



Bushfire Assessment Report

79 Oakdale Road, Gateshead NSW

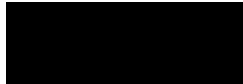
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Health Infrastructure NSW C/- DJRD Architects

7 September 2026 | Version 1.5



Project Name:	NSW Ambulance – 79 Oakdale Rd, Gateshead – J4035		
Prepared by:	David Lemcke & Lew Short		
Client Details:	Health Infrastructure NSW C/- DJRD Architects, Mark Roach, Principal 63 Myrtle St, Chippendale NSW 2008		
Project Address	79 Oakdale Rd, Gateshead NSW 2290		
Name	Position	Contact No	Email
David Lemcke	Director	0419 203 853	Lew.short@blackash.com.au
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David Lemcke | Principal – Planning & Bushfire

Blackash Bushfire Consulting

Fire Protection Association of Australia BPAD Level 3 – 68670

Master of Environmental Planning; Grad. Dip. Bushfire Protection; Grad. Dip. Urban & Regional Planning; B.A.; Adv. Dip. Public Safety (Emergency Management); Dip. Management.



Lew Short | CEO & Founder

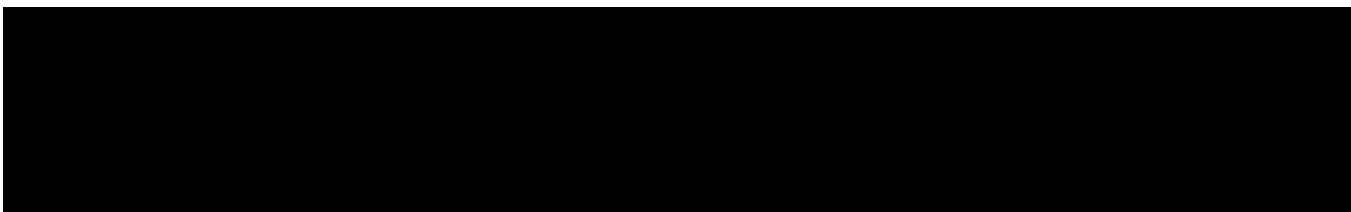
Blackash Bushfire Consulting

B.A., Grad. Dip. (Design for Bushfires), Grad. Cert. of Management (Macq), Grad. Cert. (Applied Management); Fire Protection Association of Australia BPAD Level 3 BPD-PA 16373



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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
BFSA	Bush Fire safety authority
EP&A Act	Environmental Planning & Assessment Act 1979
EPA Reg	Environmental Planning and Assessment Regulation 2000
GTA	General terms of approval
PBP	Planning for Bush Fire Protection 2019
RF Act	Rural Fires Act 1997
RFS	NSW Rural Fire Service
RFR	Rural Fires Regulation 2013
SFPP	Special fire protection purpose

2. Glossary

AS3959	Australian Standard AS 3959 Construction of buildings in bushfire-prone areas, Standards Australia, 2018, that outlines construction standards applicable to residential developments in bush fire prone areas
Bushfire Prone Area	An area of land that can support a bush fire or is likely to be subject to bush fire attack.
Bush fire safety authority	An approval of the Commissioner of the RFS required for a subdivision for residential or rural residential purpose or for a special fire protection purpose listed under section 100B of the RF Act.
Special Fire Protection Purpose	Refers to the development of land for which the end user/s are people who are considered to be at-risk members of the community, and thus more susceptible to the impacts of bushfire. These include schools, hospitals, nursing homes and tourist accommodation.

3. Summary

Table 1 is a summary of compliance shown in this Bushfire Assessment Report (BAR) 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 – NSW Ambulance station
NCC Classification	Class 5
Location	79 Oakdale Rd, Gateshead Lot 101 DP 1318933
Local Government Area	Lake Macquarie
Can this proposal comply with AS3959:2018	Yes
Does this development comply with the requirements of Planning for Bushfire Protection 2019?	Yes
Does this development comply with the Aims and objectives of Planning for Bushfire Protection 2019?	Yes
Is the proposal on Bushfire Prone Land	Yes
Is referral to the NSW RFS required?	No
Is a Bush Fire Safety Authority (BFSA) required?	No
Design Plans referenced	DJRD Architects Project 24_424 including: GF General arrangement AR-0101 Rev. J Proposed site plan AR-0101 Rev. J Landscape – NBR5 A05-AR-DWG-0101-002

Assessment Framework

☒ Planning for Bushfire Protection 2019:

☐ Meets the deemed to satisfy provisions

☒ Alternate solution/ performance-based assessment

4. Introduction, proposal and site context

DJRD Architects have commissioned Blackash Bushfire Consulting (Blackash) to undertake a bushfire risk assessment report for the development of a proposed NSW Ambulance station at 79 Oakdale Rd, Gateshead (Lot 101 DP 1318933).

The site of approximately 7465m² is currently used on the eastern side as a Transport NSW depot, with the proposed ambulance station located on the western side of the site. The site is surrounded by existing and approved future industrial/commercial development to the east and west, with cleared and bushland areas awaiting rezoning to the north. There is retained conservation zoned bushland to the south side of Oakdale Road. Oakdale Road is a sealed two lane carriageway of approximately 9m width within a maintained road reserve of approximately 29m width. The site is zoned E4 – General Industrial and is almost entirely cleared and is shown at Figure 1.

Update for version 1.5:

The site has recently been subdivided, and development is now on Lot 101 DP 1318933 (see Appendix 5 for Deposited Plan). This does not materially change the bushfire assessment – Lot 100 remains managed land in ownership of NSW state government (Transport NSW).

The site is designated Bushfire Prone Land (BPL) and is mapped at Figure 2. All new development on bushfire prone land, must comply with *Planning for Bushfire Protection 2019* (PBP).

The proposed building layout design is shown at Figure 3.

There is a significant history of bushfire within the local area, and this is shown at Figure 4. A conservative position has been taken with respect to the management of bushfire risk for the proposed ambulance station as this is critical infrastructure that must remain operational during significant bushfire events in the local area.

Figures 5-11 are photos taken at the site inspection undertaken by David Lemcke on 2 July 2025.

This BAR details the proposed bush fire protection measures and demonstrates compliance with PBP. This assessment has been prepared by David Lemcke (Senior Planner & Bushfire Specialist) Lew Short (Principal) (FPAA BPAD Level 3 Certified Practitioner No. BPAD16373) who is recognised by the 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.

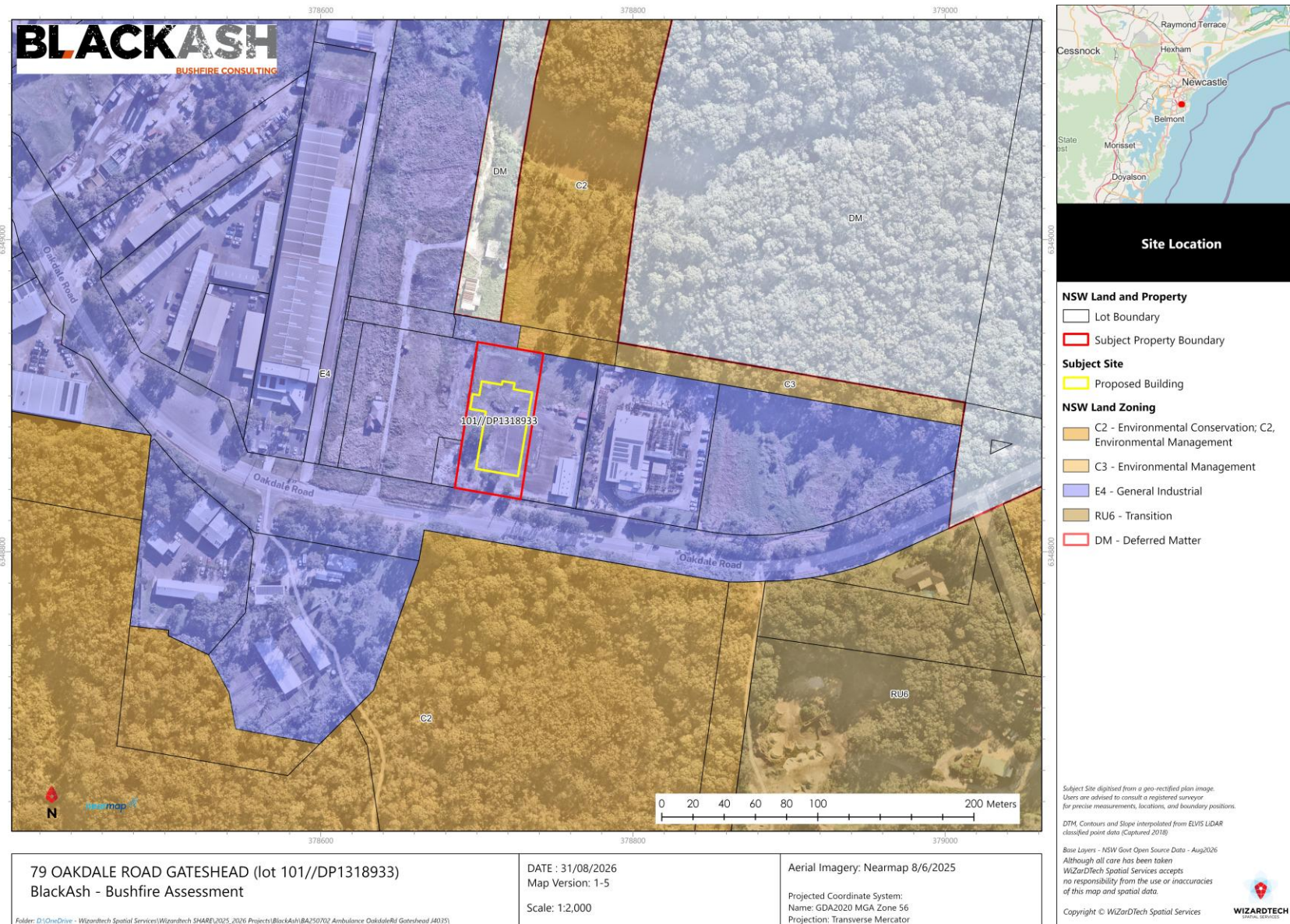


Figure 1: Site in context and current zoning

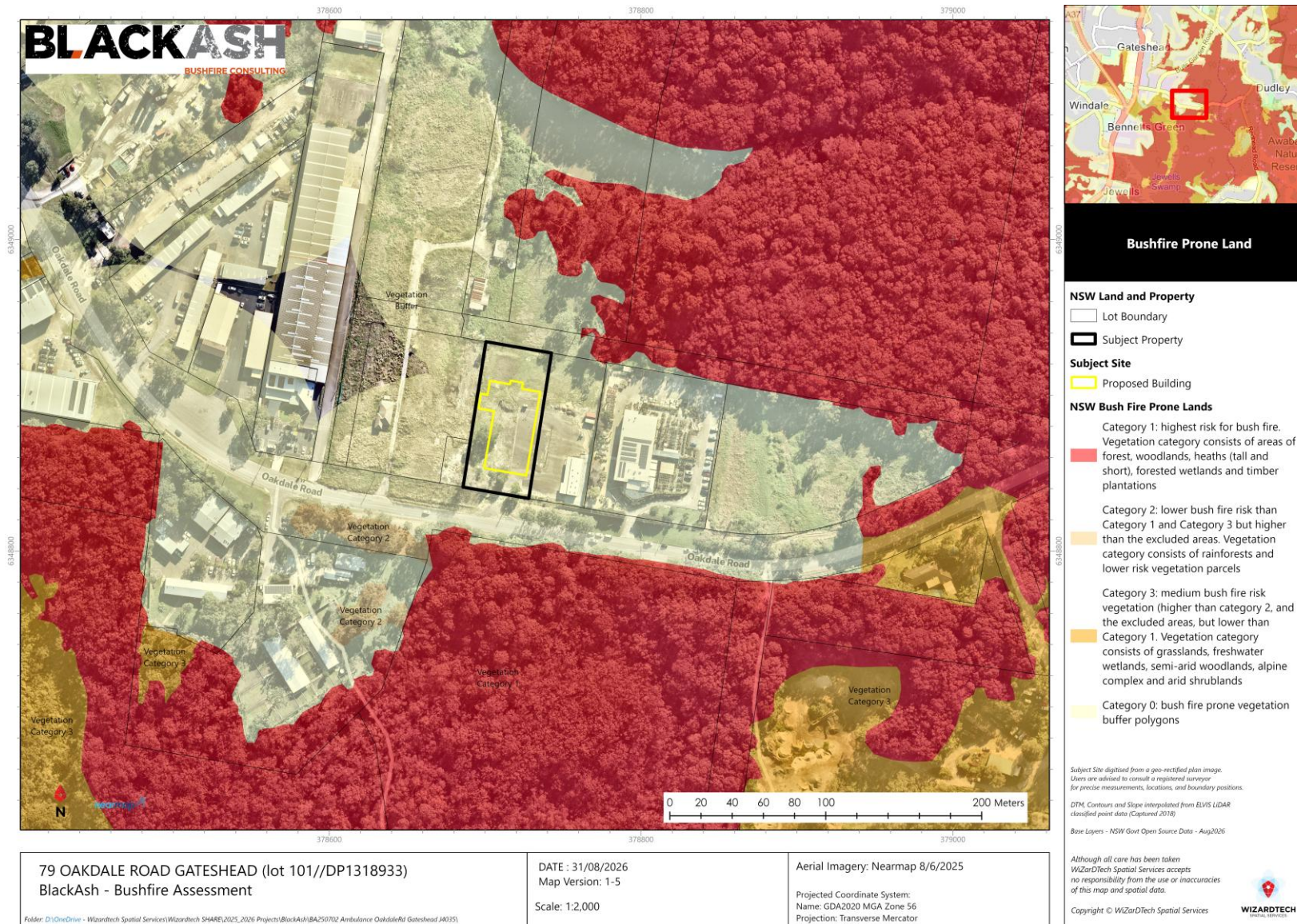


Figure 2: Bushfire Prone Land Map extract with site and proposed layout

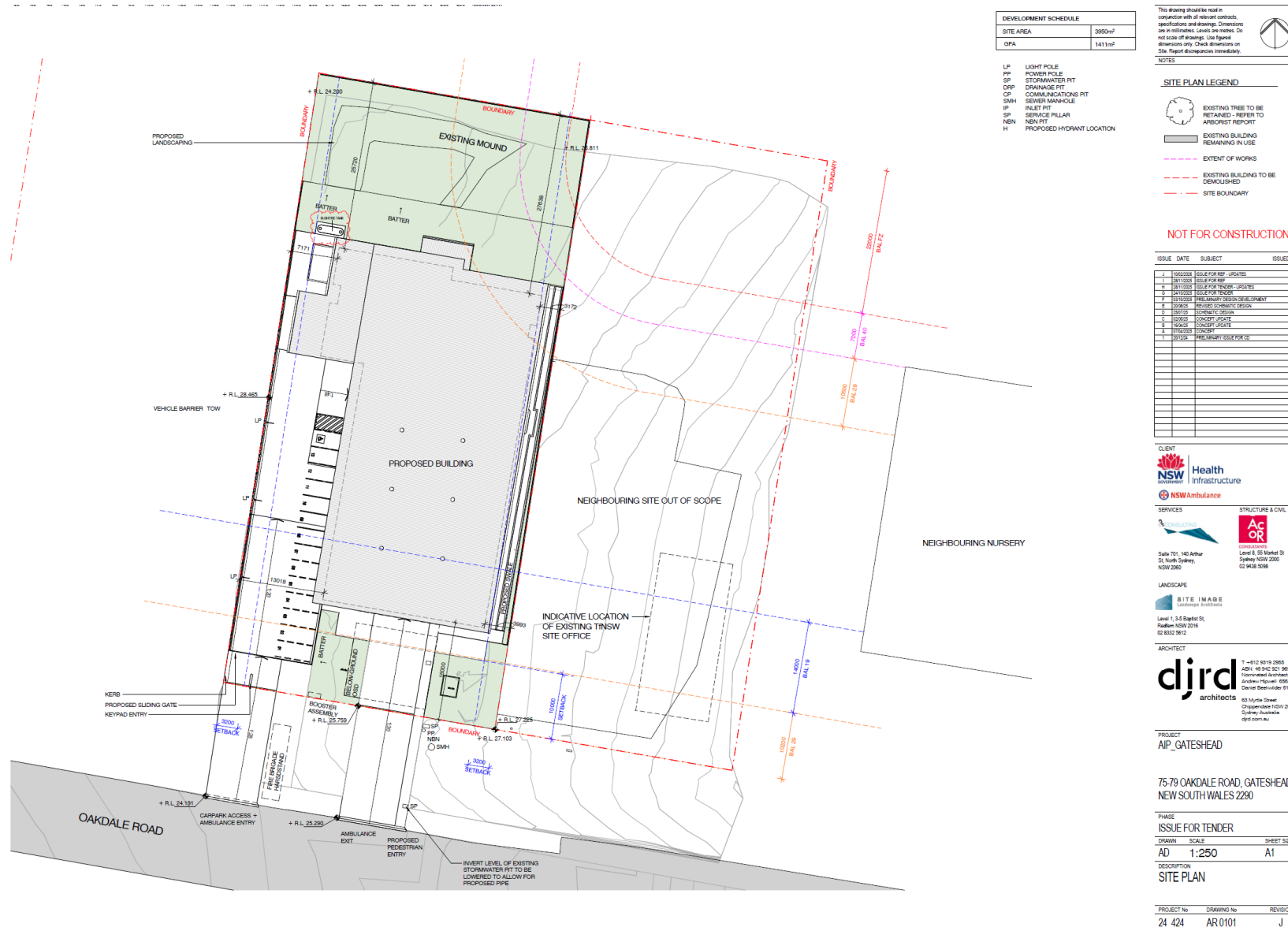
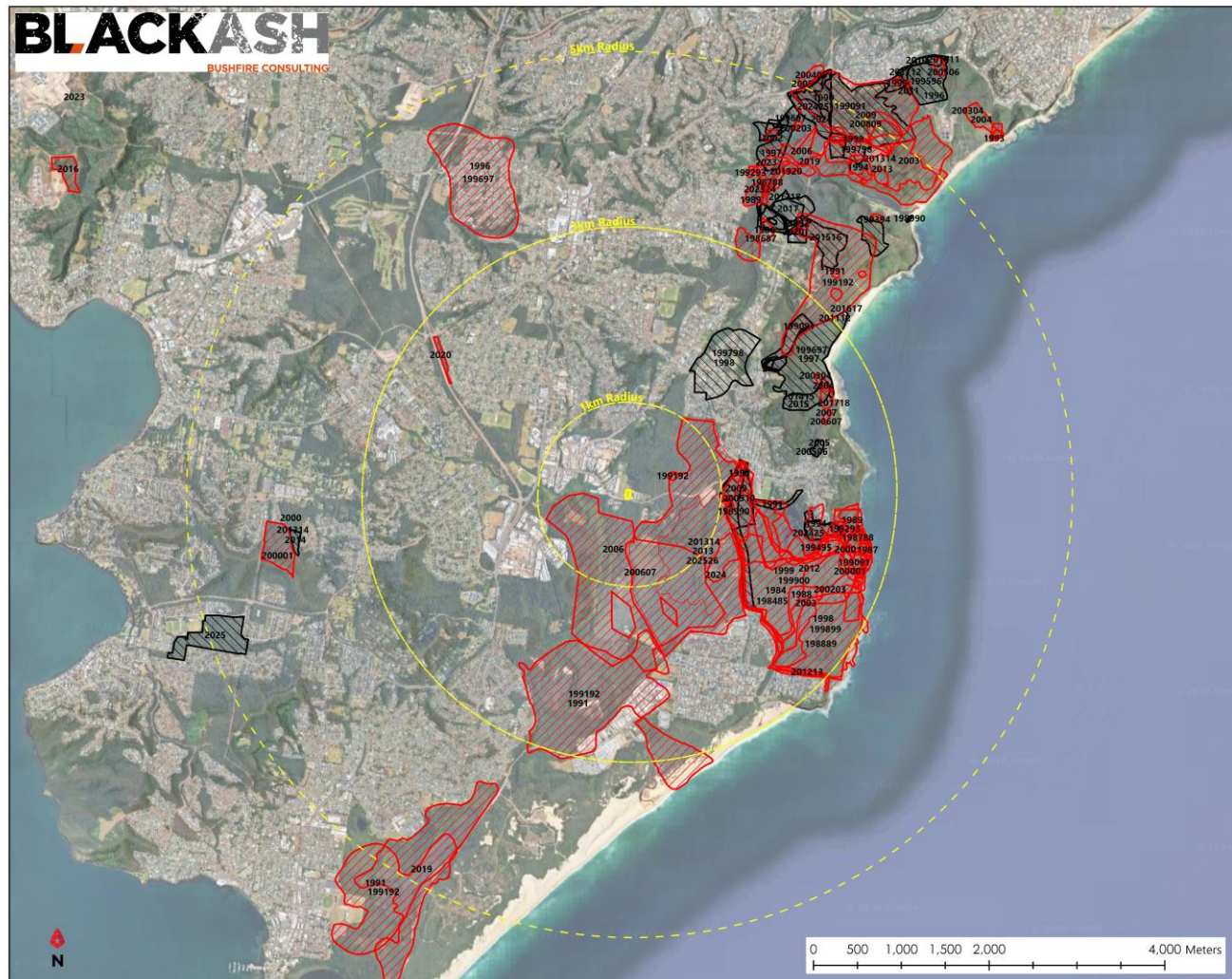


Figure 3: Proposed design



Fire History

Subject Property Boundary

Fire History NPWS and AFAC

Prescribed Burn

Wildfire

Subject Site digitised from a geo-rectified plan image.
Users are advised to consult a registered surveyor
for precise measurements, locations, and boundary positions.

DTM, Contours and Slope interpolated from ELVIS LIDAR
classified point data (Captured 2018)

Base Layers - NSW Govt Open Source Data - Aug 2025

Although all care has been taken
WizArDtech Spatial Services accepts
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79 OAKDALE ROAD GATESHEAD (lot 101//DP1318933)
BlackAsh - Bushfire Assessment

DATE : 31/08/2026
Map Version: 1-5

Scale: 1:42,801

Aerial Imagery: Google Satellite 2025

Projected Coordinate System:
Name: GDA2020 MGA Zone 56
Projection: Transverse Mercator

Folder: D:\OneDrive - WizArDtech Spatial Services\WizArDtech SHARE\2025_2026 Projects\BlackAsh\BA250702 Ambulance OakdaleRd Gateshead J4035

Figure 4: Local fire history per Geoscience Australia Fire History data



Figure 5: Looking west from site to managed land with development consent for industrial units



Figure 6: Looking east across site to Transport NSW depot



Figure 7: Looking across northeast part of site to likely retained forest vegetation



Figure 8: Looking northeast across site - site boundary survey peg in foreground



Figure 9: Looking northwest from rear of site across cleared land likely for future development



Figure 10: Looking east from front of site with retained forest to south of Oakdale Road

5. Legislative Framework

The site is located on designated BPL, mapped by Lake Macquarie City Council and certified by the NSW Rural Fire Service (RFS) Commissioner. BPL is designated in accordance with s.10.3 of the EP&A Act. BPL is land which can support a bushfire or is subject to bushfire attack. The BPL maps provide a trigger for formal assessment of new development and compliance with the NSW RFS document *Planning for Bushfire Protection 2019* (PBP).

This type of development is permissible under several legislative pathways, including Division 6 Section 2.52 (2) of State Environmental Planning Policy (Transport and Infrastructure) 2021.

This BAR has been completed as part of the Review of Environmental Factors (REF) required to be prepared for the proposed development. Formal referral to the RFS is not required, however compliance with PBP and the National Construction Code (NCC) is required.

6. Bushfire Prone Land

BPL maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone. The site itself is Vegetation Buffer and the BPL Map identifies Category 1 vegetation to the south and northeast of the site.

An area of Category 1 vegetation is defined as:

Vegetation Category 1

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

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

The proposed ambulance station will be managed for operational reasons as an Asset Protection Zone (APZ) which meets the definition of managed land as defined within PBP (p. 112):

Managed land is land that has vegetation removed or maintained to limit the spread and impact of bush fire. It may include existing developed land (i.e. residential, commercial or industrial), roads, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries. Most common will be gardens and lawns within curtilage of buildings. These areas will be managed to meet the requirements of an Asset Protection Zone.

7. Planning for Bushfire Protection 2019

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

PBP sets out an overall framework consisting of an aim and objectives, specific objectives for defined development types, types of bushfire protection measures (BPM), which may be employed in a development, and performance criteria for each BPM. In this regard, the structure of PBP is similar to the structure of the NCC and provides considerable flexibility for outcomes. However, the aim of PBP in terms of ensuring appropriate consideration of risk and protection is paramount.

An ambulance station is categorised within PBP as 'other development'. As 'other development', it must meet the aim and objectives of PBP and the specific objectives for Buildings of Class 5-8 under the NCC (Figure 11).

The aim of PBP is:

to protect people and property from the impact of bushfires. It also helps ensure that the firefighters who come to their aid in an emergency are not placed in greater danger because of unsuitable or unsafe developments.

The objectives are to:

- i. *Afford buildings and their occupants protection from exposure to a bush fire*
- ii. *Provide for a defensible space to be located around buildings*
- iii. *Provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition*
- iv. *Ensure that appropriate operational access and egress for emergency service personnel and residents is available*
- v. *Provide for ongoing management and maintenance of BPMs*
- vi. *Ensure that utility services are adequate to meet the needs of firefighters.*

8.3.1 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 5-8 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.

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.

Where a mixed use development is proposed to have a SFPP component, an appropriate mix of BPMs should be applied consistent with the SFPP provisions in Chapter 6.

Figure 11: Specific objectives for Class 5-8 buildings (PBP, p. 76)

7.1. Bushfire Protection Measures

PBP identifies a suite of Bushfire Protection Measures (BPM) that are used in combination to improve life safety, property protection and community resilience to bushfire attack. PBP promotes detailed site analysis and the application of a combination of BPM to achieve an acceptable outcome. The BPM work in combination to provide a suite of measures that meet the Aim and Objectives, and Chapter 8 'Other Development' of PBP. Appropriate combinations depend upon the bushfire risk, type of development, and the specific geographic location and site circumstances.

The types of protection measures include APZs, access, landscaping, water supply, building design and construction and emergency management arrangements as shown in Figure 12. These measures assist building and occupant survival during a bushfire. They also contribute to the safety of firefighters and members of the community occupying buildings during the passage of a bushfire front. If the site is utilised, the BPMs will need to be considered in combination for the site.

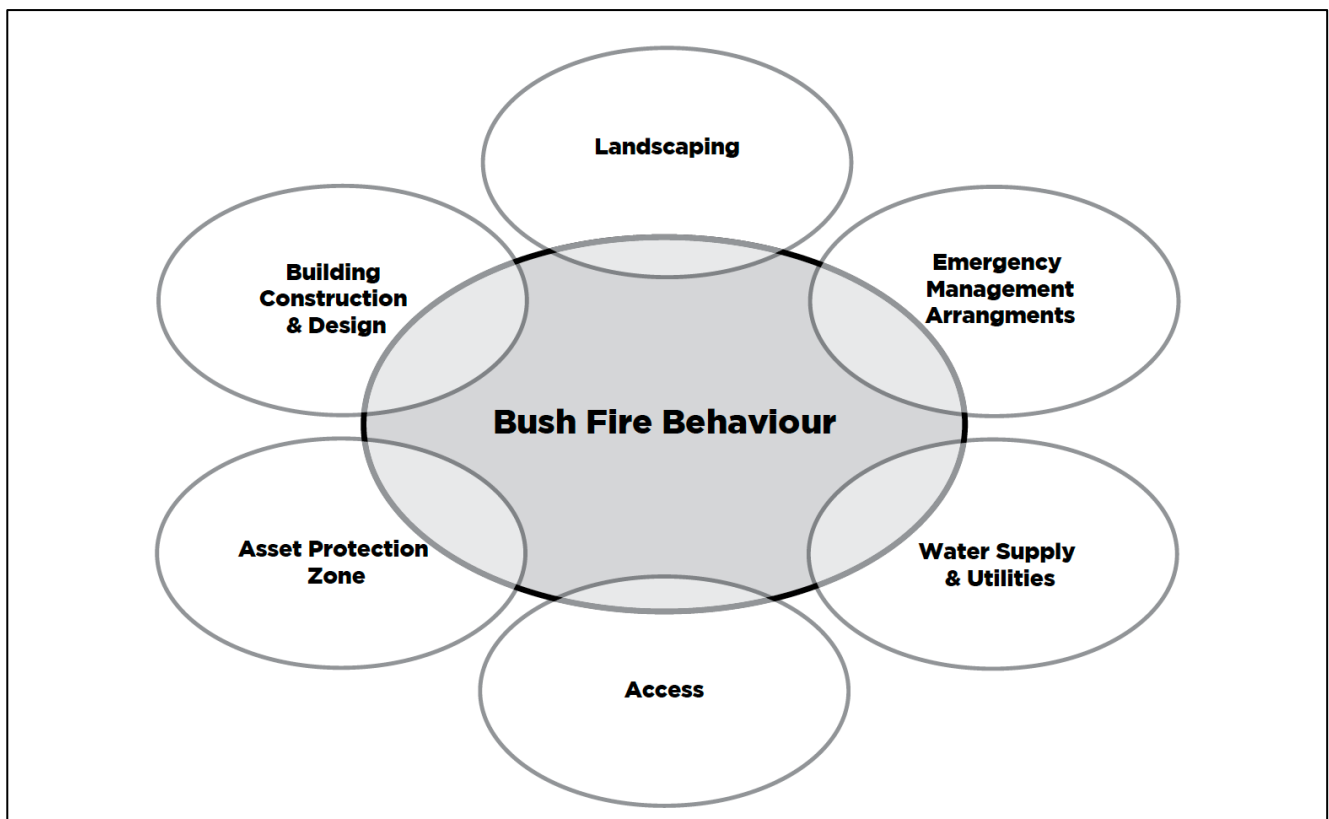


Figure 12: Bushfire Protection Measures in combination (PBP p.26)

8. Bushfire Threat Assessment

8.1. Bushfire Hazard

An assessment of the Bushfire prone land is necessary to determine the application of bushfire protection measures such as APZ locations, risk and Bushfire Attack Levels (BAL).

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 the bushfire planning framework and PBP.

The bushfire hazard affecting the investigation area was assessed during site inspections and using recent aerial photographs for at least a distance of 140m from the perimeters of the investigation area (in line with PBP).

This assessment identifies the potential bushfire threat from outside of the site. The method used for this assessment is outlined in PBP and relies on the combination vegetation, slope and design fire weather factors and is outlined below along with results.

8.2. Methodology

PBP provides a methodology to determine the bushfire threat and commensurate size of any asset protection zone (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 the requirements of the *Environmental Planning and Assessment Act 1979* and the *Rural Fires Act 1997*. The methodology used in this assessment is in accordance with PBP Appendix 1 Site Assessment Methodology.

This assessment is based on the following resources:

- Planning for Bush Fire Protection (NSW RFS, 2019)
- Council Bushfire Prone Land Map
- Aerial mapping
- Detailed GIS analysis

8.3. Fire Danger

For new development, PBP has designated the appropriate fire areas and corresponding Forest Fire Danger Rating (FFDI). The FFDI within PBP is based on a historical fire weather assessment which assumes a credible worst-case scenario and an absence of any other mitigating factors relating to aspect or prevailing winds. The site is in the Greater Hunter Fire Weather District and has an FFDI of 100.

8.4. Vegetation Analysis

PBP requires a classification of the vegetation on and surrounding the site 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.

The predominant vegetation is classified by structure or formation using the system adopted by *Ocean Shores to Desert Dunes* (Keith, 2004) and by the general description using PBP. There are 7 vegetation formations (with sub-formations) identified in PBP. Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

A conservative position has been taken with the assessment and determination of vegetation. The native vegetation is shown in Figure 13 and is consistent with the BPL Map. The existing cleared vegetation to the rear of the site is considered likely to remain cleared, however the ultimate rezoning of the deferred matters is yet to be completed. The site itself is considered 'managed land' and the vegetation to the northeast and south of Oakdale Road is Category 1 Forest.

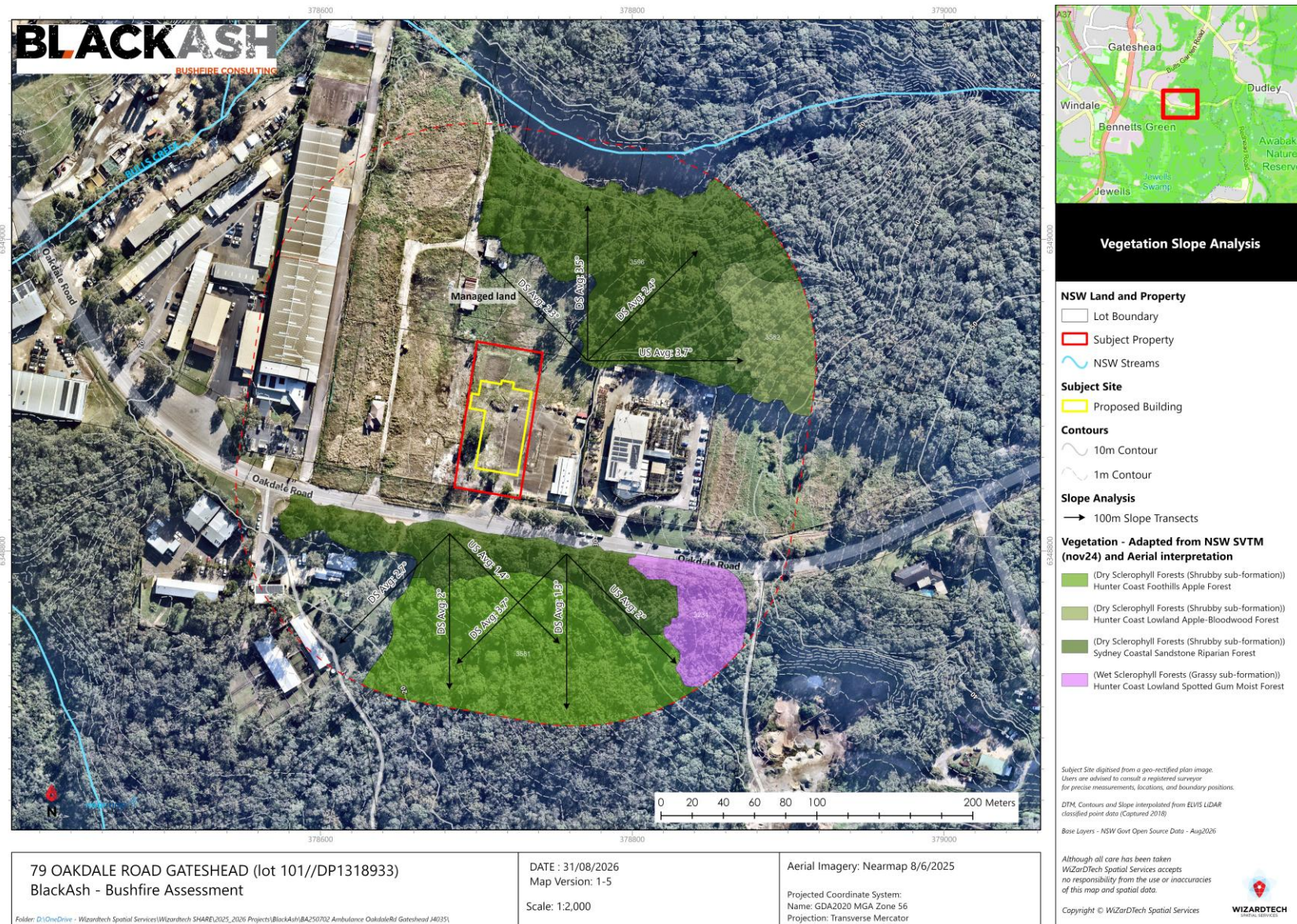


Figure 13: Native vegetation and slope assessment

8.5. Slopes Influencing Bushfire Behavior

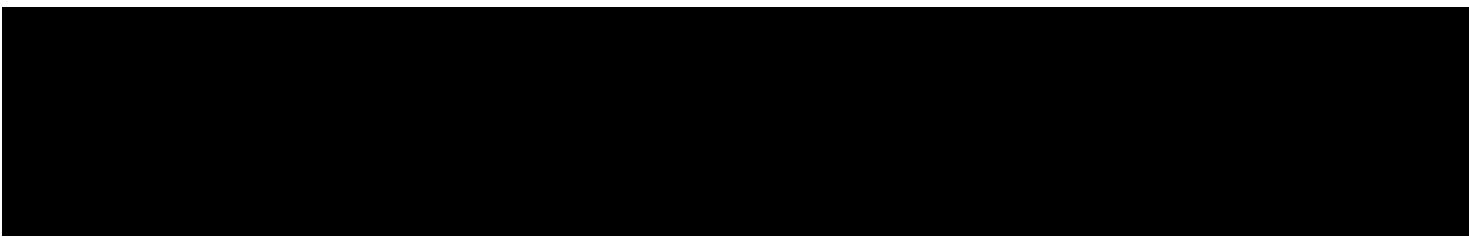
The RF Reg requires an assessment of the slope of the land on and surrounding the property out to a distance of 100 metres from the boundaries of the property or from the proposed development footprint.

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.

In accordance with the methodology the slopes on the site are put into relevant classifications to enable the use of PBP acceptable solutions (deemed-to-satisfy) for simplicity and a conservative approach to managing bushfire risk.

The slopes are mixture of moderate up and downslopes less than 5 degrees.

The effective slopes for the site are shown in Figure 13.



8.6. Asset Protection Zones and Bushfire Attack Levels

An Asset Protection Zone (APZ) is a fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard vegetation and an asset. The APZ includes a defensible space within which firefighting operations can be carried out. The proposed ambulance station surrounds would be managed to APZ standards for operational movement, safety and maintenance purposes.

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.

The APZ must be managed in compliance with Appendix 4 of PBP. As the APZ provides a fuel-reduced, physical separation between buildings and bush fire hazards, it is a key element in the suite of bushfire measures and the balance between size of APZ and construction standard is one that allows for some flexibility to incorporate less vegetation clearing and/or reduce costs through lower construction standards. In practical terms, the required setbacks for buildings and areas such as car parking will make up much of the APZ and can be conditioned to be maintained to the standard of an Inner Protection Area as detailed in PBP Appendix 4 (p. 107). The APZ is shown in Figure 14.

The Bushfire Attack Level (BAL) is 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. HI have confirmed the acceptable level of radiant heat at the new station and the relationship to building construction standards. The BAL-29 standard is used here which complies with minimum standard for new residential lots and is considered suitable for institutional buildings which are critical infrastructure such as an ambulance station. The BAL measured in from the vegetation (Figure 15) shows that BAL-29 is required for the south elevation only, however as there is some uncertainty over the future vegetation composition on the northern side of the site it is recommended BAL-29 construction is used for the northern elevation as well.

The east and west elevations may be reduced to BAL-12.5 construction standard, which focuses on ember protection, as these will not be exposed directly to bushfire attack due to the existing and approved future commercial/industrial development on those exposures.

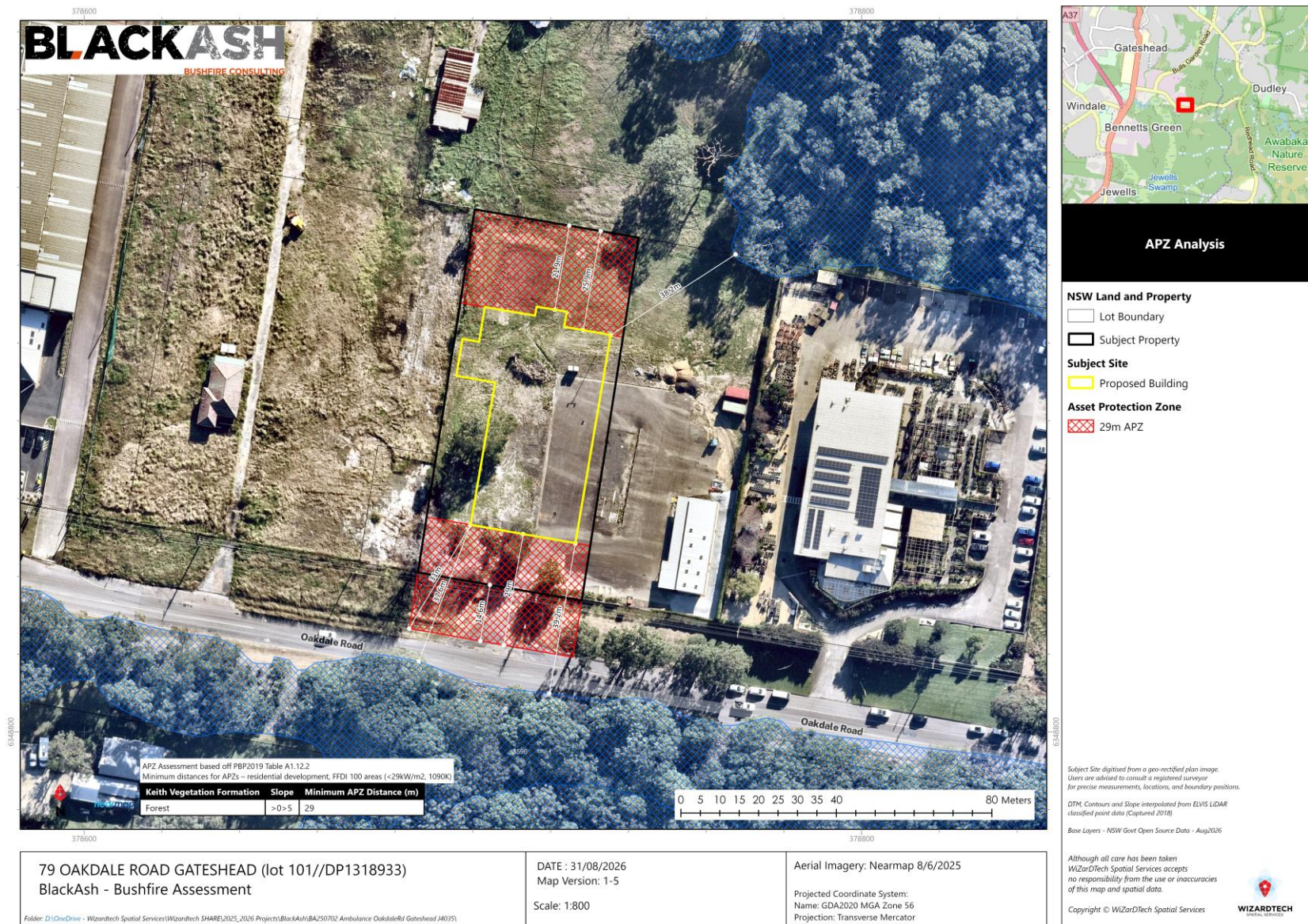


Figure 14: BAL-29 construction standard compliant APZ

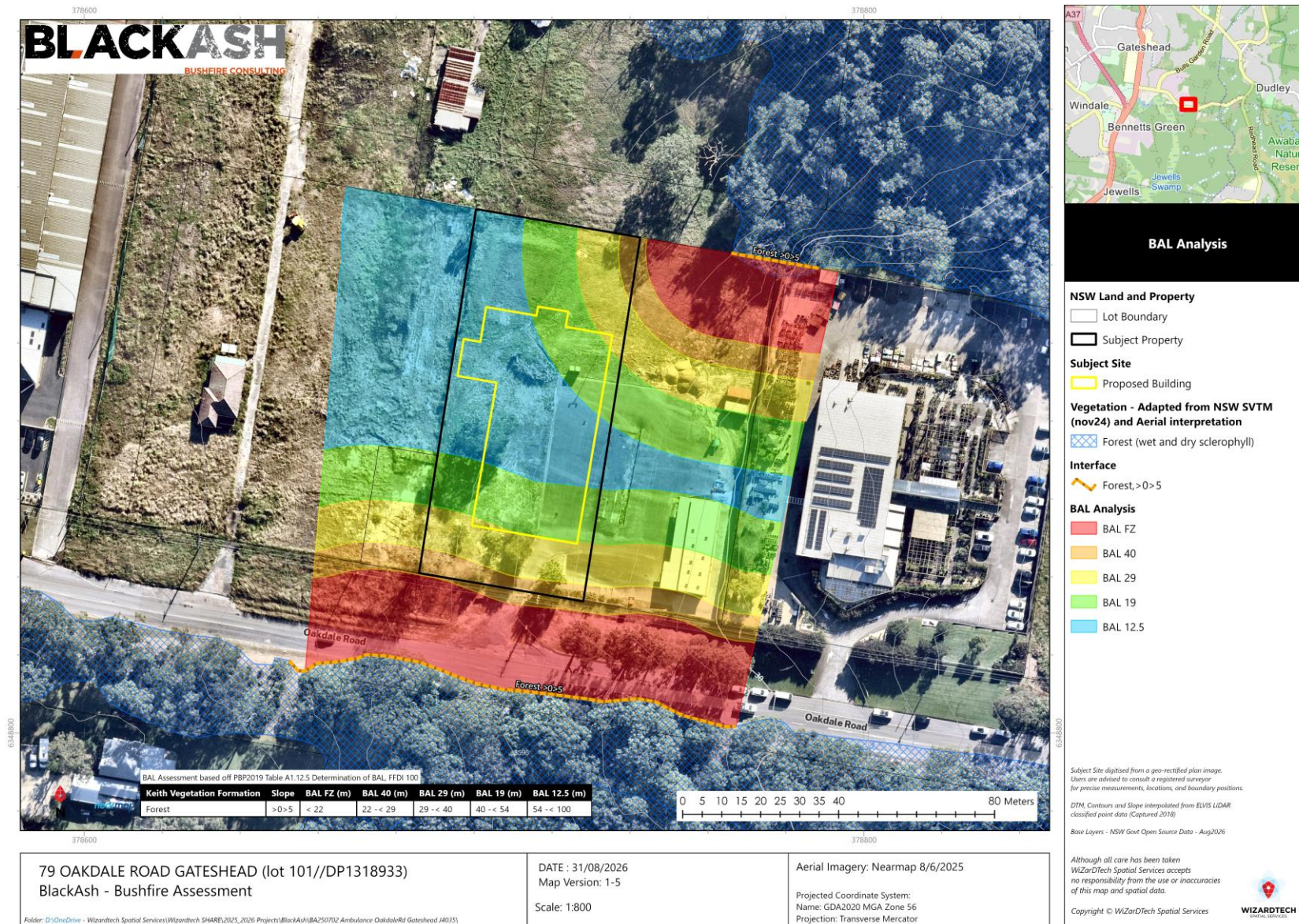


Figure 15: BAL analysis for existing vegetation – refer to discussion above

8.7. Access

The existing road infrastructure is in place. No modifications to the public road system are proposed. Adequate access is provided to the site from Oakdale Road to allow for both firefighting vehicles to gain access and ambulances to leave the site.

Access to the rear (north) side of the site for firefighting is limited to pedestrian access unless the western side of the site on the Transport NSW is available for vehicle entry. The building has a pedestrian pathway on each side of the building allowing access by firefighters to reach all parts of the building including the rear services area. This is within the urban area property access standard of 70m from the nearest road (2 lengths of hose and a 10m water stream) detailed in Table 5.3b of PBP (p. 46). This supports the operational use of firefighting vehicles to a satisfactory standard.

8.8. 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 existing services will be maintained and can be extended to the site as required.

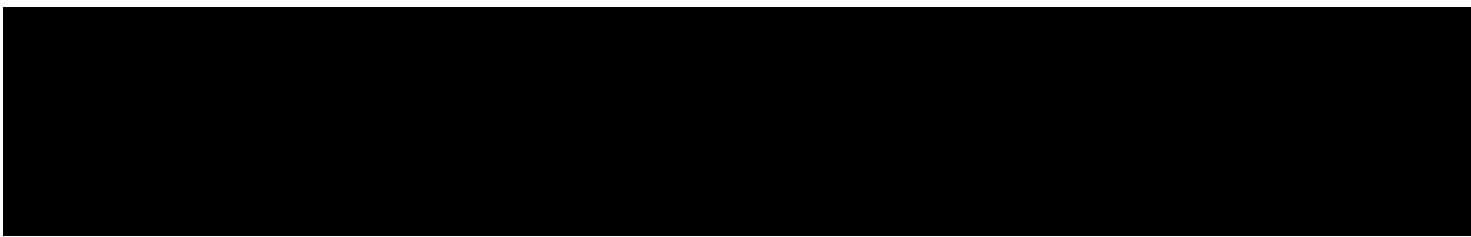
It is recommended this is supplemented with an additional water supply of minimum 10,000 litres reserved for firefighting. Should this be provided by a tank this should be accessible to firefighters and be fitted with standard 65mm Storz fittings. Current plans have provision for a tank to rear of site and ability to use the underground retention tank at front of site.

8.9. Landscaping

Landscaping onsite will be managed to at least APZ standards for the entire site. Landscape plan shown at 16.

8.10. Evacuation and Emergency Management

Prior to occupation a *Bushfire Emergency Management and Evacuation Plan* will be completed.





9. Aim & Objectives Summary Table

The RF Reg requires an assessment of the extent to which the proposed development conforms with or deviates from the standards, aim and objectives and performance criteria set out in Chapter 8 of PBP. All development in Bushfire Prone Areas needs to comply with the aim and objectives of PBP. Table 2 is an assurance approach using expert judgement.

Table 2: Aim and Objectives of PBP (Section 1.1)

Aim	Meets Criteria	Comment
The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including fire fighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and the protection of the environment.	Yes	There is a significant existing cleared area at the proposed site and the entire site will become a formal APZ to benefit the ambulance station. The site is well located and can be established and the building constructed to meet relevant standards subject to review during design process. A detailed <i>Bushfire Emergency Management and Evacuation Plan</i> should be developed to manage the site ongoing.
Objectives	Meets Criteria	Comment
Afford occupants of any building adequate protection from exposure to a bushfire.	Yes	Relevant BAL can be met through a combination of construction standards and APZ establishment.
Provide for defendable space to be located around buildings.	Yes	Relevant APZ can be established on site.
Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent direct flame contact and material ignition.	Yes	Relevant APZ can be established on site.
Ensure that safe operational access and egress for emergency service personnel and occupants is available.	Yes	The site has access to public roads, and access and egress for emergency vehicles and evacuation is adequate.
Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads, in the asset protection zone.	Yes	The site can be maintained to APZ standards as a minimum as part of the overall operation of the ambulance station.
Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting).	Yes	Reticulated water is available to the site. It is recommended an additional 10,000 litre firefighting water supply be reserved with suitable fittings to provide supplementary firefighting water.

10. Recommendations

- 1.1. The entire site shall be managed to the standard of an Inner Protection Area APZ in accordance with Appendix 4 of *Planning for Bushfire Protection 2019*.
- 1.2. The ambulance station shall be constructed in accordance with the north and south elevations to BAL-29 construction standard, and the east and west elevations to BAL-12.5 construction standard as per *Australian Standard AS3959:2018 Construction of Buildings in Bushfire-Prone Areas*.
- 1.3. An additional firefighting water supply of minimum 10,000 litres with suitable 65mm Storz fittings shall be provided on site.
- 1.4. A Bushfire Emergency Management and Evacuation Plan shall be prepared prior to occupation of the development.

11. Conclusion

This Bushfire Assessment Report demonstrates the proposed site and design meet the requirements of the regulatory framework with respect to bushfire risk management. This assessment has demonstrated that the proposed ambulance station development is aligned with *Planning for Bushfire Protection 2019* when constructed in accordance with the recommendations.

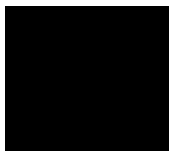


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Appendix 1 - References

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

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Appendix 2 - Staff Curriculum vitae



Curriculum Vitae

David Lemcke

Senior Planner & Bushfire Specialist

BlackAsh Bushfire Consulting



Summary

David is an experienced bushfire, planning and land management professional with over 20 years in local government and 4 years as a private sector bushfire consultant. He has undertaken a wide range of development assessments and strategic planning projects in both regulatory and proponent roles. He was Central Coast Council's bushfire subject matter expert for over 15 years, including representation in the Land & Environment Court and numerous working groups. He has a deep understanding of contemporary, practical bushfire management from a range of perspectives due to decades of experience as a public land manager and a Rural Fire Service (RFS) volunteer, and now applies this expertise with a range of clients across the private and public sectors.

David has served as Council's staff representative on the Wyong and Central Coast Bushfire Management Committees since 2007 and was instrumental in developing and contributing to emergency management planning including preparation of Bush Fire Risk Management Plans, Fire Access & Fire Trail Plan, developing local policy and pre-incident planning, and delivering community engagement.

From 2010 he was the program manager for the Wyong Shire Council and then Central Coast Council (CCC) bushfire program. These programs won several awards, sponsored research and were renowned for innovation and improvement of local government bushfire management. The CCC program included management of over 220 fire trails, management of 275 mechanical Asset Protection Zones, Hazard Reduction burning, access management, environmental protection and community engagement using both contractors and internal staff teams.

David has been active in policy development at State level, being the Local Government NSW representative on numerous RFS policy committees including the Review of the Bushfire Environmental Assessment Code and delivering numerous conference presentations.

David is an active senior RFS volunteer, with 23 years in the service, having been a field officer for 18 years.

Areas of Expertise

- Rezoning and strategic bushfire studies
- Residential, commercial and industrial development assessment
- Infrastructure vulnerability and consequence management
- Renewable energy and BESS projects
- Bushfire planning, design & construction requirements in accordance with National Standards
- Bushfire Management Plans for large and small scale holdings
- Evacuation planning and implementation
- Technical and strategic advice
- Innovative policy development

Qualifications

BPAD Level 3

Accredited Practitioner
Fire Protection Association
of Australia - 68670

Graduate Diploma of Bushfire Protection

Western Sydney University,
2025.

Advanced Diploma of Public Safety (Emergency Management)

Australian Emergency
Management Institute, 2015

Diploma of Management Management Consultancy International, 2012

Master of Environmental Planning

Macquarie University, 2005

Graduate Diploma Urban & Regional Planning

University of New England,
2000

Certificate 2 Bush Regeneration

Blue Mountains TAFE, 2000

Bachelor of Arts (Geography)

University of New England,
1998

Rural Fire Service

Various foundational,
technical, specialist and
incident management
qualifications
2002 - current

BLACKASH
BUSHFIRE CONSULTING

Curriculum Vitae

Lew Short

Director BlackAsh Bushfire Consulting

Summary

Lew is an experienced leader in the government and emergency sector. He has an intimate knowledge of the workings of government and how emergency service organisations operate. He is not only a technical expert but a practitioner who has deep industry knowledge.

Lew has extensive experience providing national leadership in building community resilience representing AFAC and the FPAA. Lew's technical expertise is in bushfire consequence management, risk assessment and mitigation, specifically the planning and design of new developments in high bushfire risk areas to comply with legislative and planning requirements.

Lew has worked with some of Australia's leading organisations including NSW Rural Fire Service, Country Fire Authority, Emergency Management Victoria, Lend Lease, Mirvac, Victorian State and Local Governments, Sydney Water Corporation, Great Lakes and Warringah Councils. Lew has a deep operational understanding of how fire works in the Australian landscape. He has multifaceted insight into how governments respond to this threat. Lew provides unique strategies to comply with regulatory requirements and safety outcomes.

Lew established and led the Community Resilience Group for the New South Wales Rural Fire Service (RFS). His areas of responsibility included land use planning, community engagement, education, vulnerable communities, bunkers, Neighbourhood Safer Places, business systems and projects, social media, integrated risk management and environmental management. He was responsible for the establishment, management and leadership of the development assessment function for the RFS at a State level where he was responsible for the assessment of over 80,000 development applications in Bush Fire Prone Areas.

Areas of Expertise

- Landuse planning & consequence management
- Legal strategy, Land & Environment Court and Expert Witness
- Bushfire planning, design & construction requirements in accordance with National Standards
- Insurance threat, vulnerability and constraints assessments
- Bushfire Prone Mapping, hazard mapping and risk assessments
- Australian Standard AS3959 Construction of Buildings in Bushfire Prone Areas
- Bushfire Management Plans
- Alternative & performance based solutions
- Evacuation planning and implementation
- Technical and Strategic advice



Qualifications / Accreditation

BPAD Level 3 Accredited Practitioner
Fire Protection Association of Australia

Graduate Diploma of Bush Fire Design
University of Western Sydney, 2006

Graduate Certificate of Applied Management
Australian Institute of Police Management, 2005

Graduate Certificate of Management Macquarie
Graduate School of Management Macquarie University, 2001

Bachelor of Arts, Resource and Environmental Management
Macquarie University, 1994

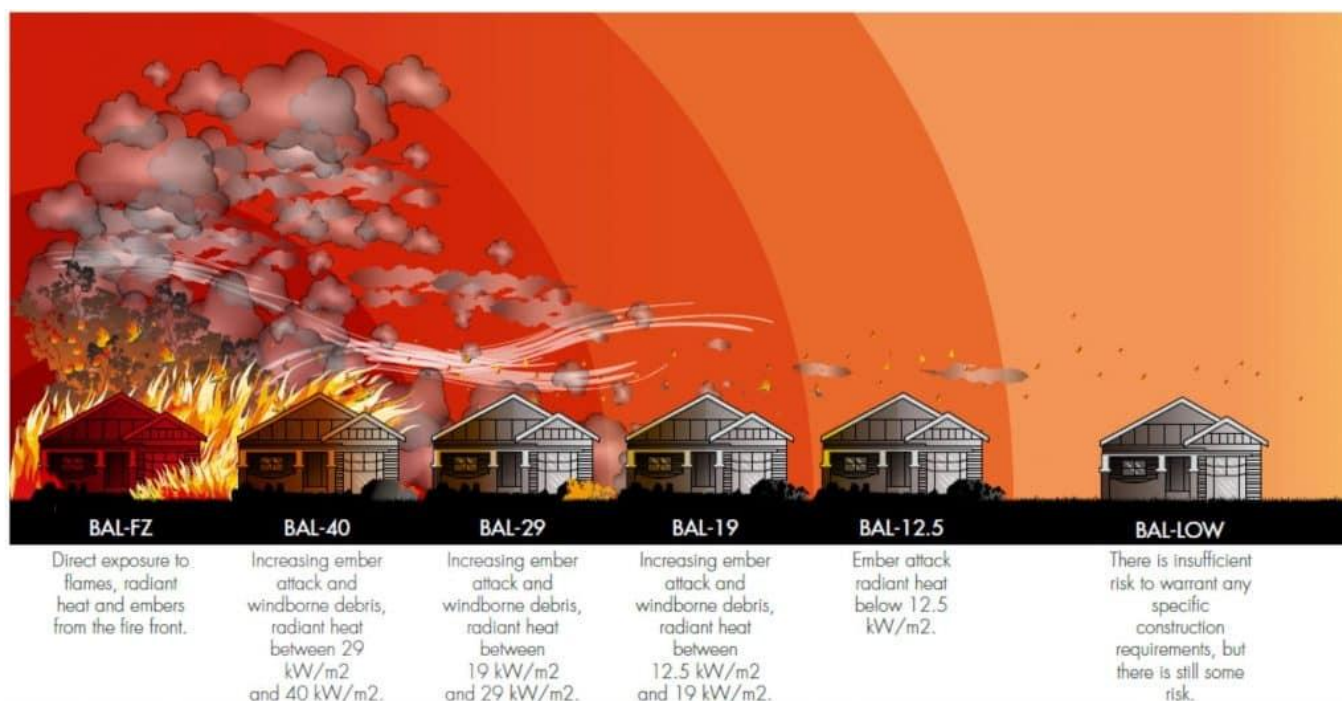
Appendix 3 - Overview of bushfire attack mechanisms

Bushfires have long remained a fundamental characteristic of the Australian bush landscape, and likewise Australians have long retained a strong affinity with bush environments. There remain a number of common factors which are associated with bushfire hazard and events and these include the incidence of fire weather, availability of fuel along with its type, structure and continuity or fragmentation, and the context of development at the bushland interface.

Bushfire attack refers to the various methods in which bushfire may impact upon life and property and principally encompass:

- Direct flame contact
- Ember attack
- Radiant heat flux
- Fire-driven wind
- Smoke

In the progression of a bushfire event, these methods interact either exclusively or in concert and are explained in the following section.



Forms of bushfire attack with relation to BAL construction standards (CFA; AS3959:2018)

Direct flame contact

Direct flame attack refers to flame contact from the main fire front, where the flame which engulfs burning vegetation is one and the same as that which assumes contact with the building. It is the highest level of bushfire attack because of direct flame contact from the fire front in addition to heat flux and ember attack.

Ember attack

The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front. Typically, ember attack occurs approximately 30 minutes prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards, thus it is the longest lasting impact of bushfire attack.

Ember attack is attack by smoldering or flaming windborne debris that is capable of entering or accumulating around a building, and that may ignite the building or other combustible materials and debris.

In essence, building loss via ember attack relates largely to the vulnerabilities and peculiarities of each building, its distance from hazardous vegetation and whether an occupant (or the like) is present to actively defend it. It is estimated by the CSIRO that approximately 80 to 90 per cent of buildings lost by bushfire are lost as a result of ember attack either in isolation or in combination with radiant heat impact.

Radiant heat flux

Exposure to radiant heat remains one of the leading causes of fatalities associated with bushfire events. Measured in kilowatts per square metre (kWm^2), radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance.

In terms of impact on buildings, radiant heat can pre-heat materials making them more susceptible to ignition or can cause non-piloted ignition of certain materials if the energy transmitted reaches a threshold level. Radiant heat can also damage building materials such as window glazing, allowing openings into a building through which embers may enter. Radiant heat impact is an especially important factor in building-to-building ignition.

In terms of radiant heat exposure for humans, it can cause pain to unprotected skin in milder situations or life threatening and fatal injury in higher exposure thresholds. The effects of radiant heat are shown in Table 2.

Table 3 The effects of radiant heat (NSWRFS 2006; Drysdale, 1999; CFA, 2012)

Radiant heat flux kW/m ²	Observed effect
1	Maximum for indefinite skin exposure
3	Hazardous conditions, firefighters expected to operate for a short period (10 minutes)
4.7	Extreme conditions, firefighters in protective clothing will feel pain after 60 seconds of exposure
6.4	Pain after 8 seconds of skin exposure
7	Likely to be fatal to unprotected person after exposure for several minutes
10	Critical conditions, firefighters not expected to operate in these conditions although they may be encountered. Considered to be life threatening in less than 60 seconds in protective equipment. Fabrics inside a building could ignite spontaneously with long exposure.
12.5 (BAL-12.5)	Volatiles from wood may be ignited by pilot after prolonged exposure. Standard float glass could fail during the passage of a bushfire.
16	Blistering of skin after 5 seconds
19 (BAL-19)	Screened float glass could fail during the passage of a bushfire.
29 (BAL-29)	Ignition of most timbers without piloted ignition (3 minutes of exposure) during the passage of a bushfire. Toughened glass could fail.
40+	Flame zone – exposure to direct flame contact from fire front

Fire driven wind

The convective forces of bushfire typically result in strong to gale force fire-driven winds which in itself, can lead to building damage. The typical effects of fire driven wind include the conveyance of embers, damage from branches and debris hitting the building, as well as direct damage to vulnerable building components such as lifting roofs or roof materials and the damage / breakage of windows.

Smoke

Smoke emission remains a secondary effect of bushfire and is one which is typically not addressed by bushfire assessments. Irrespective, it is important to note the potentially severe impact of smoke emission on the human respiratory system. It can lead to difficulties in breathing, severe coughing, blurred or otherwise compromised vision, and can prove fatal. It is also important to note that toxic smoke can occur during bushfire, particularly where buildings or materials are ignited. With regard to evacuation, it can reduce visibility and create difficulties for particularly vulnerable persons.

Appendix 4 - Asset Protection Zone Requirements

Source PBP 2019. P. 106-108

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 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.

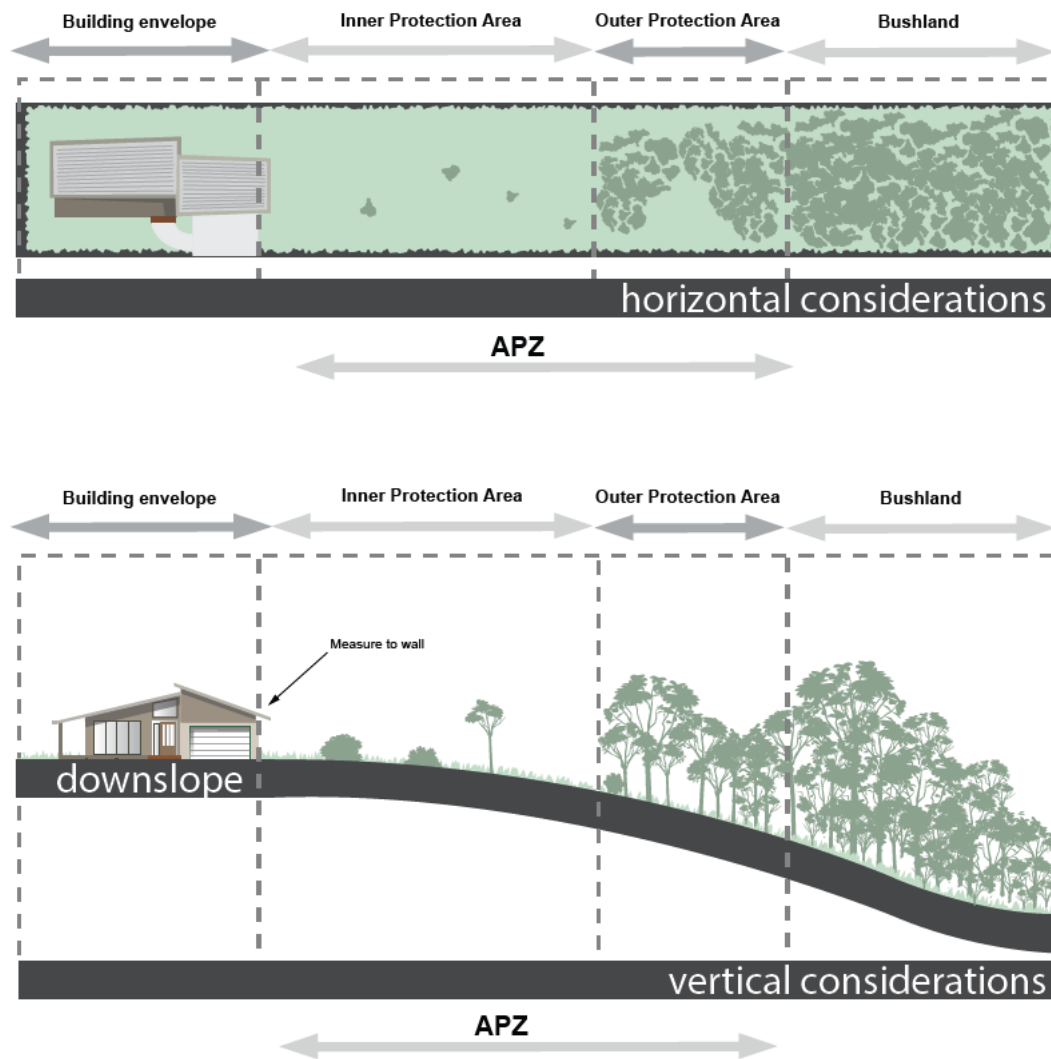
Grass

- 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.



Appendix 5 – New Deposited Plan

