

Bushfire Risk Assessment

Precincts 4C and 4D

Oakdale West Industrial Estate

Prepared for

Goodman Property Services (Aust.) Pty Ltd



Version 1.0

10 January 2023

Project Name:	Oakdale West Estate – Precincts 4C and 4D
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1. 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" commercial/ industrial
Location	Oakdale West Estate, Kemps Creek
Local Government Area	Penrith
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 referral to the NSW RFS 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

2. Introduction

Blackash Bushfire Consulting has been engaged by Goodman Property Services (Aust) Pty Ltd to provide a bushfire assessment to support the Development Application for the proposed industrial buildings 4C & 4D at the Oakdale West Industrial Estate (OWIE).

The site (shown in Figure 1) and proposed buildings form part of the larger OWIE which comprises 154 hectares of land within the Western Sydney Employment Area (WSEA) and is owned by a Joint Venture (JV) between Goodman and Brickworks Limited.

The OWIE was approved as a State Significant Development for the staged development of the land for warehousing and distribution uses.

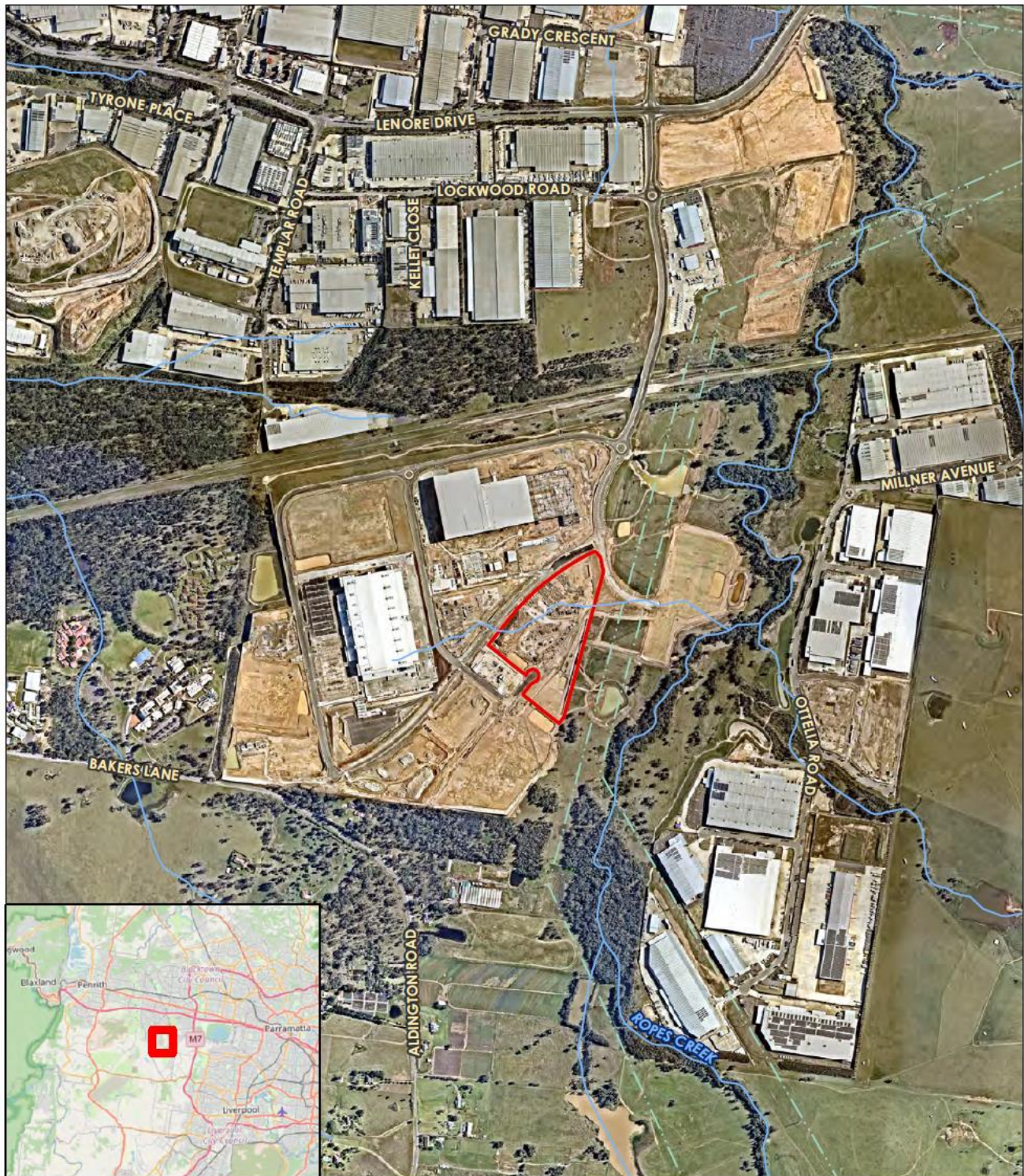
The subject sites are benched, serviced and ready for aboveground construction. SSD 7348 approved the infrastructure to these development pads.

The site is mapped as bushfire prone land and bushfire has been a key consideration in the design process. Commercial and industrial development is designated as “other” development in PBP 2019. As “other” development, a key issue for the proposal will be meeting the aim and objectives of *Planning for Bushfire Protection* and the performance requirements for commercial and industrial development.




The proposed warehouse buildings are required to respond and implement an appropriate level of bushfire protection measures, as per *Planning for Bushfire Protection 2019* (PBP 2019). This report will demonstrate that an appropriate combination of protection measures has been considered and provided.

This assessment has been prepared by Corey Shackleton, Principal Bushfire & Resilience (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-34603) who is recognised by the NSW RFS as qualified in bushfire risk assessment and have been accredited by the Fire Protection Association of Australia as a suitably qualified consultant to undertake alternative solution proposals.

The applications will be submitted to Penrith City Council as a local council development application.



Legend

-  Watercourse
-  Electricity Transmission Line
-  Subject Land

0 250 500 1,000 1,500
Metres

Coordinate System: GDA 1994 MGA Zone 56
Imagery: © Neamap

 DKGIS
Date: 21/10/2022

Figure 1: Site Location

3. Legislative Framework

The site is identified as 'bushfire prone land' (see Figure 2) for the purposes of Section 10.3 of the *Environmental Planning and Assessment Act, 1979* (EPA Act) and the legislative requirements for development on bushfire prone lands are applicable.

All development on bushfire prone land must consider and comply with PBP 2019. However, industrial development has considerable flexibility, and the nature of the development often results in the structures providing a higher degree of bushfire resistance than required by the NSW RFS.

As "other" development, the proposed industrial development is addressed through demonstrating compliance with the aim and objectives of PBP.

Under the building classification system within the *National Construction Code* (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) and the NASH Standard are not considered as a set of 'deemed to satisfy' provisions. However, compliance with AS 3959 and NASH should be considered when meeting the aims and objectives of PBP.

Whilst bushfire is not captured in the NCC for Class 5-8 buildings, PBP 2019¹ articulates the following objectives which will be applied in relation to access, water 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 bushfire should be considered on a case-by-case basis.

¹ Planning for Bushfire Protection 2019 (p. 76)

4. 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 NSW RFS.

Figure 2 shows the Bushfire Prone Land Map for 4C and 4D precincts. The extract from the Penrith Bushfire Prone Map shows that the site and the surrounding land is predominately Category 2 Bushfire Prone Vegetation, except for an area of Category 1 to the south. All the vegetation within the OWIE has since been cleared as part of the OWIE development.

5. The Proposal

The Development consists of two (2) new warehouse buildings each with ancillary office facilities, external hardstand spaces, staff carparking, landscaping and solar panels.

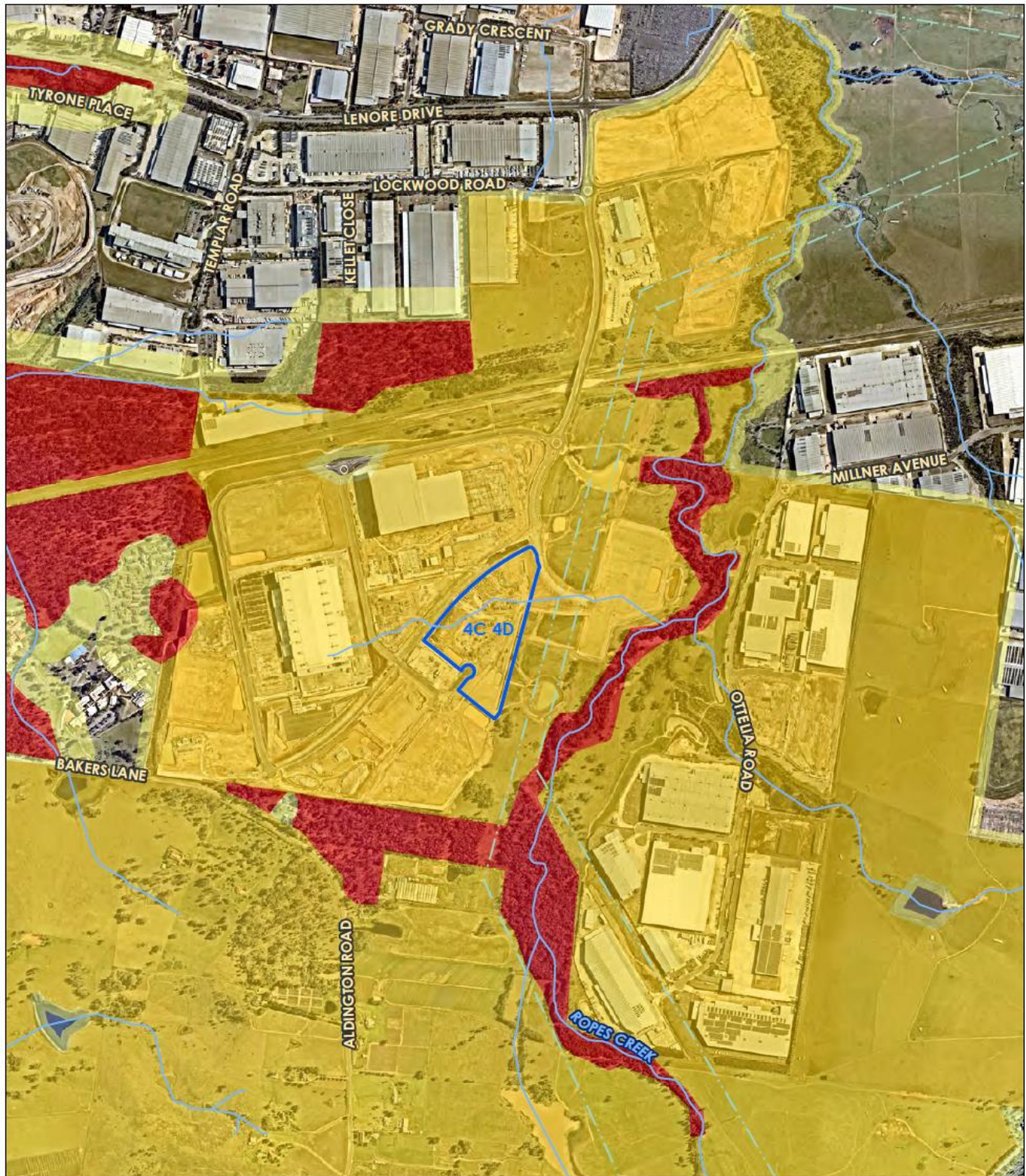
Approval is requested for the construction, operation and use, and fit-out of the buildings.

Building 4C spans 30,020 sqm of warehouse space and 1,200 sqm of office space, creating a total Gross Lettable Area of 31,220 sqm. The building has a proposed ridge height of 14.6m.

Building 4B spans 5,200 sqm of warehouse space and 400 sqm of office space, creating a total Gross Lettable Area of 5,600 sqm. The building has a proposed ridge height of 14.6m.

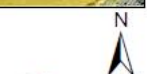
24/7 operations are proposed with a focus on warehouse and industrial use.

The proposed developments comply with MOD 12 of SSD 7348 Concept Plan that is currently with the Department of Planning & Environment for assessment.



Legend

- Watercourse
- Electricity Transmission Line
- Subject Land
- Vegetation Category 1
- Vegetation Category 2
- Bushfire Prone Land**
- Vegetation Buffer



Date: 21/10/2022

0 100 200 400 600

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 2: Bushfire Prone Land Map



Figure 3: Oakdale West Estate Concept Masterplan

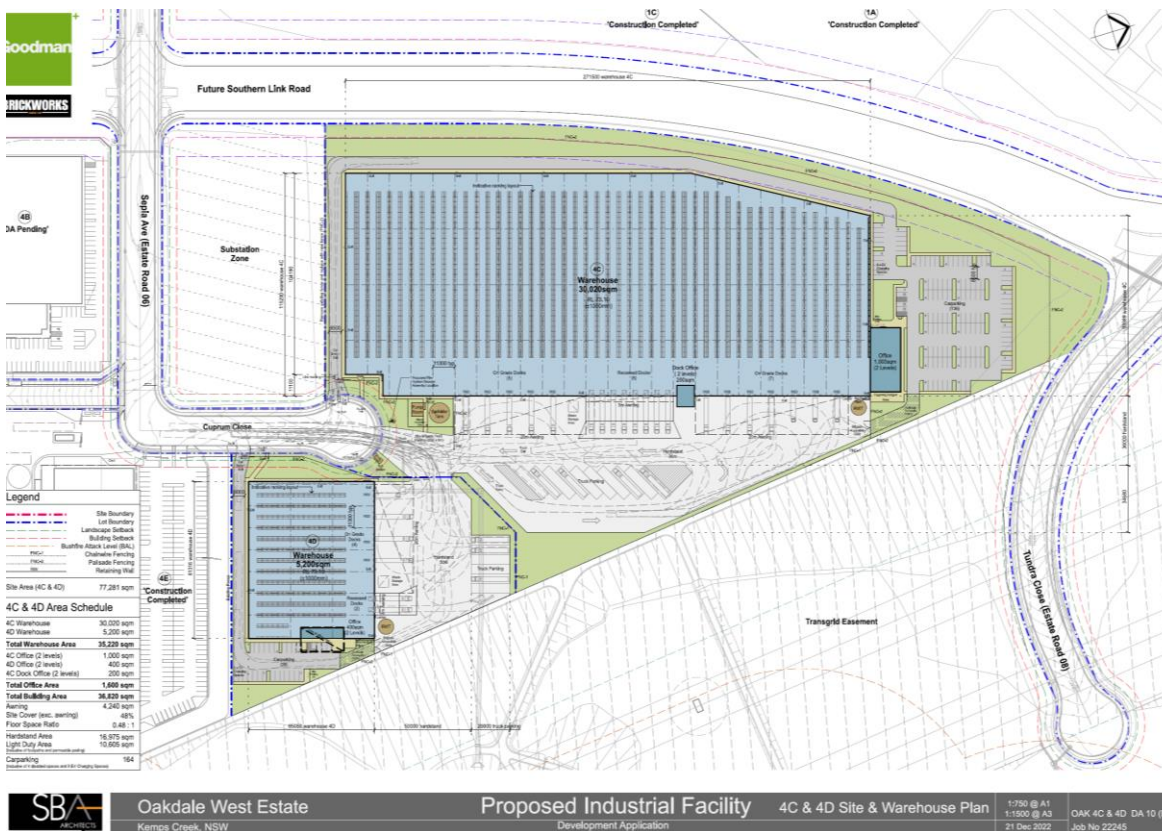


Figure 4: Proposed Precincts 4C and 4D Development

6. Site Assessment Methodology

The Bushfire Assessment Report is based on a desktop and site assessment of the site utilising the following resources:

- *Planning for Bushfire Protection* (NSW RFS, 2019);
- Aerial mapping;
- Site inspection; and
- Detailed GIS analysis.

This assessment is based on mapping of vegetation formations and slope assessment in accordance with PBP 2019. The methodology used in this assessment is in accordance with PBP 2019 and is outlined in the following sections.

6.1. Bushfire Hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone (APZ) locations and dimensions and future building 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 2019.

6.2. 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.

6.3. Vegetation

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2019. 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 or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The land to the north, south and west is all cleared for development as part of the Oakdale West Estate. The land to the east is cleared as part of the significant transmission easement. An area of forest exists a significant distance to the south, while Forested Wetland exists on the eastern side of the Transmission Easement (see Figure 5). No vegetation adjoins the 4C or 4D precincts.

6.4. Slopes Influencing Bushfire Behavior

The 'effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2019. 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 buildings.

The slopes adjoining the site are generally flat but given the significant separation of the vegetation from the site, the effective slopes are not relevant (Figure 5).



Legend

- | | |
|-------------------------------|-----------------------------|
| Watercourse | Vegetation Formation |
| Contour - 2m | Forest |
| Electricity Transmission Line | Forested Wetland |
| Subject Land | |



DKGIS

Date: 26/10/2022

0 25 50 100 150

Metres

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

Figure 5: Vegetation and Slope Precincts 4C and 4D.

6.5. Asset Protection Zones

An Asset Protection Zone (APZ) is a buffer zone between a bush fire hazard and buildings. The APZ is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development.

The APZ can include roads or properties managed to be consistent with APZ standards set out in RFS document *Standards for Asset Protection Zones*. The APZ provides a fuel-reduced, physical separation between buildings and bush fire hazards is a key element in the suite of bush fire measures and dictates the type of construction necessary to mitigate bushfire attack.

PBP 2019 requires APZs for commercial and industrial development to provide a defensible space and minimises material ignition. APZs are shown in Table 2 and Figure 6 and are compliant with the intent of PBP 2019.

The site will be managed and maintained to prevent the spread of a bushfire towards the building and to prevent the spread of fire onto or from the site in accordance with section 63 of the *Rural Fires Act 1997* (RF Act).

Table 2: APZ Assessment

Direction	Slope	Vegetation	APZ Proposed
North	NA	No hazard	NA
East	NA	Forested Wetland	>195 metres
South	NA	Forest	>175 metres
West	NA	No hazard	NA



Legend

- Electricity Transmission Line
- Subject Land
- Vegetation Formation
- Forest



Date: 10/01/2023

0 12.5 50 75

Metres

Coordinate System: GDA 1994 MGA Zone 56

Figure 6: Asset Protection Zones

6.6. Bushfire Attack Levels

The Bushfire Attack Level (BAL) is a means of measuring the severity of a buildings or sites potential exposure to ember attack, radiant heat and direct flame contact. In the Building Code of Australia, the BAL is used as the basis for establishing the requirements for construction to improve protection of building elements.

The Bushfire Attack Levels to the site (Tables 5 and 6) have been calculated through site specific radiant heat modelling. As "Other" development, the development must comply with objective 3 of PBP 2019 which requires that the development:

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

Asset Protection Zones (see section 6.5) will be provided around the development and there is considerable separation (>180 metres) from the nearest bushfire prone vegetation. The buildings will be constructed to meet the relevant requirements of AS3959-2018 as identified through the radiant heat modelling consistent with the methodology in PBP 2019.

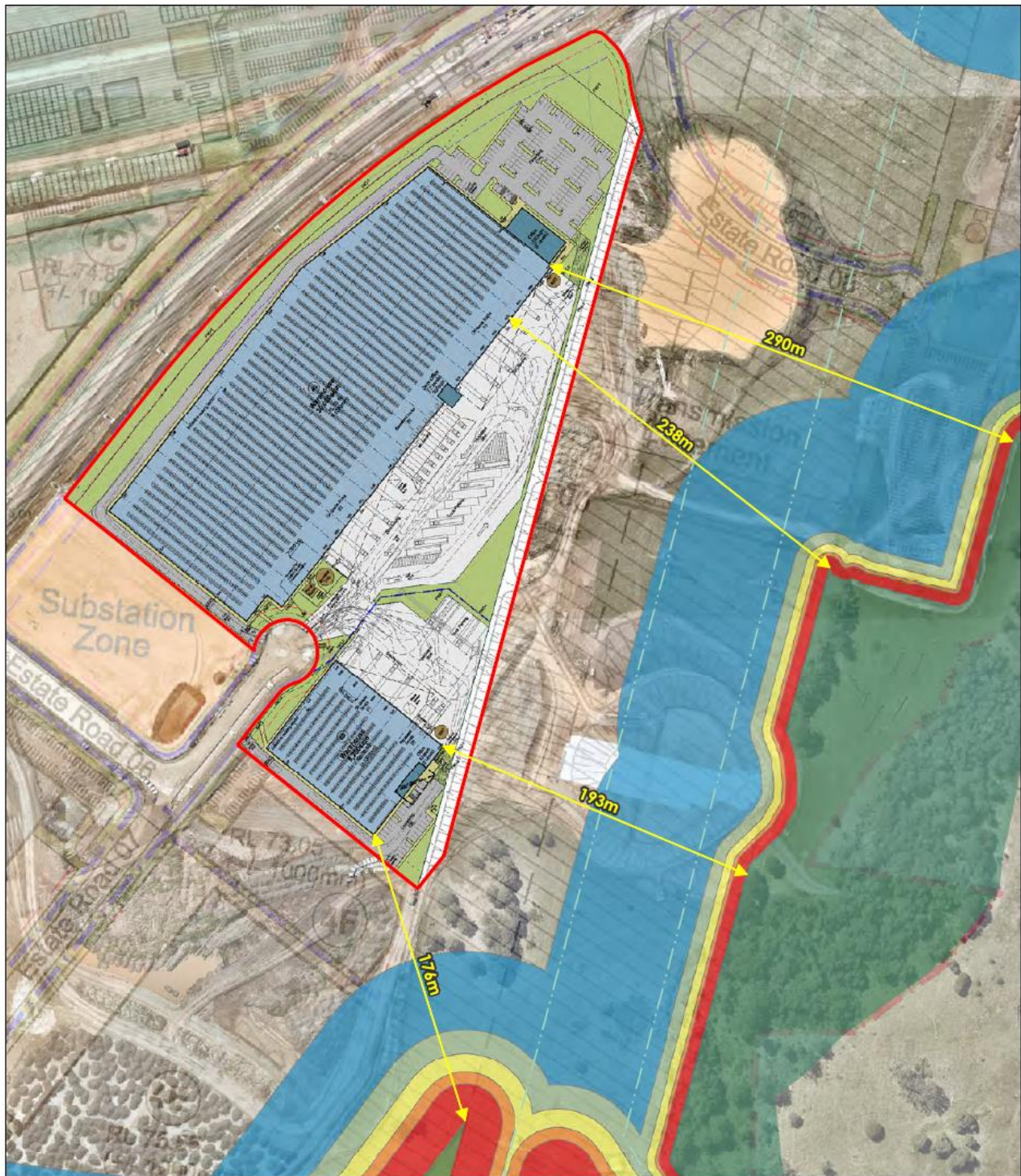
The building requirements for design and construction vary according to the bushfire attack level for the building. The building requirements for each BAL are set out in *Australian Standard: 3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)*.

Detailed BAL mapping has been undertaken for the site (see Figure 7). Table 4 (below) provides a summary of the key modelling inputs across the precincts and Figure 7 depict the BAL. The Bushfire Attack Levels have been determined based on the site assessment methodology in PBP 2019.

Table 4: Bushfire Attack Levels

Direction	Slope	Vegetation	APZ Proposed	BAL
North	NA	No hazard	NA	BAL-Low
East	NA	Forested Wetland	>195 metres	BAL-Low
South	NA	Forest	>175 metres	BAL-Low
West	NA	No hazard	NA	BAL-Low

Given the significant separation from the nearest bushfire hazard, there are no BAL requirements for either proposed warehouse precinct. Notwithstanding, the industrial nature of the buildings means there is considerable inbuilt bushfire resilience.



Legend

Electricity Transmission Line

Subject Land

Vegetation Formation

Forest

Forested Wetland

Bushfire Attack Level (BAL)

BAL - Flame Zone

BAL - 40

BAL - 29

BAL - 19

BAL - 12.5



Date: 10/01/2023

0 12.525 50 75
Metres

Coordinate System: GDA 1994 MGA Zone 56

Figure 7: Bushfire Attack Levels

7. Access

PBP 2019 requires that the design of access roads enables safe access and egress for people attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Figure 3 shows the OWIE Masterplan which includes the access to the site.

Vehicular access to the proposed warehouses will be provided through the estate roads and internal access.

The estate roads and internal access will be constructed to provide heavy rigid and articulated vehicle access to each of the proposed precincts. This road network provides suitable access for fire-fighting appliances like NSW RFS Category 1 Tankers and Fire & Rescue NSW Composite and Aerial Appliances.

Given the low bushfire risk, lack of adjoining bushfire prone vegetation and comprehensive nature of the road design, access complies with the requirements of PBP 2019.

8. Water Supply and Utilities

PBP 2019 (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.

Suitable water supply arrangements will be provided for firefighting that meet the NSW RFS requirements. A reticulated water supply for potable water supply and fire hydrants will be provided to the site. The fire-fighting water supply to the proposed building shall comply with the Building Code of Australia [BCA] and A.S. 2419.1 – 2005.

9. Assessment Against the Aim and Objectives of PBP

All development on Bushfire Prone Land needs to comply with the aim and objectives of PBP. Table 6 shows the compliance with PBP.

Table 6: Compliance with Aim & Objectives of PBP

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	Landscaping, defensible space, access and egress, emergency risk management and construction standards are in accordance with the requirements of PBP and the aims of PBP have been achieved.
Objectives	Meets Criteria	Comment
Afford occupants of any building adequate protection from exposure to a bushfire.	Yes	The development provides opportunity for all occupants to be shielded from any external bushfire. Construction material will comply with the relevant AS3959 requirements.
Provide for a defensible space to be located around buildings.	Yes	Defensible space is provided on all sides of the proposed building.
Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings.	Yes	The building is separated from the vegetation and is provided significant APZs and commensurate construction in accordance with AS3959.
Ensure that safe operational access and egress for emergency service personnel and occupants is available.	Yes	The site has direct access to public roads, and access and egress for emergency vehicles and evacuation is adequate. The development provides for the movement of heavy articulated trucks about the site.
Provide for ongoing management and maintenance of bushfire protection measures.	Yes	The site will be managed by Goodman including all APZ and landscaping in accordance with PBP.
Ensure that utility services are adequate to meet the needs of firefighters.	Yes	Utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting).

The suite of bushfire protection measures provided for the proposed development satisfies the objectives for buildings of Class 5-8 under the NCC as identified in section 8.3.1 of PBP 2019.

10. Recommendations

Given the considerable separation of the warehouses from the nearest bushfire hazard and the inherent resilience of the buildings and overall design, there are no additional measures/recommendations.

11. Conclusion

The Bushfire Hazard Assessment to support a Development Application (DA) for the construction of Precincts 4C and 4D at the Oakdale West Estate (OWIE).

The site is on bushfire prone land. Commercial and industrial development is designated as “other” development in PBP 2019. 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 specified by PBP and AS3959.

The proposed new buildings within Precincts 4C and 4D can respond and implement an appropriate level of bushfire protection measures over and above that required by PBP 2019.

This Report is a Bush Fire Hazard Assessment that provides the required information to assist Penrith City Council in determining compliance in accordance with the aims and objectives of *Planning for Bushfire Protection 2019*.



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Blackash Bushfire Consulting
B.Sc., Grad. Dip. (Design for Bushfire Prone Areas)
Fire Protection Association of Australia BPAD Level 3 - 34603



Appendix 1 References

Australian Building Codes Board Building Code of Australia Volumes 1&2

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

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