Flame temperature	1,090 K	Adjusted viewfactor	0.9295
Actual barrier height	2 m	Adjusted radiant heat flux	70.67 kW/m²
		Bushfire Attack Level	BAL-FZ

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

**Figure 2-8 – Radiant heat barrier - ~14m from forest vegetation – west**

Calculated October 13, 2025, 7:14 pm (RHBc v.1.4)

**Brookvale**

Radiant Heat Barrier calculator - A53959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.95 km/h
Vegetation Classification	Forest	Flame length	36.52 m
Understorey fuel load	22 t/ha	Flame angle	40 °
Total fuel load	36.1 t/ha	Panel height	23.48 m
Vegetation height	n/a	Elevation of receiver	11.74 m
Effective slope	9.12 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	92,387 kW/m
Distance to vegetation	24 m	Transmissivity	0.863
Flame width	100 m	Viewfactor	0.7572
Windspeed	n/a	Radiant heat flux	49.74 kW/m²
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0302
Flame temperature	1,090 K	Adjusted viewfactor	0.727
Actual barrier height	2 m	Adjusted radiant heat flux	47.75 kW/m²
		Bushfire Attack Level	BAL-FZ

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

**Figure 2-9 – Radiant heat barrier - ~24m from forest vegetation – west**



Calculated October 13, 2025, 7:15 pm (RHbc v.1.4)

**Brookvale**

Radiant Heat Barrier calculator - AS3959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	5.98 km/h
Vegetation Classification	Forest	Flame length	43.22 m
Understorey fuel load	22 t/ha	Flame angle	36 °
Total fuel load	36.1 t/ha	Panel height	25.4 m
Vegetation height	n/a	Elevation of receiver	12.7 m
Effective slope	11.85 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	111,614 kW/m
Distance to vegetation	27 m	Transmissivity	0.865
Flame width	100 m	Viewfactor	0.7968
Windspeed	n/a	Radiant heat flux	52.45 kW/m²
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0268
Flame temperature	1,090 K	Adjusted viewfactor	0.7699
Actual barrier height	2 m	Adjusted radiant heat flux	50.68 kW/m²
		Bushfire Attack Level	BAL-FZ

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

**Figure 2-10 – Radiant heat barrier - ~27m from forest vegetation – west**

Calculated October 13, 2025, 7:17 pm (RHBc v.1.4)

**Brookvale**

Radiant Heat Barrier calculator - AS3959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	7.33 km/h
Vegetation Classification	Forest	Flame length	51.97 m
Understorey fuel load	22 t/ha	Flame angle	1 °
Total fuel load	36.1 t/ha	Panel height	0.9 m
Vegetation height	n/a	Elevation of receiver	0.45 m
Effective slope	14.8 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	136,717 kW/m
Distance to vegetation	21 m	Transmissivity	1
Flame width	100 m	Viewfactor	1
Windspeed	n/a	Radiant heat flux	76.03 kW/m²
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0462
Flame temperature	1,090 K	Adjusted viewfactor	0.9537
Actual barrier height	2 m	Adjusted radiant heat flux	72.51000000000001 kW/m²
		Bushfire Attack Level	BAL-FZ

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

**Figure 2-11 – Radiant heat barrier - ~21m from forest vegetation- west**

Calculated October 13, 2025, 7:19 pm (RHBc v.1.4)

**Brookvale**

Radiant Heat Barrier calculator - AS3959-2018			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.72 km/h
Vegetation Classification	Forest	Flame length	35.07 m
Understorey fuel load	22 t/ha	Flame angle	37 °
Total fuel load	36.1 t/ha	Panel height	21.1 m
Vegetation height	n/a	Elevation of receiver	10.55 m
Effective slope	8.45 °	Effective barrier height	2 m
Site slope	0 °	Fire intensity	88,213 kW/m
Distance to vegetation	22 m	Transmissivity	0.871
Flame width	100 m	Viewfactor	0.7949000000000001
Windspeed	n/a	Radiant heat flux	52.67 kW/m²
Heat of combustion	18,600 kJ/kg	Viewfactor of barrier	0.0337
Flame temperature	1,090 K	Adjusted viewfactor	0.7611
Actual barrier height	2 m	Adjusted radiant heat flux	50.43 kW/m²
		Bushfire Attack Level	BAL-FZ

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

**Figure 2-12 – Radiant heat barrier - ~22m from forest vegetation**

### 3. SPECIFIC PROTECTION ISSUES

Given the type of development is considered 'Other Development' (Chapter 8 of *PBP*) and specifically is 'Commercial and industrial development', Chapter 7 bushfire protection measures of *PBP* have been assessed against. A suitable package of BPMs should be proposed commensurate with the assessed level of risk to the development. The scale of the development and numbers of people likely to be occupying the building will be directly relevant to the BPMs proposed. Each development will be assessed on its own individual merits.

Whilst bush fire is not captured in the NCC for Class 5-8 buildings, the following objectives will be applied in relation to access, water supply and services, and emergency and evacuation planning:

- *to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation.*
- *to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.*
- *to provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and*
- *provide for the storage of hazardous materials away from the hazard wherever possible.*

#### 3.1 Asset protection zones

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

The minimum APZ setbacks required for the proposed non-SFPP development, as well as the APZs provided are indicated within section 2.5 and generally depicted in Schedule 1. Furthermore, as indicated in schedule 1, all areas identified as an APZ or identified building area are required to be managed as an inner protection area (IPA) for the lifetime of the development or until the potential bushfire hazards are removed. This should be in accordance with *Appendix 4* of *PBP* and as shown in schedule 3 of this report.

Landscaping will be required to be minimal if proposed and require site management to comply with *Appendix 4* of *PBP*.

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.



**Table 3-1 – Performance criteria for asset protection zones and landscaping (PBP 2019)**

**Performance criteria: APZs are provided commensurate with the construction of the building; and A defensible space is provided. APZs are managed and maintained to prevent the spread of a fire to the building. the APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.**

Acceptable Solution	Complies	Comments
APZs are provided in accordance with Tables A1.12.2 and A1.12.3 in Appendix 1.	<input checked="" type="checkbox"/>	APZ setbacks do not conform with BAL-29. The forest vegetation to the west is the major threat, and proposed buildings (warehouses) have been assessed as being in BAL-FZ. The implementation of a 2m non-combustible radiant heat barrier has been recommended which will act as a mitigation measure, however all industrial buildings have been assessed as BAL-FZ.
APZs are managed in accordance with the requirements of Appendix 4 of PBP.	<input checked="" type="checkbox"/>	All required APZs, particularly to the west and south-west, must be managed in accordance with the requirements of Appendix 4.
APZs are wholly within the boundaries of the development site	<input checked="" type="checkbox"/>	APZs are wholly within property boundaries, with setbacks validated for compliance.
APZs are located on lands with a slope less than 18 degrees.	<input checked="" type="checkbox"/>	All APZs are situated on compliant gradients, ensuring operational safety and bushfire resistance.
Compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4);	<input checked="" type="checkbox"/>	Any landscaping proposed must comply with PBP Appendix 4. Can be a condition of consent.
A clear area of low-cut lawn or pavement is maintained adjacent to the house;	<input checked="" type="checkbox"/>	The proposed development is an industrial subdivision and is lawn is unlikely to be proposed around the buildings. Hard landscaping, such as pavements is recommended.
Fencing is constructed in accordance with section 7.6;	<input checked="" type="checkbox"/>	Can be a condition of consent.
Trees and shrubs are located so that: <ul style="list-style-type: none"> <li>the branches will not overhang the roof;</li> <li>the tree canopy is not continuous; and</li> <li>any proposed windbreak is located on the elevation from which fires are likely to approach.</li> </ul>	<input checked="" type="checkbox"/>	Can be a condition of consent.

**Summary:** APZ setbacks do not conform with BAL-29. The forest vegetation to the west is the major threat, and proposed buildings (warehouses) generally are in BAL-FZ.

**Considerations:**

- Design changes to comply with BAL-29 APZ setbacks and the implementation of 2m non-combustible radiant heat barrier OR construction upgrades as per AS3959:2018 BAL-FZ such as ember protection, sealing, non-combustible sarking, etc.
- Avoid mulch or leaf litter in understory.
- Incorporate hard landscaping as a practical fuel break where possible, such as gravel paths, paved driveways, masonry walls, retaining walls, etc.

## 3.2 Construction standards

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

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

The general fire safety construction provisions of the NCC are taken as acceptable solutions however construction requirements for bush fire protection will need to be considered on a case-by-case basis.

The buildings on Lot C are all to be built in accordance with Vol 1 of the NCC and should be built to Type A construction with appropriate FRLs.

**Table 3-2 – Performance criteria for construction standards (PBP 2019)**

<b>Performance criteria: the proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact; proposed fences and gates are designed to minimise the spread of bush fire; and proposed Class 10a buildings are designed to minimise the spread of bush fire.</b>		
<b>Acceptable Solution</b>	<b>Complies</b>	<b>Comments</b>
BAL is determined in accordance with Tables A1.12.5 to A1.12.7.	<input checked="" type="checkbox"/>	BAL is determined using Tables A1.12.5 to A1.12.7, however they do not conform with BAL-29 and are assessed as BAL-FZ.
Construction provided in accordance with the NCC and as modified by section 7.5	<input checked="" type="checkbox"/>	Can be condition of consent.
Fencing and gates are constructed in accordance with section 7.6.	<input checked="" type="checkbox"/>	Can be condition of consent.
Class 10a buildings are constructed in accordance with section 8.3.2.	<input checked="" type="checkbox"/>	No Class 10a buildings proposed.
<p><b>Summary:</b> The proposed industrial subdivision has been assessed as being in BAL-FZ.</p> <p><b>The implementation of a 2m non-combustible radiant heat barrier has been used as a performance solution to demonstrate BAL-29 and as a mitigation measure, however the industrial buildings on the western portion are still in BAL-FZ. A Type A construction from NCC 2022, Specification 5 is to be applied for buildings facing the fire front to the west. A 60/60/60 external fire rated walls should be incorporated. No windows facing the bushfire interface to the west.</b></p> <p><b>Considerations:</b></p> <ul style="list-style-type: none"> <li>- APZs setbacks from the west to ensure compliance with BAL-29 or construction standards to meet BAL-FZ as per AS3959:2018. Class 5 (warehouses) do not have construction standards as per NCC, however in this case ember protection, non-combustible sarking with the addition of a fire sprinkler system may be considered essential to ensure compliance and reduced bushfire risk. No windows to be facing the western aspect.</li> </ul>		

### 3.3 Access

The existing commercial and industrial buildings in the surrounding lot supports existing egress points to the proposed development site from Old Pittwater Road. The internal, two-way road leads to the various carparks within the site and offers access to all proposed buildings within the subdivision. The proposal's compliance with the acceptable solutions outlined in *PBP* is detailed within table 3-4 below.

The proposed subdivision would be the furthest buildings away from the main street access (Old Pittwater Road) however internal roads are available to the rear of the property.

Access to hydrants need to meet the requirements of the NCC for Class 5 buildings.

**Table 3-3 – Performance criteria for access**

<b>Performance criteria: Firefighting vehicles are provided with safe, all-weather access to structures; the capacity of access roads is adequate for firefighting vehicles; there is appropriate access to water supply, and; firefighting vehicles can access the dwelling and exit the property safely.</b>		
<b>Acceptable solution</b>	<b>Complies</b>	<b>Comments</b>
Property access roads are two-wheel drive, all-weather roads;	<input checked="" type="checkbox"/>	Complies.
The capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating;	<input checked="" type="checkbox"/>	Complies.
Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005;	<input checked="" type="checkbox"/>	Can be condition of consent.
There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available	<input checked="" type="checkbox"/>	Complies.
At least one alternative property access road is provided for individual buildings (dwellings) or groups of buildings that are located more than 200 metres from a public through road;	<input checked="" type="checkbox"/>	There is no alternative property access to the existing commercial/industrial area or proposed industrial subdivision. The proposed subdivision is close to the main road (Old Pittwater Road) and the internal road structure offers is accessibility to Old Pittwater Road, existing and proposed buildings and carparks.
There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.	<input checked="" type="checkbox"/>	Complies.
<p><b>Summary:</b> The proposed access infrastructure demonstrates compliance with several key criteria; however, there is a deviation for alternative property access. Though, the proposed subdivision is close to the main road (Old Pittwater Road) and the internal road structure offers is accessibility to Old Pittwater Road, existing and proposed buildings and carparks.</p> <p><b>Considerations:</b></p> <ul style="list-style-type: none"> <li>Validate the traffic management plan and kerb design compliance prior to finalizing.</li> </ul>		

**Performance criteria: Firefighting vehicles are provided with safe, all-weather access to structures; the capacity of access roads is adequate for firefighting vehicles; there is appropriate access to water supply, and; firefighting vehicles can access the dwelling and exit the property safely.**

- The proposed industrial subdivision not being a residential building can provide for reasonable access, albeit >200m from the main road system. The industrial buildings are in close proximity to Old Pittwater Road.
- Hydrants need to meet the requirements of the NCC.

## 3.4 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire. Table 3-4 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

**Table 3-4 – Performance criteria for water supplies**

**Performance criteria: an adequate water supply is provided for firefighting purposes; water supplies are located at regular intervals, and the water supply is accessible and reliable for firefighting operations; flows and pressures are appropriate; the integrity of the water supply is maintained; and a static water supply is provided for firefighting purposes in areas where reticulated water is not available.**

<b>Acceptable solution</b>	<b>Complies</b>	<b>Comments</b>
Reticulated water is to be provided to the development where available.	<input checked="" type="checkbox"/>	Reticulated water on site.
A static water supply is provided where no reticulated water is available.	N/A	Reticulated water on site.
Fire hydrant, spacing, design and sizing comply with the relevant clauses of Australian Standard AS 2419.1:2021.	<input checked="" type="checkbox"/>	Can be a condition of consent.
Hydrants are not located within any road carriageway.	<input checked="" type="checkbox"/>	Can be a condition of consent.
Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	N/A	Reticulated water proposed. Can be a condition of consent.
Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2021.	<input checked="" type="checkbox"/>	Can be a condition of consent.

### Summary:

- Reticulated water supply is supplied to the existing industrial/commercial area.

### Considerations

- Conduct a detailed review of hydrant placement to confirm compliance with AS 2419.1:2021 and ensure hydrants are clear of road carriageways.
- Confirm and document that all above-ground water service pipes and tanks are constructed with fire-resistant materials, such as metal or concrete.



## 3.5 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-5 outlines the required acceptable solutions for gas supply. The proposed development is not proposing gas including bottled gas connected to buildings. Small BBQ gas is permitted.

*Table 3-5 – Performance criteria for gas supplies (PBP 2019)*

<b>Performance criteria: location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.</b>		
<b>Acceptable Solution</b>	<b>Complies</b>	<b>Comments</b>
reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - <i>The storage and handling of LP Gas, the requirements of relevant authorities, and metal piping is used</i>	N/A	Is not proposed.
all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side	N/A	Is not proposed.
connections to and from gas cylinders are metal;	N/A	Is not proposed.
polymer-sheathed flexible gas supply lines are not used; and	N/A	Is not proposed.
above-ground gas service pipes are metal, including and up to any outlets.	N/A	Is not proposed.
<p><b>Summary:</b> No gas utilities proposed. Bottled gas (cylinders) is not supported or recommended and there should be a restriction on titles other than small bottles for BBQs.</p> <p>If future gas services are included, compliance with AS/NZS 1596:2014 and <i>PBP</i> must be verified through:</p> <ul style="list-style-type: none"> <li>• Confirmation of gas supply type (reticulated or bottled) and its installation details.</li> <li>• Assurance of adequate shielding, distance from flammable materials, and the use of fire-resistant materials like metal.</li> <li>• Site verification to ensure compliance with <i>PBP</i>.</li> </ul> <p><b>Considerations:</b></p> <ul style="list-style-type: none"> <li>• If any future gas utilities are proposed, conduct an on-site inspection to validate compliance with the acceptable solutions. A restriction to title should be considered for future gas bottle connections to houses (note: BBQ gas bottles are permitted)</li> </ul>		

## 3.6 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-6 outlines the required acceptable solutions for the subdivision's electricity supply.

*Table 3-6 – Performance criteria for electricity services (PBP 2019)*

<b>Performance criteria: location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.</b>		
<b>Acceptable solution</b>	<b>Complies</b>	<b>Comments</b>
Where practicable, electrical transmission lines are underground;	<input checked="" type="checkbox"/>	Based on surrounding area and proposed design, no proposed electrical transmission lines are underground as it is not reasonable.
Where overhead, electrical transmission lines are proposed as follows: <ul style="list-style-type: none"> <li>lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas.</li> <li>no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.</li> </ul>	<input checked="" type="checkbox"/>	Overhead transmission lines likely apply based on the surrounding area context. Compliance with pole spacing needs further verification. Vegetation clearance near power lines requires site-specific verification, particularly for areas adjacent to bushland.
<p><b>Summary:</b> The existing area generally relies on overhead transmission lines, which increases the risk of ignition if not properly managed.</p> <ul style="list-style-type: none"> <li>Underground transmission lines would reduce ignition risks but are unlikely to be feasible in this context. Confirmation is required on whether overhead lines are planned.</li> <li>If overhead lines are used, compliance with pole spacing (30m) and vegetation clearance under ISSC3 guidelines must be ensured. These factors are critical to minimize bushfire risks.</li> </ul> <p><b>Considerations:</b></p> <ul style="list-style-type: none"> <li>Confirm the proposed method for electrical service installation (underground or overhead).</li> <li>For overhead lines, validate compliance with ISSC3 vegetation clearance standards and pole spacing requirements.</li> </ul>		

## 3.7 Emergency management

The proposed development will trigger preparation of a Bushfire Emergency Management and Evacuation Plan (BEEP). This plan must be prepared consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*, and AS3745:2010.

## 4. CONCLUSION & RECOMMENDATIONS

### 4.1 Conclusion

This bushfire protection assessment has been undertaken for the proposed industrial subdivision, in an existing industrial/commercial area at 120 Old Pittwater Road, Brookvale.

Lot C is a concept-built form only and will require a detailed built form DA before construction. The indicative-built form on Lot A and B is indicative only and will also be subject to a detailed built form DA and therefore subject to further bushfire reporting for each DA documentation (see Figure 1-3). This assessment is for the residential subdivision of Lot C and associated earthworks.

This assessment has found that bushfire can potentially affect the proposed development from forest vegetation to the west and south-west. This has the potential to result in future buildings being exposed to potential flame contact, radiant heat and ember attack. APZ setbacks do not conform with BAL-29. The forest vegetation to the west is the major threat, and proposed buildings (warehouses) have been assessed as being in BAL-FZ. The proposed plans illustrate a retaining wall along the western aspect of the development. This is recommended to be a 2m non-combustible fence line and will act as a radiant heat barrier to reduce the bushfire threat to the west.

The proposed plans illustrate a retaining wall along the western aspect of the development. This is recommended to be a 2m non-combustible fence (above ground level) and will act as a radiant heat barrier to reduce the bushfire threat to the west. Flamesol, 'Radiant Heat: Method 2' calculator has been added and is recommended as a mitigation measure; however, it is acknowledged that the proposed industrial buildings are still regarded as being in BAL-FZ. The models are illustrated in Section 2.5 performance solution, using fuel loads from *PBP*.

The proposed development is an industrial subdivision intended solely for non-residential, non-habitable land uses, with no capacity for Special Fire Protection Purposes (SFPP). Warehouses and associated buildings located along the western boundary will be subject to calculated BALs as determined using Method 2 (via Flamesol), using fuel loads from *PBP*, incorporating the shielding effect of a 2m high non-combustible radiant heat barrier. The implementation of this radiant heat barrier cannot demonstrate compliance with *PBP*, BAL-29, and therefore will need to consider re-design changes to increase APZ setbacks, in order to lower the BAL, or reliance on construction standards, as per BAL-FZ, AS3959:2018.

Although AS3959:2018 does not mandate specific bushfire construction standards for Class 5 (warehouse) buildings, it is recommended that future buildings incorporate fire resisting construction principles, particularly in external cladding, glazing, ember protection, and roof design, consistent with BAL-FZ performance provisions as a risk mitigation strategy. A Type A construction from NCC 2022, Specification 5 is to be applied for buildings facing the fire front to the west. A 60/60/60 external fire rated walls should be incorporated. A sprinkler system may also be a consideration in design. No windows to be placed facing the bushfire interface to the west.

This approach ensures the development meets the performance intent of *PBP* 2019 by appropriately managing bush fire risk in the context of industrial land use, which involves limited human occupancy and inherently lower vulnerability. NSW RFS to consider the proposed design, including the performance-based application of the radiant heat shield and the recommended construction measures, as an appropriate and site-responsive solution for

managing bush fire risk associated with this form of industrial development on bush fire prone land.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *TBE* concludes satisfy the specifications and requirements of *PBP*. As a result, *TBE* proposes the following combination of bushfire measures:

- It is acknowledged that Class 5 (warehouse) buildings do not have any specific construction requirements as per the NCC. However, reducing building risk from bushfire is essential in this case. Non-combustible sarking, ember protection (i.e. roller door sealing) glazing (if applicable), external cladding is recommended. A fire sprinkler system may also be considered desirable.
- Implementation of a 2m radiant heat barrier to combat radiant heat threat from the west.
- APZs to be maintained in accordance with the setbacks outlined within Appendix 4 of *PBP* and as depicted in Schedule 1.
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP*.
- Preparation of a Bushfire Emergency and Evacuation Plan (BEEP).

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP*.

## 4.2 Recommendations

**Recommendation 1** – The development including identified APZs is as generally indicated on the attached SCHEDULE 1- Plan of Bushfire Protection Measures and section 2.5 of this report.

**Recommendation 2** – The proposed industrial subdivision is to consider design changes to conform and ensure compliance with BAL-29 (increasing setback from building envelope to forest vegetation to the west and south-west) or additional construction standards are required such as non-combustible sarking, ember protection (i.e. roller door sealing) and external cladding, as per BAL-FZ provisions. No windows to be facing the western aspect. A Type A construction from NCC 2022, Specification 5 is to be applied for buildings facing the fire front to the west. A 60/60/60 external fire rated walls should be incorporated. A fire sprinkler system may also be considered desirable.

**Recommendation 3** – A 2m non-combustible fence to the south-west and western portions of the proposed industrial subdivision to be implemented to act as a radiant heat barrier. This is recommended to sit where the building line is proposed.

**Recommendation 4** – All areas of the site that are identified building areas and APZs must be maintained as an IPA for the lifetime of the development.

**Recommendation 5** – Preparation of a Bushfire Emergency and Evacuation Plan (BEEP) and an upgrade to the site's Bushfire Management Plan (BMP) to ensure APZ maintenance.

**Recommendation 6** – Water, electricity and gas supply is to comply with Section 7.4 of *Planning for Bush Fire Protection 2019*.



## 5. INFORMATION SOURCES

### 5.1 Information collation

- 1) Aboriginal Heritage Information Management System (AHIMS).
- 2) Land Eco Consulting, *Targeted Threatened Species Survey Findings Report for potential development at 120 Old Pittwater Road, Brookvale (v1.0)*, Dated 30 April 2025
- 3) NearMap aerial photography.
- 4) NSW Planning Portal.
- 5) NSW SEED Portal.
- 6) Reid Campbell, *DA 120 Old Pittwater Road, Brookvale, LOT C STRATA SCHEME*, Issue B dated 29.08.25)
- 7) *Rural Fires Act 1997 (RF Act)*.

### 5.2 Bibliography

Australian Building Codes Board (2022) – *Building Code of Australia*, Class 1 and Class 10 Buildings Housing Provisions Volume 2.

Councils of Standards Australia AS3959 (2018) – *Australian Standard Construction of buildings in bush fire-prone areas*.

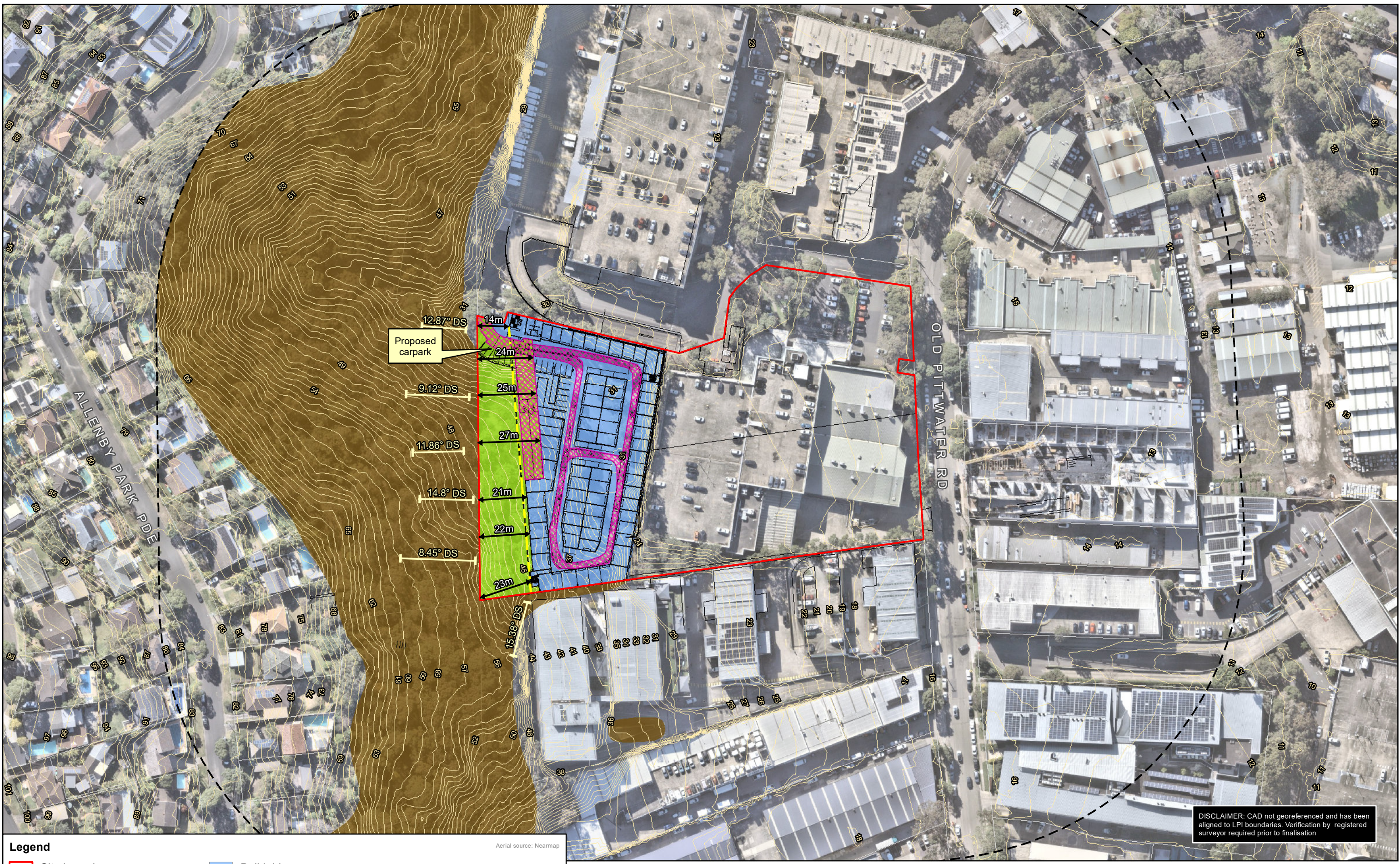
FPA Australia, *FlameSol Calculator, Radiant Heat Barrier, Method 2*, 2025.

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change.

Rural Fire Service (2019) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service.

## SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES





DISCLAIMER: CAD not georeferenced and has been aligned to LPI boundaries. Verification by registered surveyor required prior to finalisation

**Legend**

- Site boundary
- 140m assessment area
- Contour 1m (source:LiDAR)
- Proposed road
- Proposed retaining wall (1.8m non combustible fence)

**Vegetation Formation**

- Dry Sclerophyll Forests (Shrubby sub-formation)

**Buildable area**

- Asset Protection Zone (APZ)

Aerial source: Nearmap

0 20 40 m

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

**PROJECT & MXD REFERENCE**

Old Pittwater Rd Brookvale  
CEN03\_BF001

**DATE & ISSUE NUMBER**

15/10/2025  
Issue 1

**SCALE & COORDINATE SYSTEM**

1:1,500 @A3  
GDA2020 MGA Zone 56

**TITLE**

**Schedule 1 - Bushfire Protection Measures**

Document Path: N:\GIS STORAGE\N Drive\1\_GDA2020\_MappingProjects\CEN03\_OldPittwaterRd\_Brookvale\MXDs\CEN03\_BF001.mxd

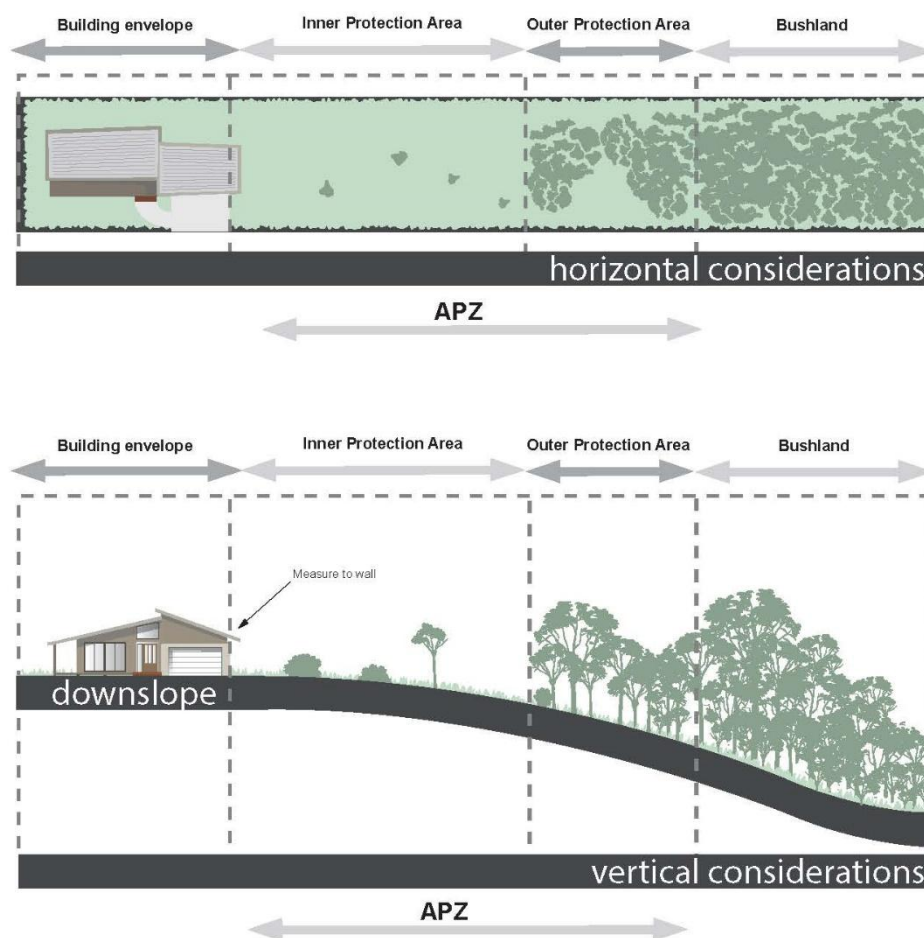
**TRAVERS BUSHFIRE & ECOLOGY**  
A TBE ENVIRONMENTAL COMPANY



## SCHEDULE 2. MANAGEMENT OF ASSET PROTECTION ZONES

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 4 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush, and the IPA is closest to the dwellings. The property is only to be managed to IPA standards. A typical APZ is graphically represented below.



**APZs and progressive reduction in fuel loads**

(Source: *PBP*)

**Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following table adapted from *PBP* provides maintenance advice for vegetation within the IPA and OPA. The APZ is to be maintained in perpetuity and maintenance should be undertaken regularly, particularly in advance of the bushfire season.



	Inner Protection Area	Outer Protection Area
Trees	<ul style="list-style-type: none"> <li>➤ Tree canopy cover should be <b>less than 15%</b> at maturity;</li> <li>➤ Trees at maturity should not touch or overhang the building;</li> <li>➤ Lower limbs should be removed up to a height of <b>2m above the ground</b>;</li> <li>➤ Tree canopies should be separated by <b>2 to 5m</b>; and</li> <li>➤ Preference should be given to retaining smooth barked and evergreen trees.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Tree canopy cover should be <b>less than 30%</b>; and</li> <li>➤ Canopies should be separated by <b>2 to 5m</b>.</li> </ul>
Shrubs	<ul style="list-style-type: none"> <li>➤ Large discontinuities or gaps in the vegetation should be provided to slow down or break the progress of fire towards buildings;</li> <li>➤ Shrubs should not be located under trees;</li> <li>➤ Shrubs should form <b>less than 10%</b> ground cover; and</li> <li>➤ Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Shrubs should not form a continuous canopy; and</li> <li>➤ Shrubs should <b>form less than 20%</b> of ground cover.</li> </ul>
Grass and Leaf Litter	<ul style="list-style-type: none"> <li>➤ Grass should be kept mown to a height of <b>less than 100mm</b>; and</li> <li>➤ Leaves and other debris should be removed</li> </ul>	<ul style="list-style-type: none"> <li>➤ Grass should be kept mown to a height of <b>less than 100mm</b>; and</li> <li>➤ Leaf and other debris should be removed.</li> </ul>
	All Management Zones	
Weeds	<ul style="list-style-type: none"> <li>➤ All weeds should be removed in accordance with best practice guidelines, and measures taken to prevent their further spread</li> </ul>	
Landscaping	<ul style="list-style-type: none"> <li>➤ Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;</li> <li>➤ Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come into contact with the building;</li> <li>➤ When considering landscape species consideration needs to be given to estimated size of the plant at maturity;</li> <li>➤ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;</li> <li>➤ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;</li> <li>➤ Avoid planting of deciduous species that may increase fuel at surface / ground level (i.e. leaf litter);</li> <li>➤ Avoid climbing species to walls and pergolas;</li> <li>➤ Locate combustible materials such as woodchips / mulch, flammable fuel stores away from the building;</li> <li>➤ Use of low flammability vegetation species.</li> </ul>	