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PO Box 363 Balgowlah, NSW, 2093

Bushfire Risk Assessment

In relation to a proposed development at:

4 Minna Close, Belrose, NSW

Report No: 4Min-01 Date: 18/04/2023

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Executive Summary

The purpose of this report is to provide a bushfire risk assessment for the proposed new industrial development at No. 4 Minna Close, Belrose, NSW

The subject site has been identified as bushfire prone land and the legislative requirements for building and development on bushfire prone lands are applicable. This report has been prepared in accordance with the requirements of Section 4.14 of the Environment Planning and Assessment Act.

This assessment includes an analysis of the hazard, threat and subsequent risk to the development proposal and provides recommendations that satisfy the Aims, Objectives and Performance requirements of the Building Code of Australia, Planning for Bushfire Protection 2019 and AS3959-2018 Construction of buildings in bushfire prone areas.

1. Description of the subject property

Property address: 4 Minna Close, Belrose (Lot 502/-/DP875858)
Local government area: Northern Beaches

1.1 Description

The development site is an existing undeveloped site located on the northern side of Minna Close.

Figure 1: Location of the subject site.

1.2 Zoning of the development site and adjoining properties

This majority of the site is Zoned B7-Business Park, with a narrow strip of C2-Environmental Conservation to the northern end of the site.

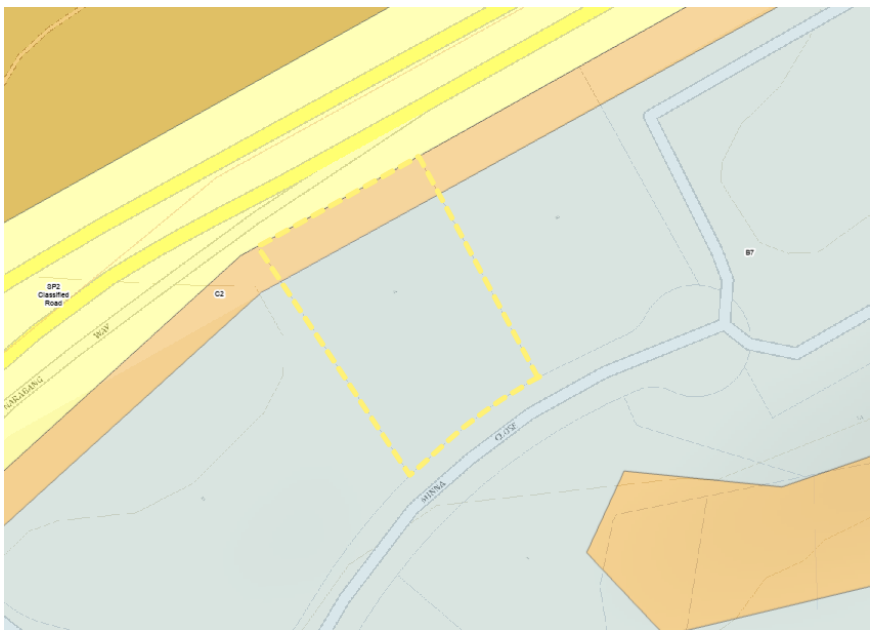


Figure 2: Land zoning map.

1.3 Development proposal and building classification.

The development proposal is for the construction of a new industrial building comprising of the following Classes:

- 7b- Storage,
- 5- Office
- 7a- Carparking.

Plans provided by:	***Bureau SRH Architecture*** ***Project No: 21108*** ***Dated: 04.04.2023***

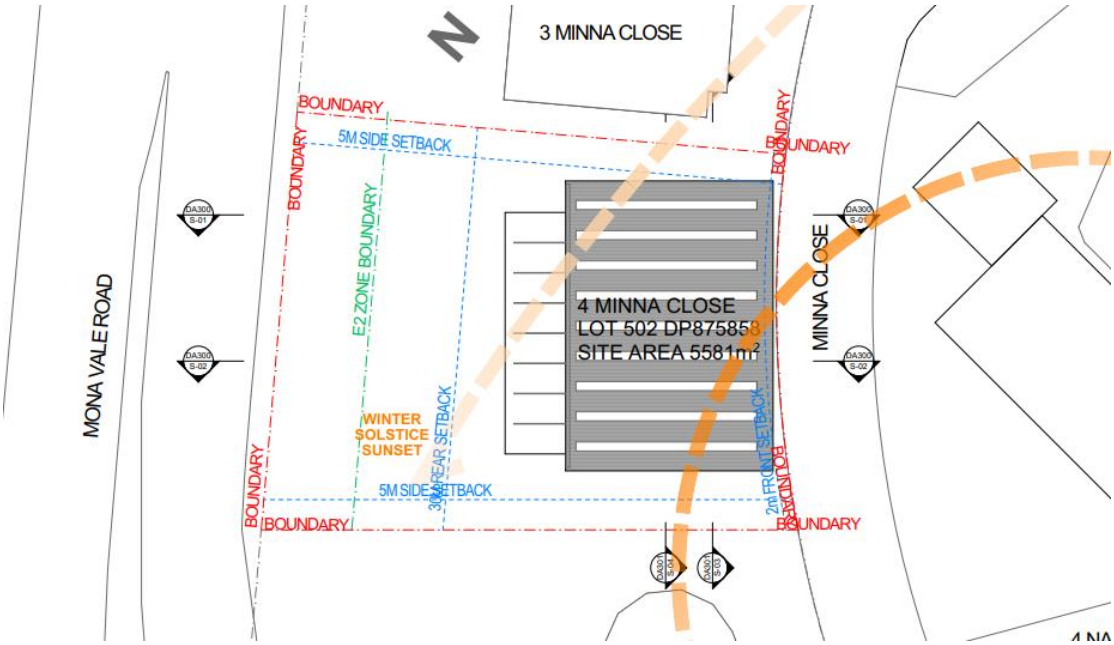


Figure 3: Site plan

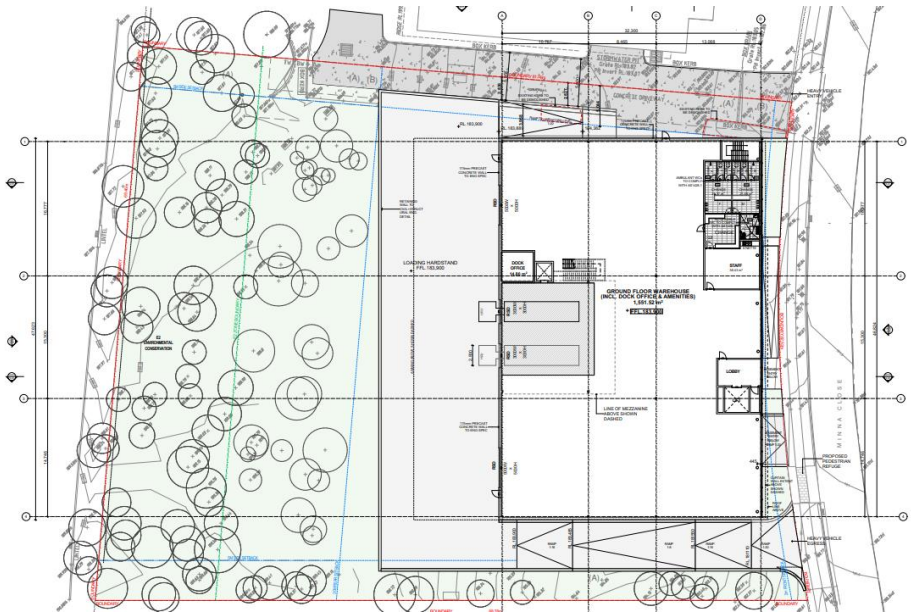


Figure 4: Ground floor plan

2. Buildings of Class 5 to 8 under the NCC

The NCC does not provide for any bush fire specific performance requirements for buildings of Class 5 to 8. As such, AS3959 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 these classes of building, 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 the 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.

3. Classification of the vegetation on and surrounding the site

For the purpose of a Bush Fire Risk Assessment, vegetation within 140m of the development is assessed and classified. In this instance there is Category 1 vegetation that lies to the north and southeast of the site which is of most significance. The vegetation formation within these areas consists of Sydney Coastal Dry Sclerophyll Forest (Refer to Figure 7), which with reference *Planning for Bush Fire Protection 2019* and for the purpose of this assessment, the vegetation within these areas will be classified as 'Forest'.

The site itself is currently heavily vegetated. Once the appropriate clearing has been undertaken for the new building there will be a small area of vegetation that will remain in-between mona Vale Road and the new building. As this narrow corridor of vegetation will not provide for a run of fire towards the building exceeding 50m, with reference to Part A1.11.1 of *Planning for Bush Fire Protection 2019,* for the purpose of this assessment, the vegetation within these areas will be classified as 'Remnant'.

Figure 6: Aerial photo showing the location of the site and surrounding vegetation.

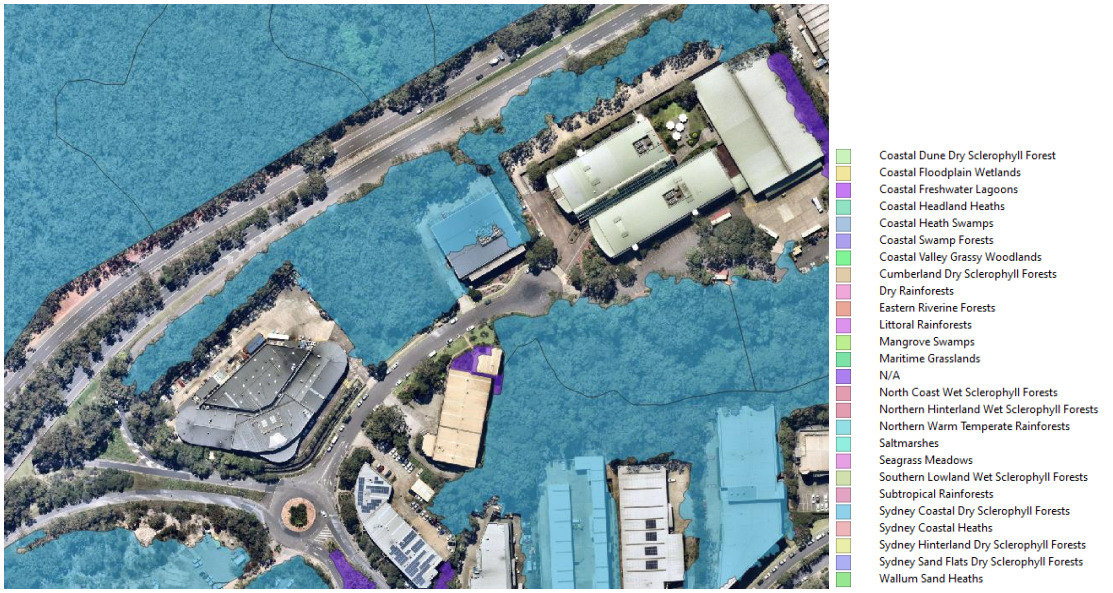
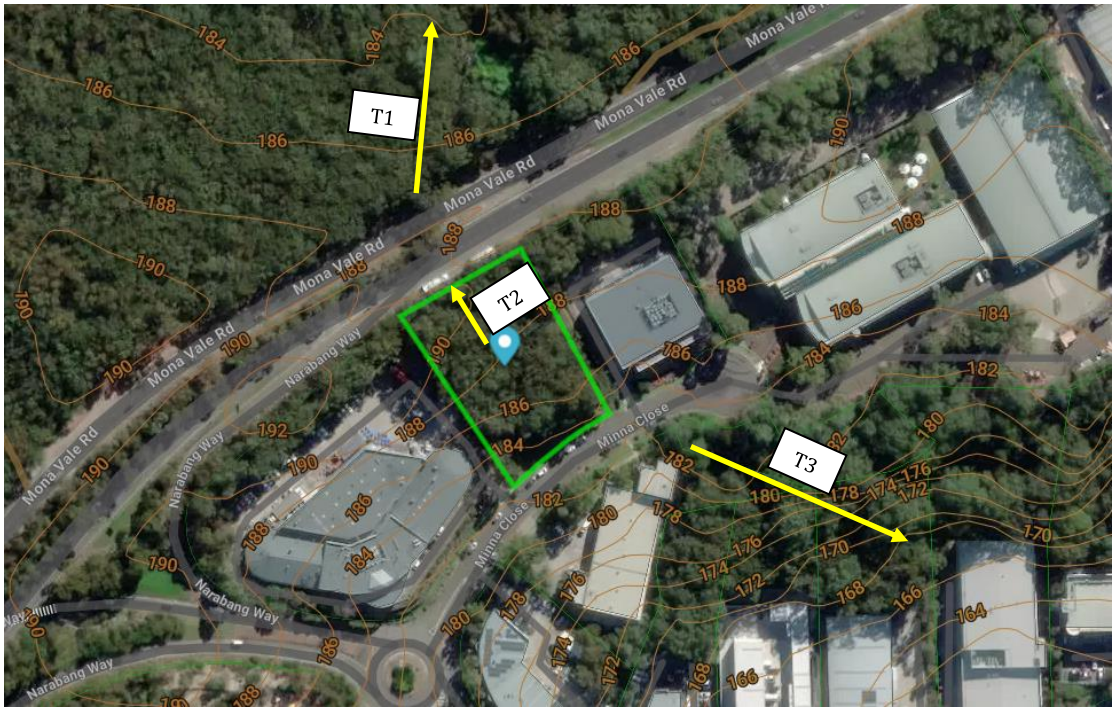


Figure 6: Aerial photo showing vegetation formations surrounding the subject site (Source: NSW Government Central Resource for Sharing and Enabling Environmantla Data)

Figure 7: Bushfire prone land map

4. Assessment of effective slope



Legend: → Direction of effective slope

Figure 8: Contour map.

Transect Line	Effective slope
T1	Downslope >0-5 degrees
T2	Upslope
T3	Downslope >5-10 degrees

5. Bushfire risk assessment

5.1 New building

Figure 8: Aerial showing the location of the new building and distance ot surroundi g vegetation.

Table 1; Determination of the category of bushfire attack for the site, and subsequent required building standards (Reference Table A1.12.5 PBP 2019).

Transect	Distance to classified vegetation	Vegetation Classification	Assessment of effective slope	FDI	Bushfire Attack Level
T1	83.49m	Forest	Downslope >0-5 degrees	100	BAL-12.5
T2	15.10m	Remnant	Upslope	100	BAL-29
T3	30.012 (24.62m off site, 5.5m onsite)	Forest	Downslope >5-10 degrees	100	BAL-40

5.2 Access and egress

The public roads in the vicinity of the subject site are all two-way with no restrictions to impede the flow of traffic and appear to be adequate to handle increased traffic in an emergency. The site has direct access to Minna Close, which is a public road, access and egress for emergency vehicles appears adequate. *Planning for Bushfire Protection 2019* requires no specific access requirements in an urban area where a 70m, unobstructed path can be demonstrated between the most distant external part of the dwelling and the nearest part of the public access road (where the speed limit is not greater 70kph) that supports operational use of emergency firefighter vehicles. As such, there are no formal property access requirements.

5.3 Construction standard to be used for building elements in the development

The National Construction Code (NCC) does not provide for any bushfire specific performance requirements for Class 5-8 buildings. As such AS3959 and the NASH Standard are not considered as 'deemed to satisfy' provisions. PBP accepts the general fire safety construction provision of the NCC are taken as acceptable solutions.

5.4 Landscaping

All new landscaping should be designed in accordance with the APZ requirements specified within Appendix 4 of PBP 2019.

5.5 Water supply

The site is serviced by a reticulated water supply with hydrants spaced at a regular distance along Minna Close. No additional water supply will be recommended. The building will also have internal water supply for fir fighting in accordance with the NCC.

5.6 Gas services

The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. Reticulated or bottled gas is installed and maintained in accordance with AS.NZS 1596:2014 and the requirements of relevant authorities and metal piping is used. Connection 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.

5.7 Emergency management

It is advised the occupants should complete a *Bushfire Survival Plan* as formulated by the NSW Rural Fire Service and Fire and Rescue NSW.

5.8 Environmental impact of any proposed bushfire protection measures.

The scope of this report has not been to provide an environmental assessment. An environmental assessment should be undertaken by a suitably qualified consultant.

6. Assessment of the extent to which the development can conform to the Aim and Objectives of 'Planning for Bush Fire Protection 2019' (PBP).

Aim	**Meets Criteria**	**Comment**
The aim of PBP is to provide for the protection of human life and minimise the impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and the protection of the environment.	Yes	This threat assessment has determined that the category of bushfire attack for the development is BAL-40 and not within the flame zone. Landscaping, defendable space, access and egress, emergency risk management and construction standards are all in accordance with the requirements of PBP 2019.
Objectives	**Meets Criteria**	**Comment**
Afford building and their occupants protection from exposure to bushfire.	Yes	The Bushfire Attack Level (BAL) for the proposal has been determined to be BAL-Low
Provide for a defendable space to be located around buildings	Yes	Defendable space can be provided on all sides of the buildings.
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to other buildings	Yes	Appropriate separation can be provided by a combination of onsite APZ and adjoining developed sites and public roads.
Ensure that appropriate operational access and egress for emergency services personnel and occupants is available.	Yes	The site has direct access to public roads providing adequate access and egress for emergency services vehicles and for crews to work about the vehicles.
Provide for ongoing management and maintenance of BPM	Yes	At the commencement of works on in perpetuity, the developed area of the site should be managed as an IPA as specified within Appendix 4 of PBP.
Ensure that utility services are adequate to meet the needs of firefighters	Yes	Reticulated water supply is located on the adjoining road at regular intervals and is easily accessible. No additional water supplies have been recommended.

7. Recommendations

The following recommendations are made for the bushfire protection measures for the proposed new industrial development at No. 4 Minna Close, Belrose, NSW and are based upon the relevant provisions of the NSW Rural Fire Service guideline entitled *Planning for Bushfire Protection 2019.*

1) Construction requirements	All new construction shall comply with the NCC. For added ember protection, all air vents/ducts on the external façade of the building should be screened with a mesh or perforated material corrosion resistant steel, bronze or aluminium with a maximum aperture of 2mm. Side hung external doors should be tight fitting to the frames with weather strips and draft excluders installed if necessary to prevent embers entering the building.
2) Asset Protection Zones/ Landscaping	At the commencement of building works and in the perpetuity all new landscaping should be designed in accordance with the APZ requirements specified within Appendix 4 of PBP 2019.
3) Electrical services	Where practicable, electrical transmission lines are underground.
4) Gas supply	-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 size. -Connections to and from gas cylinders are metal. -polymer-sheathed flexible gas supply lines are not used. -above-ground gas service pipes are metal, including and up to any outlets.
5) Adjacent Structures [class 10a & 10b]	Where Class 10a & 10b structures are within 6m from a dwelling in bush fire prone areas it must be built in accordance with the NCC.
6) Fences and gates	All fences in bush fire prone areas should be made from either hardwood or non-combustible material. However, in circumstances where the fence connects directly to the dwelling, or in areas of BAL-29 or greater, they should be made of non-combustible material.
7) Hazardous material	-Provide for the storage of hazardous materials away from the hazard wherever possible.

8. Summary

This report consists of a bushfire risk assessment for the proposed for the proposed new industrial development at No. 4 Minna Close, Belrose, NSW

The report concludes that the proposed development is on designated bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable.

This report has considered all of the elements of bushfire attack and the compensation measures listed are only of value and capable of providing the required protection from bushfire attack if they are considered as a complete package.

Provided the proposed development is approved in accordance with the recommendations included in section 7 of this report, the development proposal is considered to satisfy the Aims and Objectives Planning for Bushfire Protection 2019.

Note: Not with standing the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand a bushfire attack on every occasion. This report is a Bushfire Hazard Assessment that provides the required information to assist Local Councils and the Rural fire Service in determining compliance in accordance with Planning for Bushfire Protection 2019 and AS3959, 2018. The local Council is the final consenting authority and the construction of the building must comply with the recommendations included in the council's conditions of consent.

Matthew Toghill- Bushfire Consultant
Accreditation No. BPAD31642
Grad Cert Bushfire Protection, UWS 2012
Certificate IV Building & Construction
Certificate III in Public Safety (Firefighting and Emergency Operations)

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

9. References

Australian Building Codes Board
Building Code of Australia
Volume 1 & 2
Canprint

Australian Building Codes Board [2001]
Fire Safety Engineering Guidelines
Edition 2001
ABCB Canberra

D. Drysdale D. [1998]
Introduction to Fire Dynamics 2nd Edition
John Wiley & Sons Ltd

NSW Government Environmental Planning and Assessment Act [1979]
Part 79BA-Consultation and development consent- certain bushfire prone land
NSW Government Printer

Planning NSW [2006]
Planning for Bushfire Protection 20019
A guide for Councils, Planners, Fire Authorities and Developers
This document provides the necessary planning considerations when developing areas for residential use in residential, rural residential, rural and urban areas when development sites are in close proximity to areas likely to be affected by bushfire events and replaces Planning for Bushfire Protection 2006.
This document is essential reading. Download a copy from the RFS website or purchase a copy through the NSW Government online shop or phone 9228 6333.

Ramsay C & Rudolph L [2003]
Landscape and building design for bushfire prone areas
CSIRO Publishing

Standards Australia [2018]
Australian Standards 3959
Australian Building Code Board

Appendix 1: Northern Beaches Council Bushfire Assessment Certificate

BUSHFIRE RISK ASSESSMENT CERTIFICATE

THIS FORM IS TO BE COMPLETED BY A RECOGNISED CONSULTANT IN BUSHFIRE RISK ASSESSMENT IN ACCORDANCE WITH SECTION 4.14 1(b) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 NO 203

PROPERTY ADDRESS:	4 Minna Close Belrose
DESCRIPTION OF PROPOSAL:	New industrial warehouse building
PLAN REFERENCE: (relied upon in report preparation)	Bureau SRH Architects Project No. 21109 Dated: 04.04.2023
BAL RATING:	BAL-40 (If the BAL rating is **FZ** the application is to be referred to NSW RFS for assessment.)
DOES THE PROPOSAL RELY ON ALTERNATE SOLUTIONS:	YES (NO) (Circle the relevant response) (If **YES** the application is to be referred to NSW RFS for assessment.)

I Matthew Toghill of Bushcon Australia Pty Ltd
(Print Name) (Trading or Company Name)

have carried out a bushfire risk assessment on the above mentioned proposal and property. A detailed Bushfire Assessment Report is attached which includes the submission requirements set out in *Appendix 2* of *Planning for Bushfire Protection 2019* together with recommendations as to how the relevant specifications and requirements are to be achieved.

REPORT REFERENCE:	4Min-01
REPORT DATE:	19.04.2023
CERTIFICATION NO/ACCREDITED SCHEME:	BPAD31642

I hereby certify, in accordance with *Section 4.14 of the Environmental Planning and Assessment Act 1979 No 203*:

1. That I am a person recognised by the *NSW Rural Fire Service* as a qualified consultant in bushfire risk assessment; and

2. That subject to the recommendations contained in the attached Bushfire Risk Assessment Report the proposed development conforms to the relevant specifications and requirements

I am aware that the Bushfire Assessment Report, prepared for the above mentioned site is to be submitted in support of a development application for this site and will be relied upon by Northern Beaches Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *Planning for Bushfire Protection 2019*.

SIGNATURE: _____ **DATE:** 19.04.2023

Note: this certificate must be completed and signed by a person recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment in accordance with Section 4.14 of the EP&A Act 1979 No 203.

This form has been prepared by Northern Beaches Council for attachment to the Bushfire Assessment Report.

Appendix 2: Asset Protection Zones (APZ's)

A4.1.1 Inner Protection Areas (IPAs)

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

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

When establishing and maintaining an IPA the following requirements apply:

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; 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.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

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

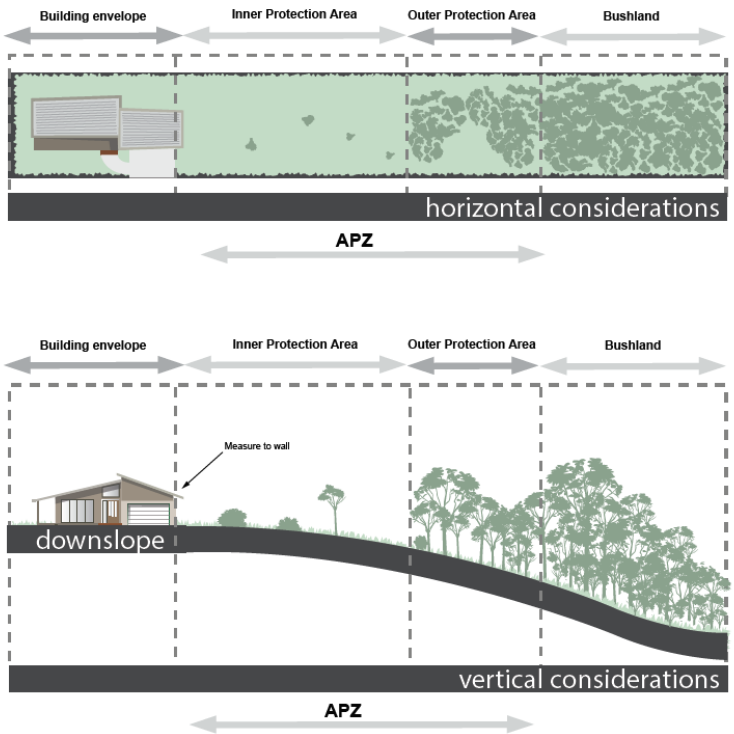
Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Figure A4.1

Typical Inner and Outer Protection Areas.



Abbreviations and definitions

AS 3959	Australian Standard AS 3959:2018 *Construction of buildings in bush fire-prone areas*
AS 2419.1:2005	Australian Standard AS 2419.1:2005 *Fire hydrant installations System design, installation and commissioning*
AS 2441:2005	Australian Standard AS 2441:2005 *Planning for emergencies in facilities*
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BFPL	Bushfire prone land
BRPL Map	Bushfire prone land map
BPM's	Bushfire protection measures
BFSA	Bushfire safety authority
DA	Development application
DCP	Development Control Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
FDI	Fire Danger index
FFDI	Forest Fire Danger Index
IPA	Inner Protection Area
kW/m2	Kilowatts per metre squared
LGA	Local government area
NASH	Nation Association of Steel Framed Housing Steel Framed Construction in Bushfire Areas 2021
NCC	National Construction Code
OPA	Outer Protection Area
PBP	*Planning for Bush Fire protection 2019*
RF Act	*Rural Fires Act 1997*
RF Reg	*Rural Fires Regulation 2013*
NSW RFS	NSW Rural Fire Service

SEPP	State Environmental Planning Policy
SFPP	Special Fire protection Purpose
SFR	Short fire run

Asset Protection Zone: A fuel reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required APZ varies with slope, vegetation and FFDI.

Bush Fire Attack level (BAL): A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. IN the NCC, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements.

Bush fire: An unplanned fire burning in vegetation, also referred to as wildfire.

Bush fire prone land (BFPL): An area of land that can support a bush fire or is likely to be subject to bush fire attack, as designated on a bush fire prone land map.

Bush fire prone land map: A map prepared in accordance with the NSW RFS requirements and certified by the Commissioner of the NSW RFS under EP&A Act s.10.3(2).

Bush fire protection measures (BPMs): A range of measures used to minimise the risk from a bushfire that need to be complied with. BPM's include APZ's, construction provisions, suitable access, water and utility services, emergency management and landscaping.

Bush fire safety authority (BFSA): An approval by the commissioner of the NSW RFS that is required for a subdivision for residential or rural residential purpose or for a SFPP development listed under section 100B of the RF Act.

Consent authority: As identified in the EP&A Act, in relation to development consents, usually the local council.

Defendable space: An area adjoining a building that is managed to reduce combustible elements free from constructed impediments. It is a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire.

Effective slope: The land beneath the vegetation which most significantly effects fire behaviour, having regard to the vegetation present.

Fire Danger Index (FDI): The chance of a fire starting, its rate of spread, its intensity and the difficulty potential for its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.

Inner protection Area (IPA): The component of a APZ which is closest to the asset (measured form unmanaged vegetation). It consists of an area maintained to minimal fuel loads so that a fire path is not created between the hazard and the building.

Managed land: Land that has vegetation removed or maintained to a level that limits the spread and impact of bush fire. This may include developed land (residential, commercial or industrial), roads, golf course fairways, playgrounds, sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas are managed to meet the requirements of an APZ.

Outer Protection Area (OPA): The outer component of an APZ, where fuel loads are maintained at a level where the intensity of an approaching bush fire would be significantly reduced. Applies to Forest vegetation only.

Special Fire Protection Purpose (SFPP) developments: Developments where the vulnerable nature of the occupants means that a lower radiant heat threshold needs to be accommodated for in order to allow for the evacuation of occupants and emergency services.

Vegetation classification: Vegetation types identified using the formations and classifications within *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and ACT (Keith, 2004).*