BLACKASH
BUSHFIRE CONSULTING

Bushfire Assessment

Lourdes Retirement Village

Proposed Redevelopment

95 Stanhope Road, Killara

Prepared for

Stockland

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

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Document Tracking

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Glossary of Terms

APZ	Asset protection zone
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2018*
BAL	*Bushfire attack level*
BCA	*Building Code of Australia*
BSA	Bushfire safety authority
EPA Act	*Environmental Planning & Assessment Act 1979*
FDI	Fire danger index
ha	Hectare
m	Metres
PBP	*Planning for Bushfire Protection 2019*
RF Act	*Rural Fires Act 1997*

1. Introduction

Stockland have commissioned Blackash Bushfire Consulting (Blackash) to undertake a Bushfire Assessment for the proposed redevelopment of the entirety of the Lourdes Retirement Village and the existing independent living units at 95 Stanhope Road, Killara (the site) which is shown in Figure 1.

The Bushfire Hazard Assessment analyses the bushfire matters pertaining to the site and the ability to address bushfire issues relevant to the rezoning. The NSW RFS have endorsed the rezoning and noted that any future DA approval must comply with the *Bushfire Engineering Design Compliance Strategy* and requires Bush Fire Safety Authority (BFSA) under s100B of the *Rural Fires Act 1997* (RFA).

Should the NSW RFS not issue a BFSA at the DA stage, the site would simply remain 'as-is' until such DA consent can be obtained.

A site inspection was completed by Blackash on 4 December 2020.

This assessment has been prepared by Corey Shackleton, Principal Bushfire and Resilience, Blackash Bushfire Consulting (FPAA BPAD-Level 3 Certified Practitioner No. BPD-PA-34603).

1.1. Location

The site is located in the suburb of Killara in the Ku-ring-gai LGA. It is located in a suburban low density residential area consisting of large lot single detached one and two storey dwellings. Stanhope Road is a collector road which is located off the Pacific Highway.

The local area is characterised by tree-lined streets and pockets of remnant bushland. Located on the southern boundary of the site, are several large open spaces and bushland parks, including Soldiers Memorial Park and Seven Little Australians Park. Bushland walking trails through these places link the suburb of Lindfield to Middle Harbour.

The land slopes away from Stanhope Road towards the bushland to the south and east on the other side of Lourdes Avenue. The site is adjoined by unmanaged bushland to the east and south which is associated with Gordon Creek. This bushland is primarily riparian forest with steep slopes and continues along Gordon Creek to the northeast (see Figure 1).

Legend

Watercourse

Subject Land

N

DKGIS

Date: 8/06/2021

0 75 150 300 450

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 1: Site Location

1.2. Project Description

The site currently contains the existing Lourdes Retirement Village which was constructed in 1983 and consists of a total of 240 units. These units range from 2-3 storey's in height and include:

- 108 Independent living apartments:
- 49 serviced apartments;
- Residential Aged Care Facility (RACF) with 83 beds; and
- Community building and associated infrastructure. Buildings.

Due to its age, the existing facility now presents major accessibility constraints and no longer meets the contemporary needs of the residents. There are no bushfire design or protection measures in place.

The proposal for the site may include a medium density development of the southern portion of the site comprising approximately 63 town houses and a new seniors housing development at the northern portion of the site comprising approximately:

- 141 independent living units;
- A new aged care facility with 110 beds; and
- 1,400sqm of internal communal space.

2. Legislative Framework

Section 100B of the *Rural Fires Act 1997* states that the Commissioner of the NSW RFS may issue a bush fire safety authority for:

a) *a subdivision of bush fire prone land that could lawfully be used for residential or rural residential purposes; or*
b) *development of bush fire prone land for a special fire protection purpose.*

A bush fire safety authority authorises development to the extent that it complies with standards regarding setbacks, provision of water supply and other matters considered by the Commissioner to be necessary to protect persons, property or the environment from danger that may arise from a bush fire.

A retirement village is considered a Special Fire Protection Purpose development and must obtain a bush fire safety authority before developing on bush fire prone land.

Section 100B of the *Rural Fires Act 1997* is typically satisfied through compliance with the requirements of *Planning for Bush Fire Protection 2019*, however this is not a specific requirement of the Act. The *Bushfire Engineering Design Compliance Strategy* (Appendix 2) was prepared by Blackash Bushfire Consulting and supported by the NSW RFS as the means for designing and determining compliance.

The requirement for a bush fire safety authority is not considered necessary for the rezoning approval process, but nonetheless essential for any future development.

2.1. Bushfire Prone Land

Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. Bushfire prone land (BFPL) is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the RFS.

The site is identified as 'bushfire prone land' (see Figure 2) as mapped by Ku-ring-gai Shire Council for the purposes of Section 10.3 of the EPA Act and the legislative requirements for building on bushfire prone lands are applicable.

Figure 2 shows that the site is adjoined by Category 1 Bush Fire Prone Vegetation to the south and east with the associated buffer covering much of the site. This does not preclude development; it merely starts the process to consider bushfire in the design of any new development.

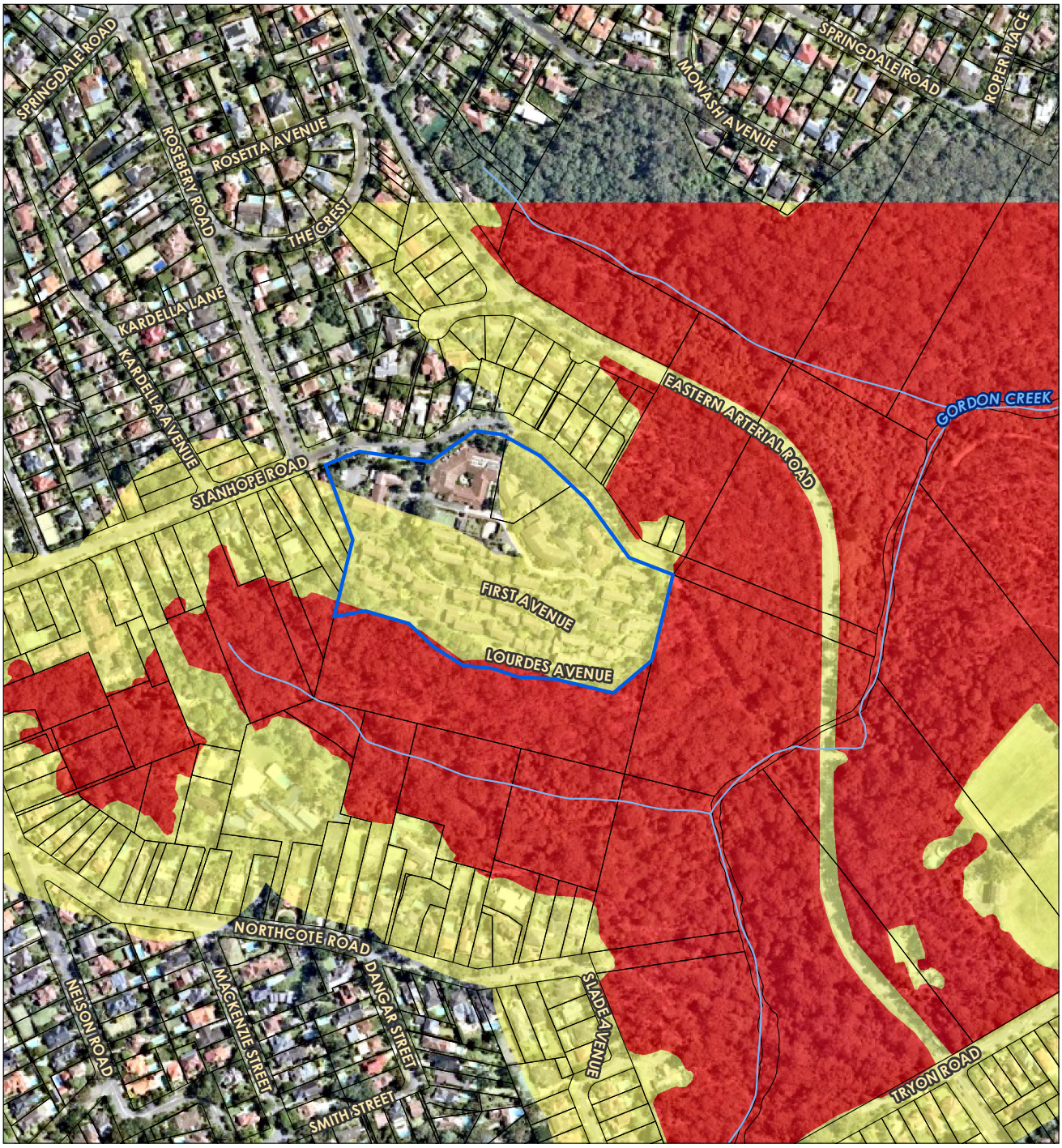

Figure 2: Bushfire Prone Land.

2.2. Bushfire Protection Compliance

The *Bushfire Engineering Design Compliance Strategy* (Appendix 2) was prepared by Blackash Bushfire Consulting and supported by the NSW RFS as the means for designing and determining compliance.

The *Bushfire Engineering Design Compliance Strategy* will satisfy section 100B of the *Rural Fires Act 1997* through a performance-based approach using the Bush Fire Engineering Brief (BFEB) process. The BFEB process will be undertaken in accordance with the *International Fire Engineering Guidelines*.

This will be undertaken within the context of complying with the Aims and Objectives of *Planning for Bush Fire Protection 2019*. Consideration will be given to the most appropriate construction approval regime and ongoing compliance will be ensured through implementation of the *Bush Fire Protection, Operations and Maintenance Plan* as developed through the design strategy.

2.2.1. Planning for Bushfire Protection 2019

All development on BFPL must satisfy the aim and objectives of PBP 2019. The aim of PBP 2019 is to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment. The objectives are to:

I. *afford buildings and their occupants protection from exposure to a bush fire;*

II. *provide for a defendable space to be located around buildings;*

III. *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*

IV. *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*

V. *provide for ongoing management and maintenance of BPMs; and*

VI. *ensure that utility services are adequate to meet the needs of firefighters.*

In response to their distinctive vulnerabilities, PBP 2019 treats residential development and Special Fire Protection Purpose development differently and has Specific Objectives unique to both types of development.

2.3. Specific Objectives for Residential Development

Any residential development on the should respond to the specific objectives for residential and rural residential subdivisions which are defined in PBP 2019 as follows:

- *minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);*
- *minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;*
- *ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression; and*
- *ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

2.4. Specific Objectives for SFPP Development

The proposed retirement village is a designated SFPP, defined in Section 100B(6) of the *Rural Fires Act*. Planning for Bushfire Protection states that:

> *"An SFPP development is one which is occupied by people who are identified as at-risk members of the community. In a bushfire event, these occupants may be more susceptible to the impacts of radiant heat and other bushfire effects. Evacuating at-risk members of the community is more challenging because they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings. Examples of SFPP developments are schools, hospitals, nursing homes and tourist accommodation."*

The specific objectives within PBP 2019 for SFPP developments are to:

- *Minimise levels of radiant heat, smoke and ember attack through increased APZ, building design and siting;*

- *Provide an appropriate operational environment for emergency service personnel during firefighting and emergency management;*
- *Ensure the capacity of existing infrastructure (such as roads and utilities) can handle the increase in demand during emergencies as a result of the development; and*
- *Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.*

3. Bushfire Threat Assessment

While PBP is clear that no development in bushfire prone areas can be guaranteed to be entirely safe from bushfires (PBP 2019 p. 11), the aim of the document is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment (PBP 2019 p. 10).

The detailed site analysis and the application of a combination of bushfire protection measures are used to achieve an acceptable outcome. Appropriate combinations not only depend upon site location and site circumstances but also on the nature of the proposed use. The site assessment methodology within PBP will be used to determine the bushfire threat to the site.

3.1. Assessment Methodology

PBP 2019 provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

The following assessment is prepared in accordance with Section 100B of the RF Act, Clause 44 of the RF Reg and PBP. This assessment is based on both a site inspection and desktop assessment of the site assessment utilising the following resources:

- Planning for Bushfire Protection (NSW RFS, 2019);
- Council Bushfire Prone Land Map;
- Site Inspection;
- Aerial mapping; and
- Detailed GIS analysis.

The methodology used in this assessment is in accordance with PBP 2019 and is outlined in the following sections.

3.2. Bushfire Hazard

An assessment of the Bushfire Prone Land is necessary to determine the application of bushfire protection measures such as Asset Protection Zone (APZ) locations and future building construction levels. The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the site, and which determine the planning and building response of PBP.

3.2.1. Fire weather

The fire weather is dictated by PBP 2019 and assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The site has a Fire Danger Index (**FDI**) of 100 as per PBP 2019. A more detailed analysis of the FDI may be undertaken as part of the detailed bushfire assessment, engineering and design work at the DA stage.

3.2.2. Vegetation Assessment

The RF Regulation requires a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in PBP.

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP and is shown in Figure 3.

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation is determined in all directions from the building footprints. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The vegetation impacting the site (see Figure 3) is considered Forest for the purposes of assessing bushfire threat. A more detailed analysis of the vegetation, including the applicability of any Short Fire Run modelling will be undertaken as part of the detailed bushfire assessment, engineering and design work at the DA stage.

Legend

- Contour - 2m
- Watercourse
- Subject Land

Vegetation Formation - Vegetation of the Sydney Metropolitan Area v3

- Dry Sclerophyll Forests
- N/A
- Rainforests
- Wet Sclerophyll Forests

N

DKGIS

Date: 8/06/2021

0 12.5 25 50 75

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 3: Vegetation and Slope

3.2.3. Slopes Influencing Bushfire Behavior

The RF Reg requires an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property or from the proposed development footprint).

The effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP. This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100 metre transect measured outwards from the development boundary or the existing/ proposed buildings.

Figure 3 shows the effective slopes relevant to the proposal. Major slope constraints exist in the northeast portion of the site where slopes are greater than 18 degrees. A more detailed analysis of the effective slopes, including the influence of adjoining rock formations, creeklines and potential Short Fire Runs will be undertaken as part of the detailed bushfire assessment, engineering and design work at the DA stage.

4. Bushfire Compliance Strategy

PBP 2019 recognises the unique attributes of both residential and SFPP developments and promotes detailed site analysis and the application of a combination of bushfire protection measures (**BPMs**) to achieve an appropriate outcome.

The BPMs work in combination to provide a suite of measures that meet the Aim and Objectives and Specific Objectives PBP 2019. The BPMs are shown in Figure 4.

Appropriate combinations depend upon geographic location and site circumstances.

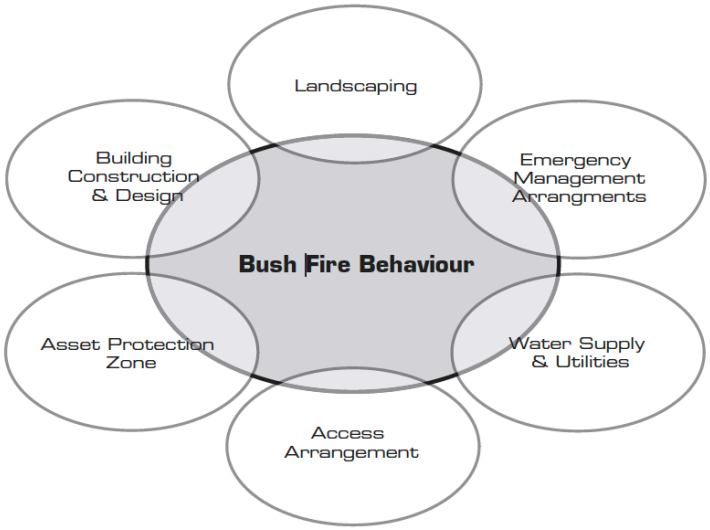

Figure 4: Bushfire Protection Measures in Combination (source PBP 2019 p. 26)

4.1. Asset Protection Zones

For proposed new residential and SFPP development, PBP 2019 requires that a minimum separation is provided in the form of Asset Protection Zones (**APZ**). The APZ is a fuel-reduced, physical separation between buildings and bushfire hazards.

A detailed analysis and application of APZ will be undertaken as part of the detailed bushfire assessment, engineering and design work at the DA stage. This will ensure appropriate APZ are incorporated into any future development.

4.2. Building Construction & Design

All proposed buildings must be located, designed and constructed in a manner that can withstand the relevant bushfire attack in the form of wind, embers, radiant heat and flame contact.

In order to provide the most appropriate and complaint outcome, all buildings must be assessed against the methodology in PBP 2019 to determine the appropriate Bushfire Attack Level (BAL). The BAL is a means of measuring the ability of a building to withstand attack from bushfire. The BAL assesses the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per square metre, which is the basis for establishing the requirements for construction to improve protection of a building from potential attack by a bushfire, as defined in *Australian Standard AS 3959-2009 Construction of buildings in bushfire-prone areas* (AS 3959-2018).

A detailed analysis and application of building construction will be undertaken as part of the detailed bushfire assessment, engineering and design work at the DA stage.

4.3. Water Supply

An adequate supply of water is essential for firefighting purposes. Any future development will ensure suitable water supply arrangements will be provided for firefighting that meet the NSW RFS requirements.

The site is capable of providing water supplies in accordance with PBP 2019. This will form a key element of the detailed bushfire assessment, engineering and design work at the DA stage.

4.4. Landscaping

The bush fire risk can be reduced by implementing simple measures to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Landscaping throughout the site will form a key element of the detailed bushfire assessment, engineering and design work at the DA stage and can comply with PBP 2019.

4.5. Gas and electrical supplies

Electricity supply for the new development will comply with PBP 2019. All electrical transmission lines will be underground. This complies with PBP 2019.

The site is capable of providing gas services in accordance with section 6.8.3 of PBP 2019 and compliance will form a key element of the detailed bushfire assessment, engineering and design work at the DA stage.

4.6. Access Arrangements

The design of public access roads and property access (within a site) should enable safe access, egress and defendable space for fire fighters and emergency services. The access for the development must ensure safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing the area.

The site is capable of providing access in accordance with Section 6.8.2 of PBP 2019 including width, grade, crossfall, hydrant locations, parking and curve radius. Compliance and will form a key element of the detailed bushfire assessment, engineering and design work at the DA stage.

4.7. Emergency Management Arrangements

Prior to occupation of any future development, a Bush Fire Emergency Management and Evacuation Plan will be prepared. The Bush Fire Emergency Management and Evacuation Plan will be consistent with the following:

- The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;
- Australian Standard AS 3745:2010 Planning for emergencies in facilities; and
- Australian Standard AS 4083:2010 Planning for emergencies – Health care facilities.

5. Recommendations

The following recommendations are made to ensure any future development is designed in a manner that ensures appropriate bushfire protection for the site:

Recommendation 1: Any future development must be designed in accordance with the *Bushfire Engineering Design Compliance Strategy*.

Recommendation 2: Any future development must comply with the aims and objectives of PBP 2019.

Recommendation 3: Any future development must satisfy section 100B of the *Rural Fires Act 1997* and obtain a Bush Fire Safety Authority from the NSW RFS Commissioner.

Recommendation 4: A Bushfire Protection, Operations and Maintenance Plan is developed which will include an Emergency Management and Evacuation Plan and ongoing maintenance and certification of essential bushfire protection measures.

Recommendation 5: Emergency management and evacuation planning is developed and implemented through a holistic system to minimise exposure of occupants to potential high-risk bushfire events. This is based on fire weather predictions, actual fire weather conditions and bush fire activity.

6. Conclusion

The proposal rezoning presents no issues in the context of bushfire.

In the authors professional opinion, the site is suitable for redevelopment and has the capability to provide appropriate bushfire protection measures which satisfy the aim and objectives of *Planning for Bush Fire Protection 2019* and allow for the issue of a Bush Fire Safety Authority under Section 100B of the *Rural Fires Act 1997*.

The detailed design and compliance issues must be addressed through any future development and associated DA approval process. Any future development must comply with the approved *Bushfire Engineering Design Compliance Strategy* and obtain a Bush Fire Safety Authority (BFSA) under s100B of the *Rural Fires Act 1997* (RFA).

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Appendix 1: References

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

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.

NSW Rural Fire Service (2015). *Guide for Bushfire Prone Land Mapping.*

NSW Rural Fire Service (2019). *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners.*

NSW Rural Fire Service (2017). *Short Fire Run Methodology for assessing bush fire risk for low risk vegetation.*

NSW Government (1979). *Environmental Planning and Assessment Act 1979*. NSW Government Printer.

Appendix 2: Bushfire Engineering Design Compliance Strategy