



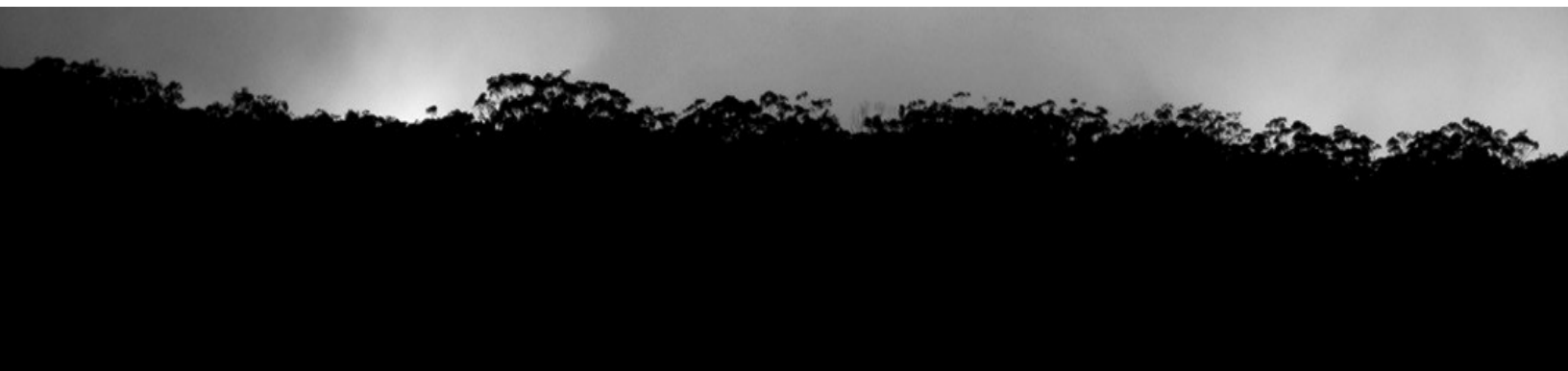
Bushfire Hazard Assessment

Proposed St George Illawarra Dragons CHPC
University of Wollongong, NSW

Prepared for

St. George Illawarra Rugby League Football Club Pty Ltd

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1. Abbreviations

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
NCC	National Construction Code
EP&A Act	Environmental Planning & Assessment Act 1979
EPA Reg	Environmental Planning and Assessment Regulation 2022
PBP	Planning for Bush Fire Protection 2019
RF Act	Rural Fires Act 1997
RFS	NSW Rural Fire Service
RFR	Rural Fires Regulation 2022

2. Summary

Table 1 is a summary of compliance with relevant documents and approaches to limit bushfire attack and meet the requirements of the NSW planning framework for new development in Bushfire Prone Areas.

Table 1: Summary

Planning for Bushfire Protection 2019 Classification	'Other Development'
NCC Classification(s)	Class 5 and Class 9b
Location	7 Squires Way Fairy Meadow 2519 Lot 1 DP 1172135 11A Cowper Street Fairy Meadow 2519 Lot 2 DP 1172135
Local Government Area	City of Wollongong
Can this proposal comply with AS3959:2018	AS3959:2018 does not apply as a DTS Provision
Does this development comply with the requirements of <i>Planning for Bushfire Protection 2019</i>?	Yes
Does this development comply with the Aims and objectives of <i>Planning for Bushfire Protection 2019</i>?	Yes
Is the proposal for a State Significant Development (SSD)	No
Is referral to the NSW RFS required?	No
Is a Bush Fire Safety Authority (BFSA) required?	No
Assessment Framework	<input checked="" type="checkbox"/> <i>Planning for Bushfire Protection 2019</i> <input checked="" type="checkbox"/> Meets the deemed to satisfy provisions <input type="checkbox"/> Alternate solution/ performance-based assessment

3. Introduction

Bridge42 has commissioned Blackash Bushfire Consulting Pty Ltd (Blackash) to prepare a Bushfire Hazard Assessment for a proposed Community and High-Performance Centre (mixed-use commercial development) across two lots (the site), at 7 Squires Way Fairy Meadow which is legally known as Lot 1 DP 1172135 and 11A Cowper Street Fairy Meadow which is legally known as Lot 2 DP 1172135 (refer Figure 1). The site is 7 hectares in size and is located near the corner of Elliotts Road and Squires Way, within the University of Wollongong's Innovation Campus grounds. The site is identified as managed land, with the classified Bushfire Prone Vegetation to the east of the site containing Coastal Swamp Forest type vegetation. Fairy Meadow is a small beachside village with a population of approximately 7,400.

The site is located on designated Bushfire Prone Land (BFPL), as per Wollongong City Council's Bushfire Prone Land Map. Section 4.14 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) requires compliance with the NSW Rural Fire Service (RFS) document *Planning for Bush Fire Protection 2019* (PBP). PBP applies to all new development on bushfire prone land.

Commercial development such as the proposed development is designated as 'Other Development' in PBP. As Other Development, the proposed development has considerable flexibility and the nature of the development often results in the structures providing a higher degree of bushfire resistance than that of which is required by the RFS. As Other Development, a key issue for the proposal will be meeting the aim and objectives of PBP and the specific requirements for commercial development.

This assessment has been prepared by Mr. Scott Palin, Bushfire Specialist (Level 2 FPAA BPAD-A Certified Practitioner No. BPD-PA-60359) and reviewed by Mr. Lew Short, Principal at Blackash Bushfire Consulting (Level 3 FPAA BPAD-A Certified Practitioner No. BPD-PA-16373) who is recognised by the NSW Rural Fire Service (RFS) as qualified in bushfire risk assessment and has been accredited by the Fire Protection Association of Australia as a suitably qualified consultant to undertake alternative solution proposals.

A site inspection was not performed under the scope of the assessment.



Figure 1: Site Location

4. Bushfire Prone Land

The site is identified as 'bushfire prone land' (Figure 6) for the purposes of Section 10.3 of the EPA Act and the legislative requirements for building on bushfire prone lands are applicable.

Bush fire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. Bush fire 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 the local council and certified by the Commissioner of the RFS.

The BFPL Map shows the site as affected by the vegetation buffer zone that surrounds the Category 1 and Category 2 Bushfire Hazard Vegetation, that is associated with the Coastal Swamp Forest vegetation to the east of the site.

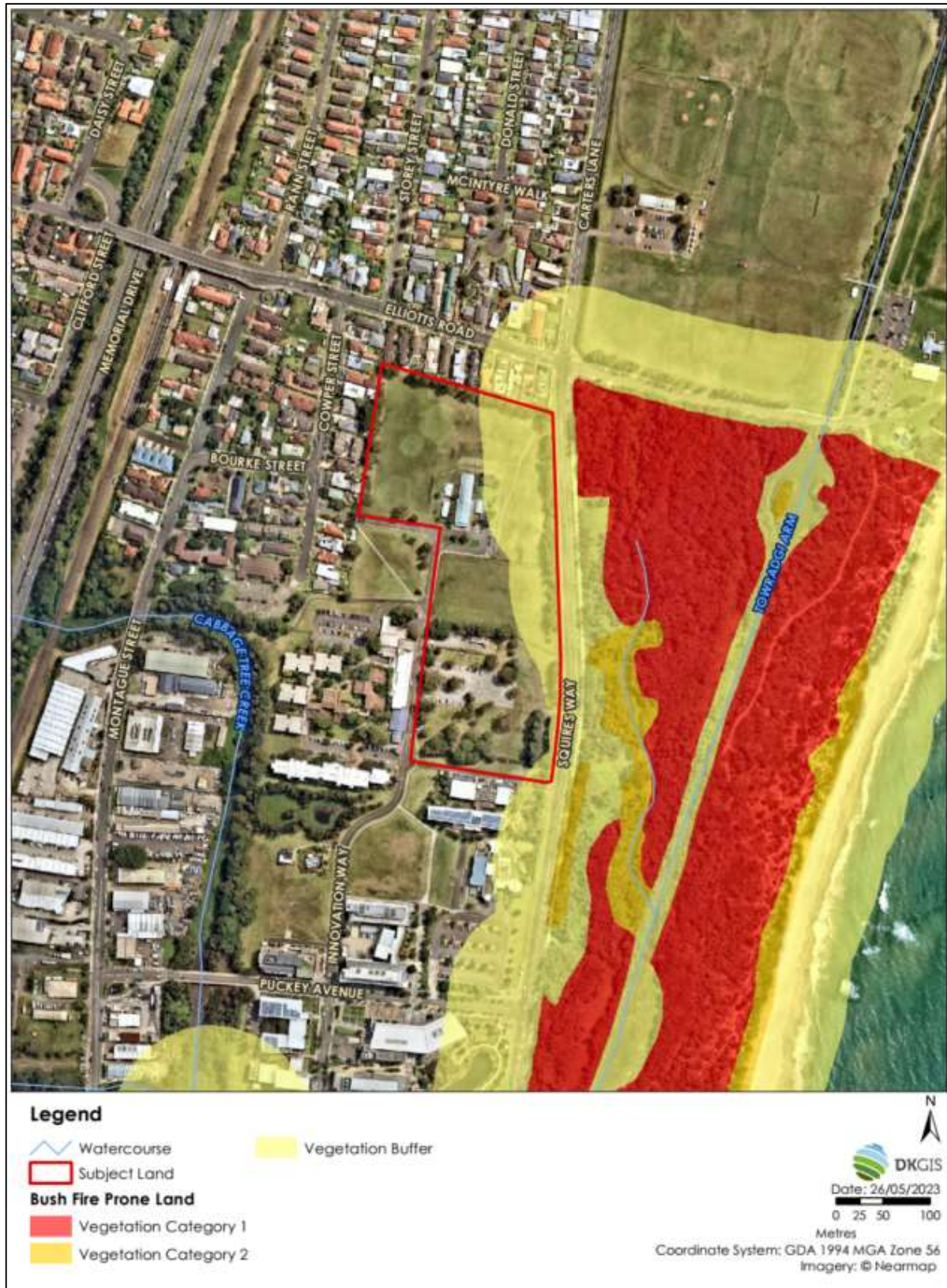


Figure 2: Bushfire Prone Land Map

5. Site Context and The Proposal

The site is approximately 7 hectares in size and is bordered:

- North - by the managed land associated with the existing residential properties and the managed land of Thomas Dalton Park;
- East - by approximately 220 meters (at the widest point) of unmanaged Coastal Swamp Forest vegetation that adjoins to the Towradgi Arm water course;
- West by the managed land associated with the existing residential properties; and
- South - by the managed land associated with the University of Wollongong's Innovation Campus grounds.

The site is zoned as SP1 – Special Activities under the Wollongong Local Environmental Plan 2009 (2010 EPI 76).

Bridge42 is preparing a proposed mixed-use commercial development application for their client, St. George Illawarra Rugby League Football Club Pty Ltd, that will include:

- Gymnasium and ancillary facilities
- Premises for Sports Science, Medical and Physiotherapy operations
- Lecture theatre and classrooms
- Offices, function rooms, boardroom, administration area and open plan work areas
- Café and commercial kitchen
- Community tenancy space
- External training areas and training fields
- Carparking

The Proposed Site Plan has been provided in Figures 3 and 4 below.

The proposed development site incorporates three access points for connection into the greater public road network via Cowper Street, Squires Way and Montague Street. The access arrangements available for the proposed development site provides multiple access and egress options for the purpose of evacuation in an emergency situation.



Figure 3: Proposed Site Plan



Figure 4: Proposed Site Plan - Schematic

6. Legislative Requirements

Bush Fire Prone Land (BFPL) is designated in accordance with s.10.3 of the EP&A Act. BFPL is land which can support a bushfire or is subject to bushfire attack, that has been identified and mapped by the local council and certified by the Commissioner of the NSW RFS. The BFPL maps provide a trigger for formal assessment of new development and compliance with PBP. All new development on BFPL must comply with PBP.

Integrated development, under Division 4.8 of the EP&A Act, is development requiring consent and one or more additional approvals. Section 4.46 of the EP&A Act requires a Bush Fire Safety Authority (BFSA) from the NSW RFS under Section 100B of the RF Act for a Special Fire Protection Purpose (SFPP) development on BFPL. Section 100B of the RF Act and Section 46 of the RF Regs specifies the development types which are considered SFPP, for which the proposed development is **not** identified. Under Division 4.8 of the EP&A Act the proposed development is **not** Integrated development.

Under the building classification system within the *National Construction Code 2022 (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 bushfire specific performance requirements for these particular classes of building. As such the *Australian Standard for Construction of Buildings in Bushfire Prone Areas (AS 3959:2018)* and the NASH Standard are not considered as a set of 'deemed to satisfy' provisions. However, compliance with AS 3959:2018 and NASH should be considered when meeting the aims and objectives of PBP.

With consideration made to Section 8.3.11 Public assembly buildings in PBP, the proposed development incorporates areas that will be used for public assembly. Based on the information provided by the client, the total floor space for the areas of the building that will be used for public assembly is 406 m². Given that the total floor space area for public assembly within the building is less than 500m², the proposal is not required to be treated and/or assessed as an SFPP development.

There is no overnight accommodation included in the proposal, as such the development does not trigger the SFPP provisions under Division 4.8 of the EP&A Act and a Bush Fire Safety Authority (BFSA) is not required for the development.

The proposed commercial development will be assessed against the Aim and Objectives of PBP (Section 1.1 of PBP), the specific objectives for buildings of Class 5 to 8 under the NCC (Section 8.3.1 of PBP) and the objectives for commercial and industrial development (Section 8.3.10 of PBP).

Blackash being a Level 3 Certified Practitioner can confirm whether the proposed development conforms to the relevant specifications and requirements of *Planning for Bush Fire Protection 2019* in compliance with s4.14 (1)(b) of the *Environmental Planning and Assessment Act 1979*. As such, no formal referral under the EP&A Act is required to the NSW RFS for the development proposal.

7. NCC 2022

The NCC 2022 (NCC) came into effect on the 1st of May 2023, with Volume 1 – Building Code of Australia Class 2 to 9 buildings applicable to the development. The revised NSW bushfire provisions are included under Part G5 Construction in bushfire prone areas, with the stated Applications as per below:

'Applications

NSW G5P1 only applies in a designated bushfire prone area to—

- (a) a Class 2 or 3 building; or*
- (b) a Class 4 part of a building; or*
- (c) a Class 9 building that is a **special fire protection purpose**; or*
- (d) a Class 10a building or deck immediately adjacent or connected to a building or part of a type listed in (a), (b) or (c).'*

The BCA classifications for the proposed building, with reference to Mr. David Blackett's email confirmation dated 28th of March 2022, are **Class 5 and Class 9b**. The application of Part G5 of the NCC only applies to Class 9 buildings that are SFPP, for which the building is not. As such, Part G5 of the NCC 2022 NSW bushfire provisions do not apply to the development.

7.1. AS3959:2018

The NCC 2022 Volume 1 – Building Code of Australia Class 2 to 9 buildings Part G5D3 Protection states:

'In a designated bushfire prone area, a Class 2 building, a Class 3 building, a Class 4 part of a building or a Class 10a building or deck immediately adjacent or connected to such a building or part, must comply with the following—

- (a) AS 3959 except—*
 - i. as amended by Planning for Bush Fire Protection; and*
 - ii. for Section 9 Construction for Bushfire Attack Level FZ (BAL-FZ), buildings subject to BAL-FZ must comply with specific conditions of development consent for construction at this level; or*
- (b) the requirements of (a) above as modified by the development consent following consultation with the NSW Rural Fire Service under section 4.14 of the Environmental Planning and Assessment Act 1979 if required; or*

(c) the requirements of (a) above as modified by development consent with a bushfire safety authority issued under section 100B of the Rural Fires Act 1997 for the purposes of integrated development.'

The BCA classifications for the proposed building, with reference to Mr. David Blackett's email confirmation dated 28th of March 2022, are **Class 5 and Class 9b**. As such, the NCC 2022 NSW bushfire provisions do not include AS3959:2018 as a deemed to satisfy provision for the development.

Notwithstanding the above, Blackash has considered and ultimately applied the construction requirements as specified by AS 3959:2018 to the development, to meet the aims and objectives of PBP.

8. Planning for Bushfire Protection 2019 (PBP)

PBP guidelines are performance-based, seeking to achieve a safe outcome based on innovation and the specific circumstances of the individual site and proposed development. PBP provides a planning framework for developments in rural and urban areas close to land, which is likely to be affected by bushfire.

8.1. PBP: Aim and Objectives

The Aim of and Objectives of PBP (p. 10) overall are:

All development on BFPL must satisfy the aim and objectives of Planning for Bush Fire Protection (PBP).

The aim of PBP 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.

The objectives are to:

- *afford buildings and their occupants protection from exposure to a bush fire;*
- *provide for a defendable space to be located around buildings;*
- *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
- *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
- *provide for ongoing management and maintenance of BPMs; and*
- *ensure that utility services are adequate to meet the needs of firefighters.*

The above objectives have been assessed using expert judgement and included in Section 15.1 of this report.

8.2. PBP: Other Development

Chapter 8 of PBP (p. 74) explains that for 'Other Development' (Commercial) there are bush fire provisions or requirements that need to be applied, that align with the unique features of the development type.

In order to comply with PBP the following conditions must be met:

- *satisfy the aim and objectives of PBP outlined in Chapter 1;*
- *consider any issues listed for the specific purpose for the development set out in this chapter; and*
- *propose an appropriate combination of BPMs.*

8.3. Buildings of Class 5 to 8 under the NCC

Section 8.3.1 of PBP applies the following objectives to Class 5 to 8 buildings (p.76):

- *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 above objectives have been assessed using expert judgement and included in Section 15.2 of this report.

8.4. Commercial Development

Section 8.3.10 of PBP applies the following objectives to commercial development (p.79):

- *Where no residential component is included, commercial and industrial development is addressed through the aim and objectives of PBP (Chapter 1); and*
- *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.*

9. Bushfire Protection Measures

The subject land is identified as being bushfire prone land on the Wollongong City Council's Bushfire Prone Land Map. The following detailed assessment is based on the methodology and requirements of PBP and supporting RFS policy.

PBP recognises the unique attributes of 'Other Development' and promotes detailed site analysis and the application of a combination of bushfire protection measures (BPMs) to achieve an acceptable outcome. The BPMs work in combination to provide a suite of measures that meet the Aim and Objectives and Chapter 8 of PBP. The BPMs are shown in Figure 5.

Appropriate combinations depend upon the type of development, and the specific geographic location and site circumstances.

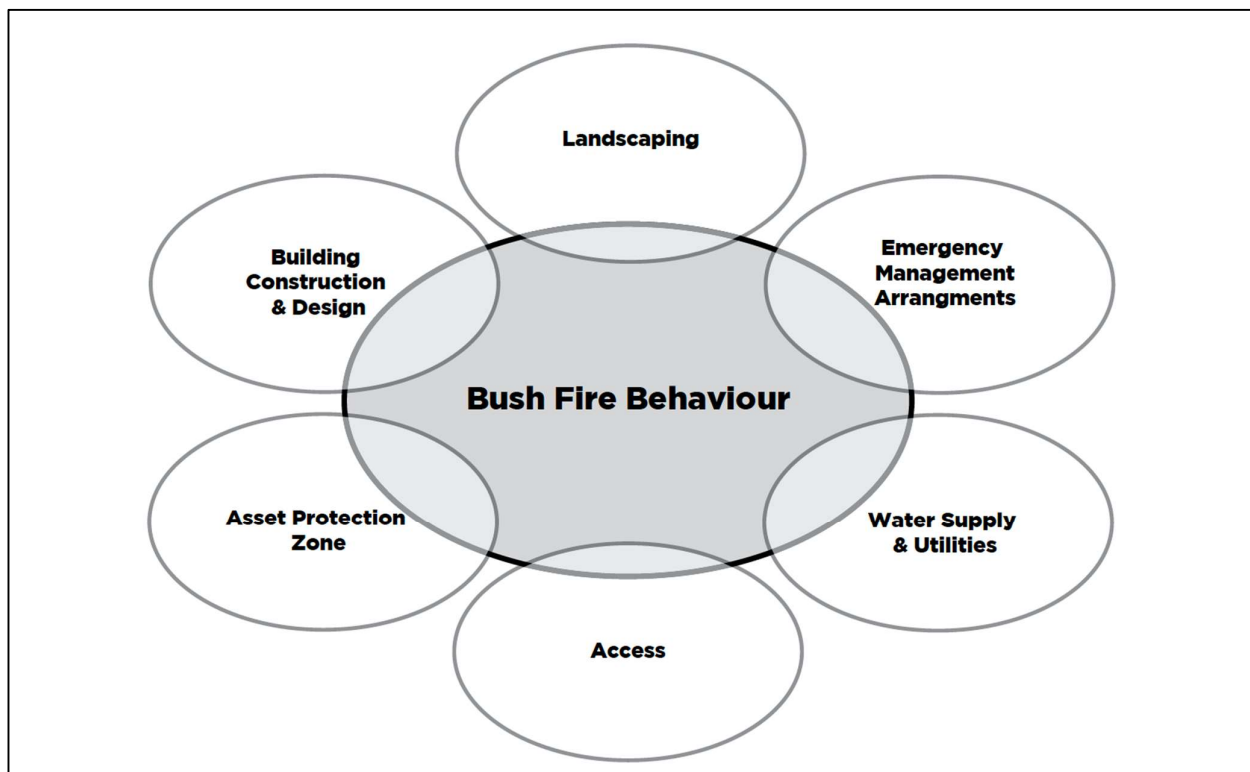


Figure 5: Bushfire Protection Measures in combination (PBP p.26)

10. Bushfire Threat Assessment

10.1. Methodology

PBP provides a methodology to determine the bushfire threat and commensurate 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. For new commercial developments, APZ requirements are based on keeping radiant heat levels at new buildings below 40kW / m² (to meet the objective of PBP through the *provision of an appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings*).

This assessment is based on the following resources:

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

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

10.2. Bushfire Hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as APZ locations / dimensions and future building construction requirements in accordance with AS3959:2018. 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 responses of PBP.

10.3. Fire weather

The fire weather is dictated by PBP 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 the Wollongong LGA is within the Illawarra / Shoalhaven Fire Weather District per PBP.

10.4. Vegetation

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP. Vegetation types give rise to radiant heat and fire behaviour characteristics. There are 7 vegetation formations (with sub-formations) identified in PBP.

The predominant vegetation has been determined over a distance of at least 140 metres in all directions from the proposed property boundary or building footprint on the site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate. Figure 6 includes the assessment of the predominant vegetation to the east as Coastal Swamp Forest. As per PBP, Coastal Swamp Forest is included under 'Forest' type vegetation and has been assessed as such (refer to Figure 7).

The vegetation has been drawn from the Illawarra vegetation data layers.

The site is bordered:

- to the north by the managed land associated with the existing residential properties and the managed land of Thomas Dalton Park;
- to the east by approximately 220 meters (at the widest point) of unmanaged Coastal Swamp Forest vegetation that adjoins to the Towradgi Arm water course;
- to the west by the managed land associated with the existing residential properties; and
- to the south by the managed land associated with the University of Wollongong's Innovation Campus grounds.



Figure 6: Vegetation Communities map

10.5. Slopes influencing bushfire

The 'effective slope' influencing fire behaviour approaching the site 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 m transect measured outwards from the development boundary or the existing / proposed building(s).

The effective slopes impacting on the site are demonstrated in Figure 7.



Figure 7: Slope and Vegetation map

10. Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure which provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defensible space within which firefighting operations can be carried out.

An APZ is land that has vegetation removed or maintained to a level that limits the spread and impact of bushfire. This may include:

- developed land (residential, commercial, or industrial),
- permanent roads, bike paths, parking areas,
- 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.

For commercial developments, the APZ requirements must result in radiant heat levels at new buildings being below 40kW/m² and provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.

The minimum required APZ of 22 meters is provided for within the Squires Way road reserve (refer to figure 8). As an additional Bushfire Protection Measure (BPM), Blackash recommend that the entire subject site be formalised as an APZ and be managed to Inner Protection Area (IPA) Standards in accordance with the NSW RFS Standards for Asset Protection Zones and Appendix 4 of PBP (refer to Appendix 2).

As the APZ provides a fuel-reduced, physical separation between buildings and bush fire hazards, it is a key element in the suite of BPMS and dictates the type of construction necessary to mitigate bushfire attack. PBP requires APZs for commercial and industrial development to provide a defensible space and to minimise material ignition.

Table 2 provides a summary of the APZs for the proposed development.

Table 2: APZ Assessment (Acceptable Solutions)

Direction	Slope	Vegetation	APZ Required (metres)	APZ Proposed (metres)
North	NA	No hazard	Nil	NA
East	0-5° Downslope	Forest	22	74.5
South	NA	No hazard	Nil	NA
West	NA	No hazard	Nil	NA

As demonstrated in Table 2 and Figure 8 below, the site can accommodate the required 22-meter commercial development APZ to achieve the maximum radiant heat level of 40kW/m² at the proposed new building site.



Figure 8: The minimum required APZ to achieve 40kW/m² Radiant Heat Exposure

11. Bushfire Attack Levels

The Bushfire Attack Levels (BAL) is a means of measuring the ability of a building to withstand attack from bushfire. The form of bushfire attack and the severity will vary according to the conditions (FDI, vegetation, slope and setback) on the site.

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. This forms 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 3959:2018 Construction of buildings in bushfire-prone areas* (AS 3959:2018).

The BALs impacting on the development has been determined using the Acceptable Solutions from Table A1.12.5 of PBP. The applicable BALs are summarised in Table 3 and demonstrated in Figure 9.

Table 3: Bushfire Attack Levels (BALs)

Direction	Slope	Vegetation	APZ Proposed (meters)	Bushfire Attack Level
North	NA	No hazard	Nil	-
East	0-5° Downslope	Forest	74.5	BAL-12.5
South	NA	No hazard	Nil	-
West	NA	No hazard	Nil	-

11.1. Application of AS3959 (2018)

The design and construction of the building must comply with the corresponding Bushfire Attack Level (BAL) as shown in Figure 9.

The application of each BAL is as defined on Figure 9 and not broadly applied across the entire elevation/building. The construction must comply with the corresponding sections of the Australian Standard *AS3959:2018 Construction of buildings in bush fire-prone areas* or NASH Standard *National Standard Steel Framed Construction in Bushfire Areas – 2021* as appropriate and Section 7.5 of PBP.

The elevations and/or parts of the building that are not identified in Figure 9 as having a BAL are considered BAL-Low, and with reference to Section 4 of AS3959:2018, do not warrant specific bushfire construction requirements.

The construction of the building in this manner complies with the Aim and Objectives of PBP.



Figure 9: Bushfire Attack Level (BAL) Map

12. Access

PBP Section 3.4 Access arrangements prescribes the following requirement when designing access roads for a development:

Design of access roads shall enable safe access and egress for residents attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Multiple access points from the overall site and in different directions, can assist in maintaining access / egress in case one route is blocked due to fires or related incidents (e.g. tree fall, car accident). Importantly there is also the ability to evacuate the site from fires approaching from different directions.

The site has sufficient opportunities to meet the specified access requirement. There are multiple access points to Cowper Street, Squires Way and Montague Street for vehicles attempting to enter and exit the site simultaneously, especially in an emergency situation. An existing perimeter road is provided for the proposed site in the form of Innovation Way, Cowper Street, Elliotts Road, Squires Way and Puckey Avenue, that provides additional safe operational access for firefighters whilst simultaneously providing for evacuation.

Access and emergency egress is one of the key heads of consideration that the RFS requires in the Planning Proposal. This will need to be carefully worked through with traffic engineers and key roads and carrying capacity determined.

Given the nature of the existing public road network and the proposed design of the internal access, the proposal can comply with the access requirements of PBP.

13. Water Supply & Utilities

PBP (p. 47) requires that adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

The site will be serviced by a reticulated water supply. Fire hydrants are to be provided in accordance with the Building Code of Australia Section E1P3 and *AS2419.1:2021 Fire hydrant installations System design, installation and commissioning*.

The nearest hydrant external to the site is located adjacent to the development within the Squires Way road reserve (refer to Figure 10), which is located between the site and the hazard vegetation.

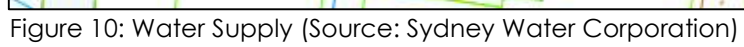
Electricity supply will be provided via in ground conduits.

It appears likely that a reticulated gas supply will be provided. Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 *The storage and handling of LP gas* (Standards Australia, 2014).

It is considered the provision of adequate water services and the location of electricity and gas supplies can be planned and managed to comply with PBP.

14. Evacuation and Emergency Management

Emergency management arrangements will be demonstrated through a separate Bushfire Emergency Management and Evacuation Plan, that will be prepared consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* prior to occupation of the development.








15. Compliance Summary Tables

15.1. Aim and Objectives

PBP provides the Aim and Objectives for all development on BFPL (Section 1.1). Table 4 is an assurance approach using expert judgement.





Table 4: Aim and Objectives

Specific Objective for Retail Premises	Compliance	Comment
Afford buildings and their occupants protection from exposure to a bush fire.		<ul style="list-style-type: none"> APZs provided to achieve the required 40kW/m² radiant heat at the sited building. Application of AS3959:2018 construction requirements as per Figure 9.
Provide for a defensible space to be located around buildings.		Sufficient defensible space provided within the proposed site.
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.		APZs provided to achieve the required 40kW/m ² radiant heat at the sited building.
Ensure that appropriate operational access and egress for emergency service personnel and occupants is available.		Access arrangements are compliant with PBP Section 3.4.
Provide for ongoing management and maintenance of BPMs.		Entire site to be formalised and managed as an APZ, as per Section 10 of this report.
Ensure that utility services are adequate to meet the needs of firefighters.		Reticulated water supply.

15.2. Buildings of Class 5 to 8 under the NCC

PBP provides Specific Objectives for Buildings of Class 5 to 8 under the NCC (Section 8.3.1). Table 5 is an assurance approach using expert judgement.

Table 5: Specific Objectives for Buildings of Class 5 to 8 under the NCC

Specific Objective for Retail Premises	Compliance	Comment
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.		Access arrangements are compliant with PBP Section 3.4. A Bushfire Emergency Management and Evacuation Plan is to be developed prior to occupation of the development.
To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.		A Bushfire Emergency Management and Evacuation Plan is to be developed prior to occupation 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.		Water, gas and electrical supplies are to be installed in compliance with Section 13 of this report.
To provide for the storage of hazardous materials away from the hazard wherever possible.		Hazardous materials are to be stored away from the hazard wherever possible.

16. Recommendations

The following recommendations are made to ensure the proposed commercial development is provided with adequate bushfire protection in accordance with PBP:

Recommendation 1: The proposed new building is to be designed and constructed to comply with the applicable BAL as per Section 11.1 and Figure 9, and the corresponding sections of the Australian Standard AS3959:2018 *Construction of buildings in bush fire-prone areas* and Section 7.5 of PBP.

Recommendation 2: Access and emergency egress is one of the key heads of consideration that the RFS requires in a Planning Proposal. This will need to be carefully worked through with traffic engineers and key roads and carrying capacity determined.

Recommendation 3: The entire site will be formalised and managed as an APZ to Inner protection Area (IPA) standards in accordance with the NSW RFS Standards for Asset Protection Zones and Appendix 4 of PBP (included at Appendix 2).

Recommendation 4: Fire hydrants are to be provided in accordance with the Building Code of Australia Section E1P3 and AS2419.1:2021 *Fire hydrant installations System design, installation and commissioning*.

Recommendation 5: Locate gas and electrical supplies so as not to contribute to the risk of fire to the building. Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 *The storage and handling of LP gas* (Standards Australia, 2014).

Recommendation 6: Fencing and gates are to be constructed in accordance with section 7.6 (p. 70) of PBP:

"Fences and gates in bush fire prone areas may play a significant role in the vulnerability of structures during bush fires. In this regard, all fences in bush fire prone areas should be made of either hardwood or non-combustible material.

However, in circumstances where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only."

Recommendation 7: A Bushfire Emergency Management and Evacuation Plan will be prepared consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* prior to occupation of the development.

Recommendation 8: Hazardous materials are to be stored away from the hazard wherever possible.

17. Conclusion

Blackash have completed this Bushfire Hazard Assessment for the proposed mixed-use commercial development located within the University of Wollongong's Innovation Campus in NSW. The site is zoned for Special Activities and is Bushfire Prone Land.

The eight recommendations have been provided to ensure compliance with Planning for Bush Fire Protection 2019. This assessment has demonstrated that the proposed commercial development can comply with *Planning for Bush Fire Protection 2019*. The required APZs are achieved, which renders the site able to meet the minimum performance-based requirement of 40kW/m² radiant heat at the sited building.



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Appendix 1: References

National Construction Code (NCC) of Australia Volume 1

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 (RFS). 2019. *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra

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

Standards Australia. 2014. *The storage and handling of LP Gas, AS/NZS 1596:2014*, SAI Global, Sydney.

Standards Australia. 2021. *Fire hydrant installations System design, installation and commissioning, AS2419.1:2021*, SAI Global, Sydney.

Appendix 2: Asset Protection Zone Requirements

Source PBP 2019, P. 107

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

This Appendix sets the standards which need to be met within an APZ.

A4.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website www.rfs.nsw.gov.au.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows for suppression of fire;
- an area from which backburning or hazard reduction can be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the building;
- damage to the building asset from intense radiant heat; and
- ember attack.

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type and bush fire threat. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

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 defensible 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.