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Bushfire Protection Assessment

Industrial Development

Aerotropolis Core – AMRF First Building

Western Parkland City Authority

DOCUMENT TRACKING

Project Name	Bushfire Protection Assessment – Industrial Development – AMRF First Building
Project Number	21SUT_19533
Project Manager	Deanne Hickey
Prepared by	Kate Mannell / Deanne Hickey
Reviewed by	Bruce Horkings FPAA BPAD Certified Practitioner No. BPAD29962-L3
Approved by	Bruce Horkings FPAA BPAD Certified Practitioner No. BPAD29962-L3
Status	Final
Version Number	v2
Last saved on	12 November 2021

This report should be cited as 'Eco Logical Australia 2021. *Bushfire Protection Assessment – Industrial Development – AMRF First Building*. Prepared for Western Parkland City Authority.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Hassell.

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Template 2.8.1

Contents

1. Executive Summary	1
1.1 The Secretary’s Environmental Assessment Requirements	1
2. Property and proposal	1
2.1 Description of proposal	1
2.2 Assessment process	1
2.3 Significant environmental features	2
3. Bushfire hazard assessment	4
3.1 Process	4
3.2 Vegetation assessment	4
3.3 Slope assessment	4
3.4 Summary of assessment	4
4. Bushfire Protection Measures	7
4.1 Specific aim and objectives for industrial/commercial development	7
4.2 Specific objectives for Class 5-8 buildings	8
4.3 Asset Protection Zones	8
4.4 Access	9
4.5 Water supplies	11
4.6 Electricity services	12
4.7 Gas services	12
4.8 Construction standards	13
4.8.1 Bushfire Attack Level (BAL)	13
4.8.2 Construction requirements	13
4.8.3 Ember protection measures	13
4.8.4 Fences and gates	14
4.9 Landscaping	14
4.10 Staged development	15
4.11 Emergency and Evacuation Planning	15
5. Conclusion	16
6. Recommendations	17
7. References	18
Appendix A - Asset protection zone and landscaping standards	19
Appendix B - Emergency Service Vehicle Access	20

List of Figures

Figure 1: First Building site plan	3
Figure 2: Bushfire Hazard Assessment	6
Figure 3: Proposed access roads, including public roads to be constructed to support First Building (shown in grey).....	9
Figure 4: Roller shutter door installation (SA 2018).....	14

List of Tables

Table 1 How the Report Addresses the SEARs	1
Table 3: Subject site and development proposal summary.....	1
Table 4: Summary of bushfire protection measures assessed.....	2
Table 4: Bushfire hazard assessment, APZ requirements and BALs	5
Table 5: APZ requirements and compliance (adapted from Table 7.4a of PBP)	8
Table 6: General access requirements (adapted from Table 5.3b of PBP)	10
Table 7: Perimeter road requirements (adapted from Table 5.3b of PBP).....	11
Table 8: Water supply requirements (adapted from Table 7.4a of PBP)	11
Table 9: Requirements for the supply of Electricity services (adapted from Table 7.4a of PBP)	12
Table 10: Requirements for the supply of gas services (adapted from Table 7.4a of PBP)	12
Table 11: Construction requirements (adapted from Table 7.4a of PBP).....	13
Table 12: Landscaping requirements and compliance (adopted from Table 7.4a of PBP)	15
Table 13: Development Bushfire Protection Solutions and Recommendations.....	16
Table 14: APZ management specifications	19

Abbreviations

Abbreviation	Description
AS 3959	Australian Standard AS 3959-2018 <i>Construction of buildings in bushfire prone areas</i>
APZ	Asset protection zone
BAL	Bushfire attack level
BFPL	Bush fire prone land
BPM	Bushfire protection measures
DCP	Development control plan
FDI	Fire danger index
IPA	Inner protection area
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
PBP	Planning for Bush fire Protection 2019
RFS	NSW Rural Fire Service

1. Executive Summary

This report is a Bushfire Protection Assessment for the proposed First Building within the Bradfield City Centre site off 215 Badgerys Creek Road, Bringelly. The site is located in the Liverpool City local government area (LGA) and part of the Aerotropolis Core Precinct and is zoned land under the State Environmental Planning Policy (Western Sydney Aerotropolis) 2020. Consistent with the above, this report has been prepared to support a State Significant Development Application (SSD-25452459) under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The proposal was assessed in accordance with *Planning for Bush Fire Protection* (RFS 2019), herein referred to as PBP. The proposal is for a commercial development and therefore, has been assessed in accordance with the aim and objectives of PBP. Chapter 7 of PBP has been utilised as a guide in developing relevant bushfire protection measures (BMP) commensurate with the bushfire risk to the site.

The proposed development meets the specific objectives of PBP subject to the implementation of recommendations in relation to Asset Protection Zones (APZs), access, water supply, electricity service, gas service, construction standards and Landscaping.

1.1 The Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) have been issued in respect of the proposal. The SEARs require a bushfire assessment of the development. Table 1 below indicates the areas of the report that address each of these components.

Table 1 How the Report Addresses the SEARs

Key Issue of SEAR	Addressed by Section of the Report
Bushfire - including a bushfire assessment report that addresses the aims and objectives of Planning for Bush Fire Protection (NSW Rural Fire Service, 2019), and includes: <ul style="list-style-type: none"> - details of proposed operational access for emergency services personnel - details of emergency and evacuation arrangements for occupancy/ visitors. 	<ul style="list-style-type: none"> • Section 2.2 presents requirements of Planning for Bush Fire Protection • Section 3 present the bushfire hazard assessment • Section 4 presents bushfire protection measures, with Section 4.4 specifically addressing access and Section 4.10 addressing evacuation

2. Property and proposal

Table 2 identifies the subject property and outlines the type of development proposed.

Table 2: Subject site and development proposal summary

Street address:	215 Badgerys Creek Road, Bringelly
Postcode:	2556
Lot/DP no:	Lot 10 DP 1235662 (Existing)
Local Government Area:	Liverpool City Council
Fire Danger Index (FDI)	100
Current land zoning:	ENT – Enterprise, MU – Mixed Use
Type of development proposed:	Commercial Building

2.1 Description of proposal

The proposal is for an advanced manufacturing and research facility (AMRF), referred to herein as the First Building (Figure 1). The First Building is located in the proposed Aerotropolis Core Precinct, situated within the Bradfield City Centre Masterplan.

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 proposed development is mixed use, with areas identified as either Building Class 5 or 8 and an approximate footprint of 2,675 m². The building class or primary operational use as an AMRF is not considered Special Fire Protection Purpose development (SFPP) under PBP.

The site is identified as Bush Fire Prone Land (BFPL) on the Bushfire Prone Land layer within the ePlanning Spatial Viewer¹.

2.2 Assessment process

The proposal was assessed in accordance with *Planning for Bush Fire Protection* (RFS 2019), herein referred to as PBP.

The proposal is for a commercial development and therefore, has been assessed in accordance with the aim and objectives of PBP, including consideration to section 8.3.1 (buildings of Class 5 to 8) and 8.3.10 (commercial and industrial development) of PBP. Chapter 7 of PBP has been utilised as a guide in developing relevant bushfire protection measures (BMP) commensurate with the bushfire risk to the site.

¹ <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

This assessment is based on the following information sources:

- Background documentation provided by Western Parkland City Authority;
- Information contained within the site plan prepared by Hassell, 015842 AMRF – First Building, October 2021;
- GIS analysis including online spatial resources (i.e. Near Maps and the NSW Government Planning Portal); and
- Site inspection undertaken 5 October 2021.

Table 3 identifies the BPM assessed in this report.

Table 3: Summary of bushfire protection measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.3
Access	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.4
Water supplies	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0
Electricity services	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.6
Gas services	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.7
Construction standards	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.8
Landscaping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.9

2.3 Significant environmental features

An assessment of significant environmental features, threatened species, populations or ecological communities under the *Biodiversity Conservation Act 2016* that may potentially be affected by the proposed bushfire protection measures has not been undertaken in this report as it is covered by other parts of the Development Application (DA) process.

The impact footprint of the BPM (e.g. Asset Protection Zone (APZ)) is clearly identified within this report and therefore capable of being assessed by suitably qualified persons as required. Liverpool City Council is the determining authority for this development; they will assess more thoroughly any potential environmental issues.

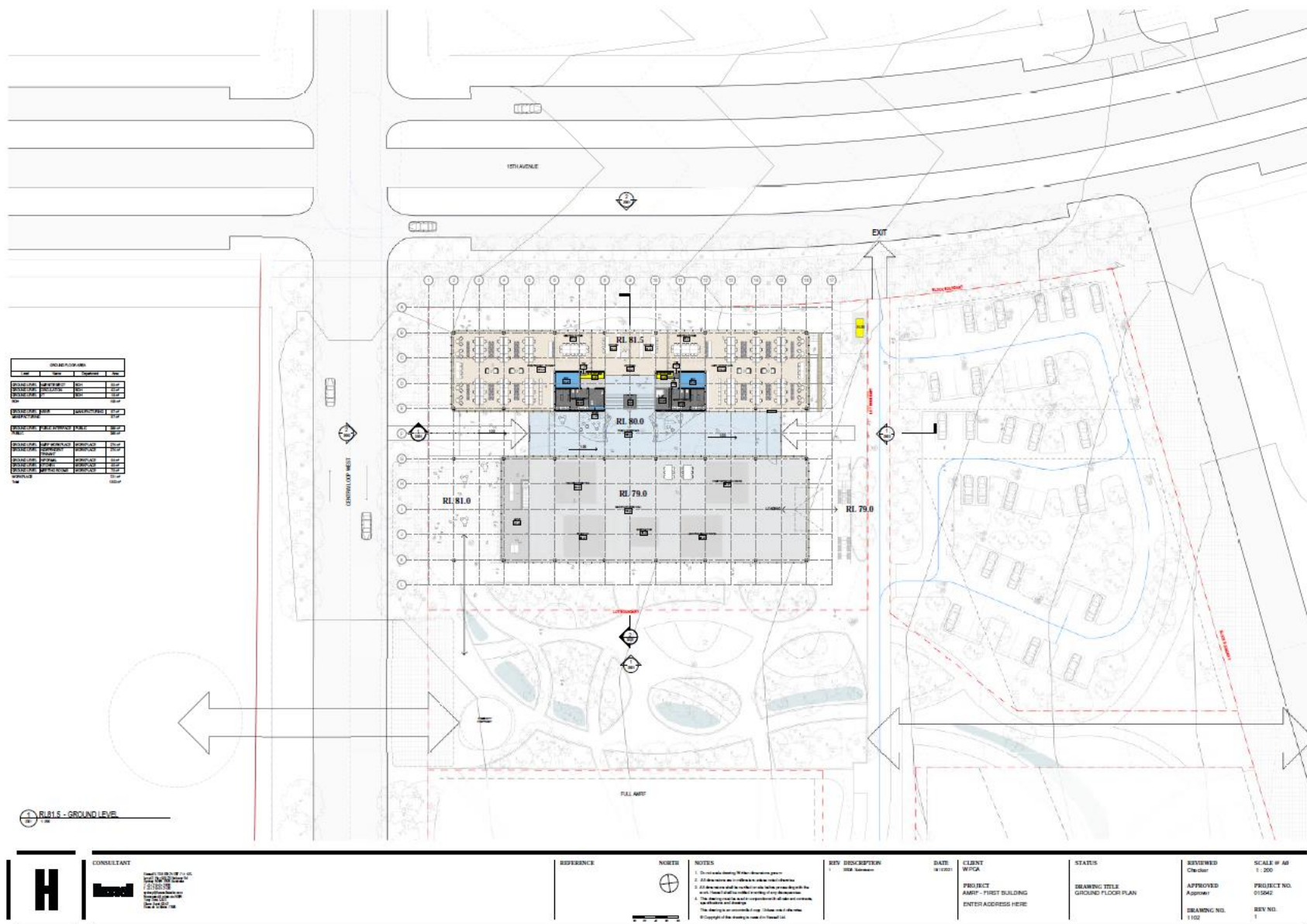


Figure 1: First Building site plan

3. Bushfire hazard assessment

3.1 Process

The site assessment methodology set out in Appendix 1 of PBP has been utilised in this assessment to determine the APZ requirements. Figure 2 and Table 4 show the effective slope and predominant vegetation representing the highest bushfire threat potentially posed to the development from various directions.

3.2 Vegetation assessment

In accordance with PBP, the predominant vegetation formation has been assessed for a distance of at least 140 m from the subject land in all directions.

The predominant vegetation has been determined from online vegetation maps (DPIE 2015) and previous site assessment works in the region.

As shown in Figure 2, to the north of the site is an Environmental and Recreation Zone (ENZ), along with two proposed Land Reservation Acquisition Lots (north and north-west). These areas correspond to future open space areas and it is likely that some of the existing woodland hazard will remain. Therefore, the hazard to the north and north-west has been assessed as woodland.

To the east and south lies a temporary grassland hazard. Within the subject land, the grassland hazard will be removed through the management of a temporary 50 m APZ.

Land to the west and south-west is managed.

3.3 Slope assessment

In accordance with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the proposed development under the classified vegetation.

The effective slope has been determined from 2 m contour data.

3.4 Summary of assessment

As shown in Figure 2 the predominant bushfire threat to the proposed development is woodland and unmanaged grassland.

The grasslands hazards are considered temporary in nature and will be removed as the broader Aerotropolis precinct is activated and further development occurs.

Table 4: Bushfire hazard assessment, APZ requirements and BALs

Transect #	Slope	Vegetation Formation	Residential APZ	Recommended APZ	Comments
1 (North-west)	All upslope and flat land	Grassy and semi-arid woodland	12 m	≥50 m	APZ provided within subject land boundary and proposed road corridor
2 (North)	All upslope and flat land	Grassy and semi-arid woodland	12 m	≥49 m	APZ provided within subject land boundary and proposed road corridor.
3 (East)	>0° to 5° downslope	Grassland	12 m	≥50 m	APZ provided wholly within subject land boundary.
4 (South)	>0° to 5° downslope	Grassland	12 m	≥50 m	APZ provided within subject land boundary and road corridor.

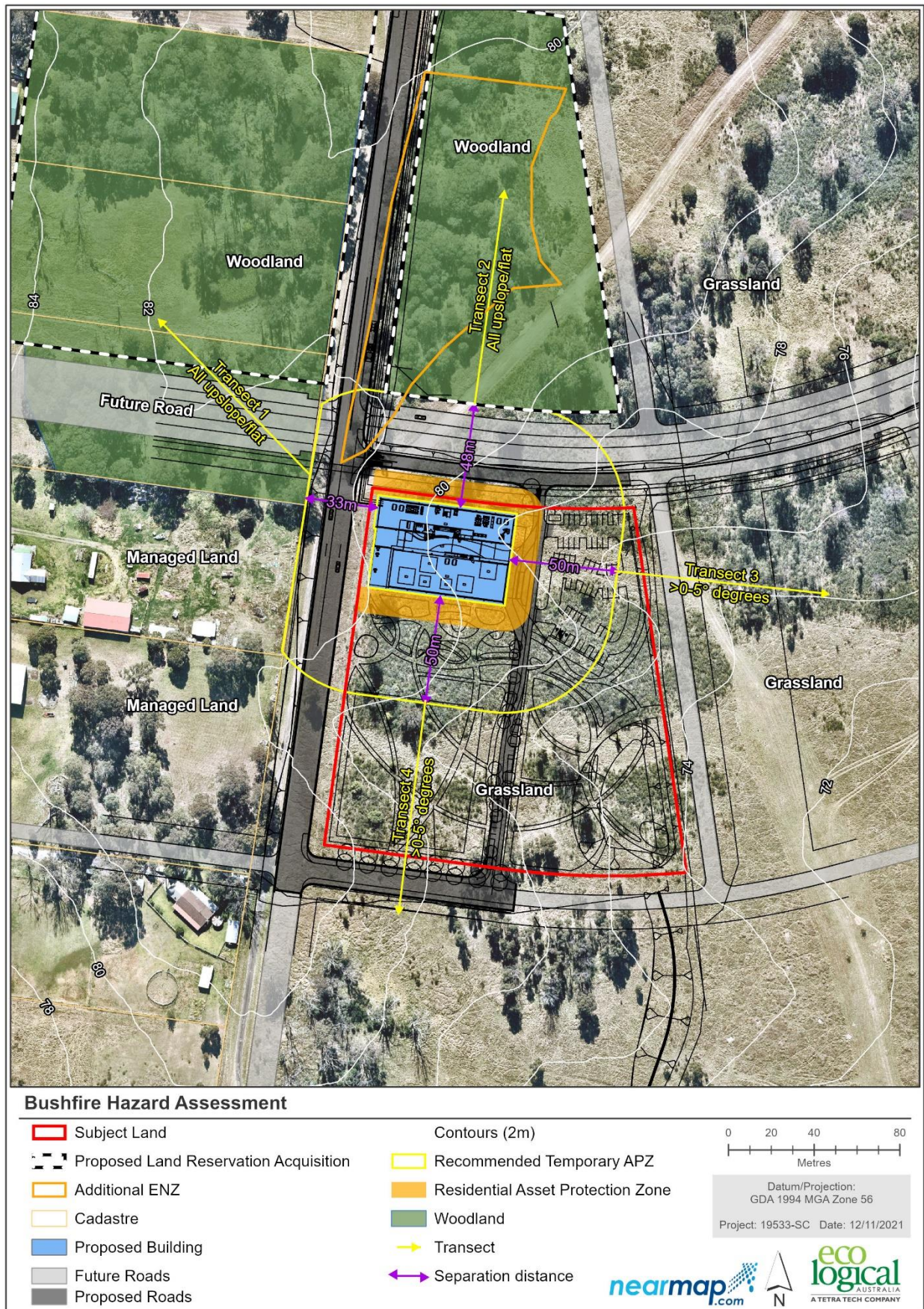


Figure 2: Bushfire Hazard Assessment

4. Bushfire Protection Measures

4.1 Specific aim and objectives for industrial/commercial development

Below is the Aim of PBP and the Specific Objectives for industrial/commercial development and a comment on how they are achieved. As directed in Section 8.3.10 of PBP, the BPM identified in Chapter 7 (of PBP) have been used as the baseline (where applicable), and either the acceptable solution or performance criteria has been achieved:

- **Aim** - 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 proposed development complies with the aim of PBP by achieving the specific objectives for industrial / commercial development identified below.
- **Specific Objective 1** - *afford buildings and their occupants protection from exposure to a bush fire;*
 - The development provides protection from exposure by way of defensible space by adequate APZ and perimeter access as shown in Figure 2.
 - The internal road links to the public road network to the west and east, and complies with Section 7 of PBP providing safe evacuation routes for future occupants.
- **Specific Objective 2** - *provide for a defensible space to be located around buildings;*
 - The site provides a defensible space by way of perimeter access/road and temporary APZ as shown in Figure 2.
- **Specific Objective 3** - *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;*
 - The development design provides opportunity to achieve suitable defensible space between the hazard and building.
 - Perimeter access by public road on three boundaries is provided.
 - Pedestrian access on the southern boundary and management of a temporary APZ enables emergency service personal adequate operational area for prevention of fire spread.
- **Specific Objective 4** - *ensure that appropriate operational access and egress for emergency service personnel and occupants is available;*
 - The Aerotropolis precinct development will enable access to the development via public roads at two locations, affording safe operational access/egress to emergency services as shown in Figure 2 and demonstrated further in Section 4.
- **Specific Objective 5** - *provide for ongoing management and maintenance of BPM; and*
 - The entire development site can be managed as an Inner Protection Area (IPA) as per the specifications outlined in Appendix A.
- **Specific Objective 6** - *ensure that utility services are adequate to meet the needs of firefighters.*
 - The development is capable of complying with the acceptable solutions for utilities under Section 7 of PBP and specific objectives outlined in Section 4 of this report.

4.2 Specific objectives for Class 5-8 buildings

Below are the Specific Objectives for Class 5 - 8 buildings and a comment on how they are achieved.

- **Specific Objective 1** - *provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation.*
 - As shown in Figure 2 and demonstrated further in Section 4.4 of this report, the proposed development has direct access to the proposed public road system of the Aerotropolis precinct, providing safe access/egress for both firefighters and occupants.
- **Specific Objective 2** - *provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.*
 - An emergency plan, meeting requirements of the Work Health safety Regulation 2017 and relevant legislation, is to be prepared for the building prior to Occupation Certificate.
- **Specific Objective 3** - *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.*
 - The proposed development will be serviced by reticulated water. Electricity to the development is underground and complies with PBP. Supply of gas (if any) will be installed and maintained in accordance with Section 4.6 of this report.
- **Specific Objective 4** - *provide for the storage of hazardous materials away from the hazard wherever possible.*
 - The building will be required to store any hazardous materials (if any) in accordance with the relevant safety guidelines and safety data sheets.

4.3 Asset Protection Zones

Table 5 shows the dimensions of the required APZ and where relevant, information on how the APZ is to be provided is included. The footprint of the APZ is also shown on Figure 2: Bushfire Hazard Assessment.

The compliance of the proposed APZ with regards to Section 7.4 of PBP, is detailed in Table 5.

Table 5: APZ requirements and compliance (adapted from Table 7.4a of PBP)

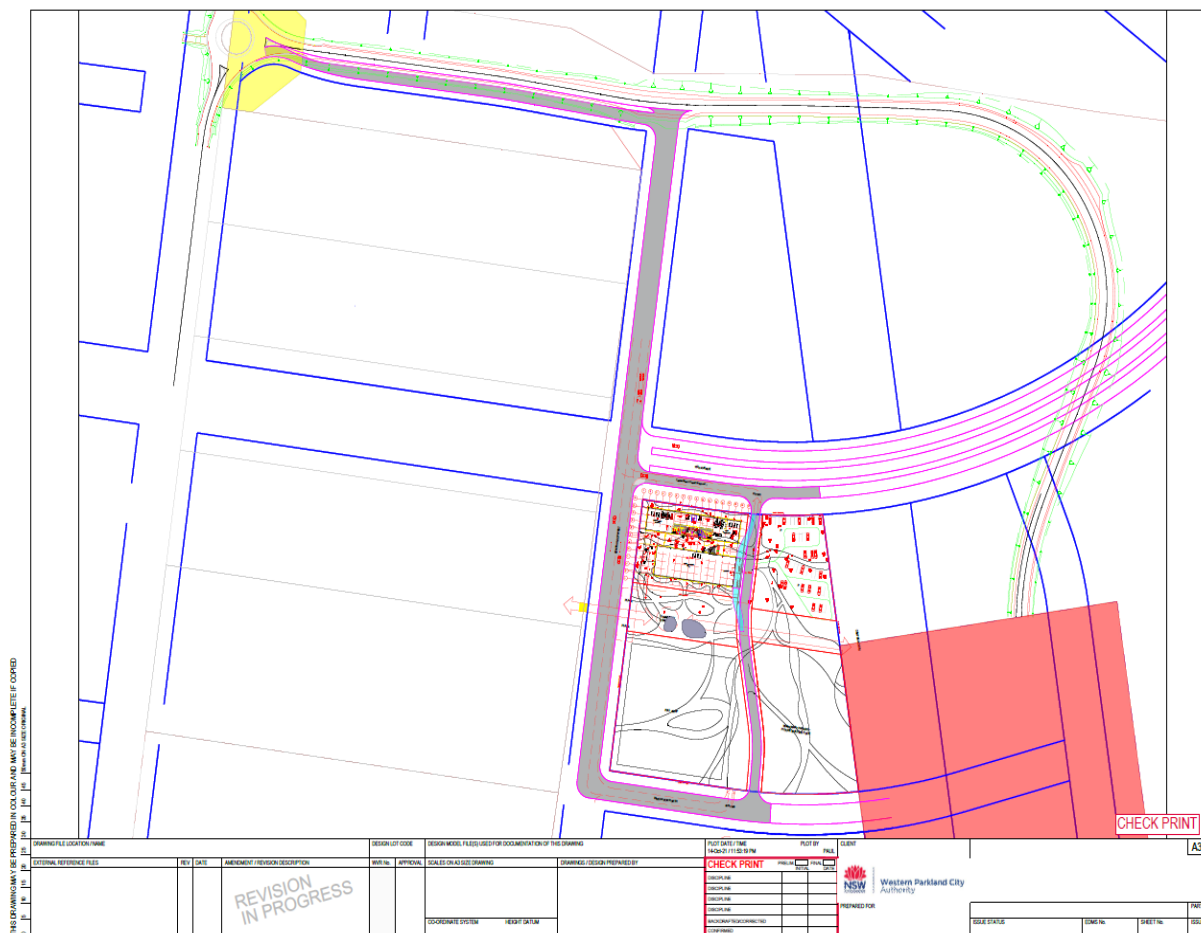
Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
APZs are provided commensurate with the construction of the building; and A defensible space is provided.	An APZ is provided in accordance with Table A1.12.2 in Appendix 1.	Complies APZ provided in accordance with Table A1.12.2 as shown in Table 4 and Figure 3.
APZs are managed and maintained to prevent the spread of a fire to the building	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	To comply APZ to be managed in accordance with PBP. Fuel management specifications provided in Appendix A.

Performance Criteria	Acceptable Solutions	Compliance Notes
The APZ is provided in perpetuity. APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are wholly within the boundaries of the development site or by public roads.	Complies Complies with performance criteria, APZ located within the development boundary and public road.
	APZ are located on lands with a slope less than 18 degrees.	Complies APZ is not located on slopes greater than 18°.

4.4 Access

Access to and within the proposed development (Figure 3) can meet the specific objectives of PBP (Section 4.1 and 4.2) as outlined in Table 6 below.

Table 7 provides additional information regarding perimeter access for public roads to be constructed



to support the development.

Figure 3: Proposed access roads, including public roads to be constructed to support First Building (shown in grey).

Table 6: General access requirements (adapted from Table 5.3b of PBP)

Performance Criteria	Acceptable Solutions	Compliance notes
The intent may be achieved where:		
Firefighting vehicles are provided with safe, all-weather access to structures.	Property access roads are two-wheel drive, all-weather roads;	Complies All roads will be sealed, two-wheel drive.
	Perimeter roads are provided for residential subdivisions of three or more allotments;	Complies Perimeter road to be constructed as part of broader development.
	Subdivisions of three or more allotments have more than one access in and out of the development;	Complies Access provided to site via public roads to the north and west.
	Traffic management devices are constructed to not prohibit access by emergency services vehicles;	Complies .
	Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;	Complies Maximum grade does not exceed standard
	All roads are through roads;	Complies All proposed roads are through roads.
	Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	Complies No dead-end roads proposed.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;	To comply Details not provided at this stage.
	Where access/egress can only be achieved through forest, woodland or heath vegetation, secondary access shall be provided to an alternate point on the existing public road system;	Complies Access/egress traverses managed lands and along a riparian corridor.
	One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	Complies.
The capacity of access roads is adequate for firefighting vehicles.	The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.	To comply Details not provided at this stage.
There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;	To comply Details not provided at this stage.
	Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2017 – Fire hydrant installations system design, installation and commissioning; and	To comply Details not provided at this stage.

There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.	Not applicable Reticulated water supply proposed.
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Table 7: Perimeter road requirements (adapted from Table 5.3b of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Are two-way sealed roads;	Complies All public roads two-way sealed
	Minimum 8 m carriageway width kerb to kerb;	Complies Perimeter roads carriageway widths are minimum 8 m
	Parking provided outside of the carriageway width;	Complies Parking to be provided outside carriageway.
	Hydrants are located clear of parking areas;	Can comply Details not provided at this stage.
	There are through roads, and these are linked to the internal road system at an interval of no greater than 500 m;	Complies All proposed roads are through roads and they link to the internal road system as interval of ≤ 500 m
	Curves of roads have a minimum inner radius of 6 m;	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 5.3b of PBP.
	The maximum grade road is 15 degrees and average grade is 10 degrees;	
	The road crossfall does not exceed 3 degrees;	
	A minimum vertical cleared of 4 m to any overhanging obstructions, including tree branches, is provided.	

4.5 Water supplies

The compliance of the proposed water supply with Section 7.4 of PBP is detailed in Table 8.

Table 8: Water supply requirements (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development where available; A static water supply is provided where no reticulated water is available.	Can comply The development will be serviced by a reticulated water supply.

Performance Criteria	Acceptable Solution	Compliance Notes
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations.	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1 (SA 2005); Hydrants are not located within any road carriageway; and Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 7.4a of PBP.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1 (SA 2005).	
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps; and Above-ground water storage tanks shall be of concrete or metal.	

4.6 Electricity services

The compliance of the proposed supply of electricity services with Section 7.4 of PBP is detailed in Table 9.

Table 9: Requirements for the supply of Electricity services (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Where practicable, electrical transmission lines are underground; Where overhead, electrical transmission lines are proposed as follows: Lines are installed with short pole spacing (30 m), unless crossing gullies, gorges or riparian areas; and No part of a tree is closer to a power line than the distance set out in ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets (ISSC3 2016).	Can comply Electricity services to the development will be located underground. Not applicable.

4.7 Gas services

The compliance of the proposed supply of gas services (reticulated or bottle gas) with Section 7.4 of PBP is detailed in Table 10.

Table 10: Requirements for the supply of gas services (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 – The Storage and handling of LP gas (2014), the requirements of relevant authorities, and metal piping is used; All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 m and shielded on the hazard side; Connections to and from gas cylinders are metal;	Can comply The advice of a relevant authority or suitably qualified professional should be sought, for certification of design and installation in accordance with relevant legislation, Australian

Performance Criteria	Acceptable Solution	Compliance Notes
	Polymer-sheathed flexible gas supply lines are not used; and Above-ground gas service pipes are metal, including and up to any outlets.	Standards and table 5.3c of PBP.

4.8 Construction standards

The building construction standard is generally based on the determination of the BAL in accordance with Appendix 1 of PBP. The BAL is based on known vegetation type, effective slope and managed separation distance between the development and the bushfire hazard.

The compliance of the proposed construction with Section 7.4 of PBP is detailed in Table 11.

Table 11: Construction requirements (adapted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.	BAL is determined in accordance with Tables A1.12.5 to A1.12.6 of PBP; and	Complies BAL determined using Table A1.12.5 of PBP.
	Construction provided in accordance with the NCC and as modified by Section 7.5 of PBP.	Complies with performance criteria No specific requirements for bushfire related construction under the NCC for this building class. See Section 4.8.2 for further detail.
Proposed fences and gates are designed to minimise the spread of bush fire.	Fencing and gates are constructed in accordance with Section 7.6 of PBP.	Can comply Specification detailed in Section 4.8.4 of this report.
Proposed Class 10a buildings are designed to minimise the spread of bush fire.	Class 10a buildings are constructed in accordance with Section 8.3.2 of PBP.	Not applicable No Class 10a buildings proposed.

4.8.1 Bushfire Attack Level (BAL)

The proposed development is exposed to **BAL-12.5**.

4.8.2 Construction requirements

As stated within Section 8.3.1 of PBP, National Construction Code (NCC) Class 5 to 8 buildings (which include offices, factories, warehouses and other commercial or industrial facilities) do not have specific bushfire performance requirements under the NCC and as such building construction standards under AS 3959:2018 (SA 2018) or the NASH standard (NASH 2014) do not apply as a set of deemed to satisfy provisions.

New construction shall be in accordance with the general fire safety provisions of the NCC and incorporate the additional ember protection measures listed in Section 4.8.3 below.

4.8.3 Ember protection measures

The additional ember protection measures based on the requirements of AS 3959 are as follows:

- The roof/wall junctions are to be sealed/screened with aluminium, steel or bronze mesh with a minimum aperture size of 2 mm;
- All openable portions of windows to be screened with aluminium, steel or bronze mesh with a minimum aperture size of 2 mm;
- The base of side-hung external doors shall be fitted with draught excluders/draught seals/weather strips;
- Gutters should be fitted with non-combustible gutter guard to prevent the build-up of combustible material;
- The rollers doors shall be protected with suitable weather strips/draught excluders/draught seals or brushes (Figure 4). If fitted with guide tracks no edge gap protection required; and
- Roller shutter doors with ventilation slots shall be protected with non-combustible mesh with 2 mm aperture.

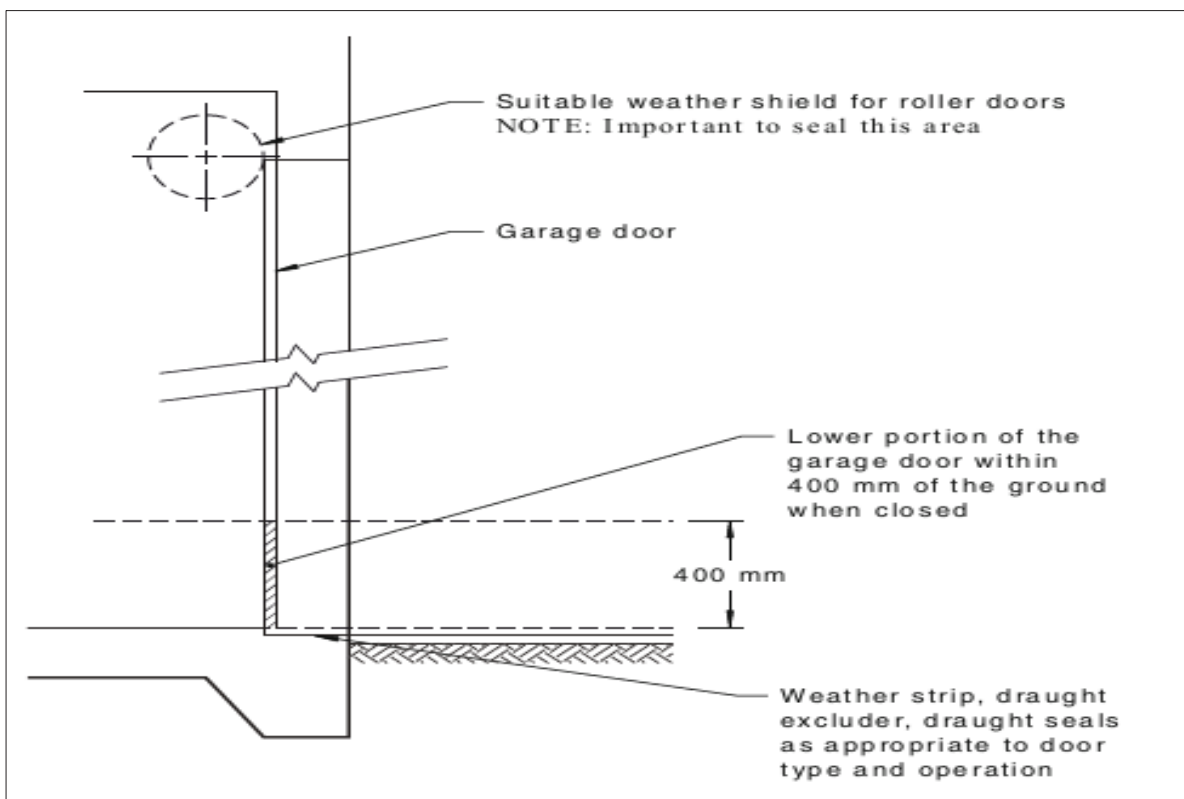


Figure 4: Roller shutter door installation (SA 2018)

4.8.4 Fences and gates

To comply with Section 7.6 of PBP, all fencing and gates are to be constructed of hardwood or non-combustible material. Where fencing connects directly to any proposed building or in areas of BAL-29 or greater, they should be made of non-combustible material.

4.9 Landscaping

The compliance of the proposed landscaping with Section 7.4 of PBP is detailed in Table 12.

Table 12: Landscaping requirements and compliance (adopted from Table 7.4a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Compliance with the NSW RFS 'Asset protection zone standards' (Appendix 4 PBP);	To comply APZ / Landscaping is to be managed in accordance with PBP, as detailed in Section 4.9.
	A clear area of low-cut lawn or pavement is maintained adjacent to the house;	
	Fencing is constructed in accordance with Section 7.6 of PBP.	To comply Fencing to be constructed in accordance with Section 7.6 of PBP (see Section 4.8.4)
	Trees and shrubs are located so that: <ul style="list-style-type: none"> - the branches will not overhang the roof; - the tree canopy is not continuous; and - any proposed wind break is located on the elevation from which fires are likely to approach. 	To comply APZ / Landscaping is to be managed in accordance with PBP. Landscaping specifications provided in Section 4.9.

4.10 Staged development

The proposed development will not be staged.

4.11 Emergency and Evacuation Planning

Due to the nature and use of the proposed development, and due to the surrounding bushfire hazard being removed/reduced over time an emergency plan meeting the requirements of the Work Health safety Regulation 2017, relevant legislation and building requirement of the NCC is considered suitable and commensurate to risk for this development.

5. Conclusion

The proposed development meets the specific objectives of *'Planning for Bush Fire Protection 2019'*, as outlined in Table 13 below.

Table 13: Development Bushfire Protection Solutions and Recommendations

Bushfire Protection Measures	Recommendations	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	This assessment indicates the proposed development will comply with the PBP APZ performance criteria (Figure 2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.3
Access	Access to meet specific objectives as per Section 4.4 of this report.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.4
Water supply	Reticulated water supply to meet PBP acceptable solution specifications.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	0
Electricity service	Electricity supply located underground.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.6
Gas service	Gas services are to be installed and maintained in accordance with AS/NZS 1596:2014.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.7
Construction standard	The development is to be constructed in accordance with the general fire safety provisions of the NCC and incorporate the additional ember protection measures listed in Section 4.8.2 below.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.8
Landscaping	Any future landscaping meets the requirements of PBP listed in Section 4.9.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.9

6. Recommendations

It is recommended that the proposed development be approved with consent conditions based on the findings in Table 13.



Deanne Hickey
Senior Environmental Consultant



Bruce Horkings
Senior Bushfire Consultant
FPAA BPAD Accredited Practitioner No. BPAD29962-L3



7. References

- Department of Planning, Industry and Environment (DPIE). 2015. *Remnant Vegetation of the western Cumberland subregion, 2013 Update. VIS_ID 4207*. Sharing and Enabling Environmental Data, NSW Government.
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- National Association of Steel Framed Housing (NASH). 2014. *Steel Framed Construction in Bush Fire Prone Areas*. NASH
- NSW Rural Fire Service (RFS). 2019. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Homeowners* - issued December 2019. Australian Government Publishing Service, Canberra.
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- Standards Australia (SA). 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014. SAI Global, Sydney.
- Standards Australia (SA). 2018. *Construction of buildings in bushfire-prone areas*, AS 3959:2018. SAI Global, Sydney.

Appendix A - Asset protection zone and landscaping standards

The following APZ management specifications in Table 14 apply to the APZs specified in Table 4. These APZ management specifications should be considered for any landscaping and ongoing management within the subject land.

The APZs identified in Table 4 are to be maintained in perpetuity and management undertaken on an annual basis (as a minimum) and prior to the commencement of the fire season.

Further details on APZ implementation and management can be found on the NSW RFS website (<https://www.rfs.nsw.gov.au/resources/publications>).

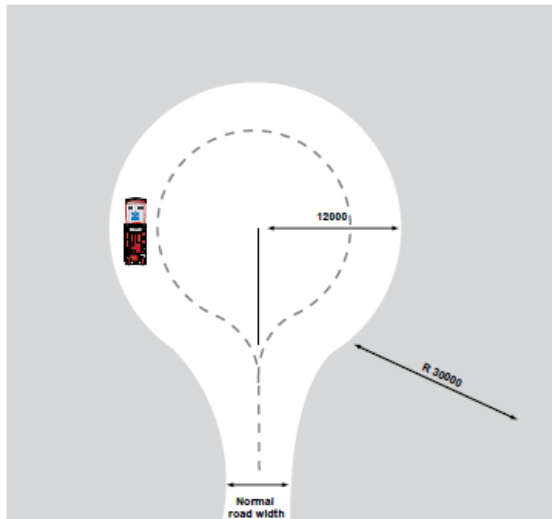
Table 14: APZ management specifications

Vegetation Strata	Inner Protection Area (IPA)
Trees	<p>Tree canopy cover should be less than 15% at maturity;</p> <p>Trees (at maturity) should not touch or overhang the building;</p> <p>Lower limbs should be removed up to a height of 2 m above ground;</p> <p>Canopies should be separated by 2 to 5 m; and</p> <p>Preference should be given to smooth barked and evergreen trees.</p>
Shrubs	<p>Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;</p> <p>Shrubs should not be located under trees;</p> <p>Shrubs should not form more than 10% ground cover; and</p> <p>Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.</p>
Grass	<p>Should be kept mown (as a guide grass should be kept to no more than 100 mm in height); and</p> <p>Leaves and vegetation debris should be removed.</p>

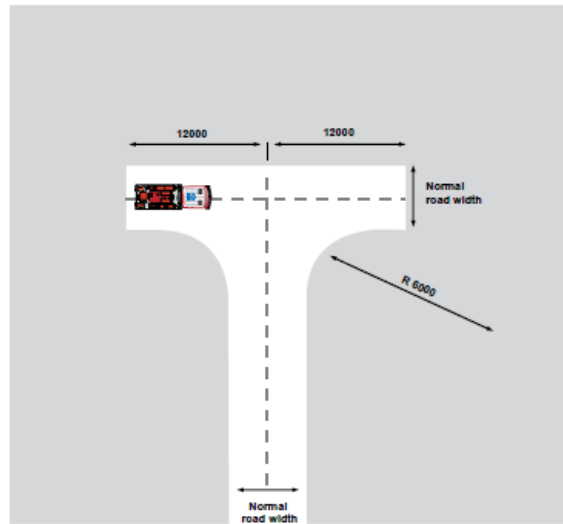
Appendix B - Emergency Service Vehicle Access

As per Appendix 3 of PBP (2019).

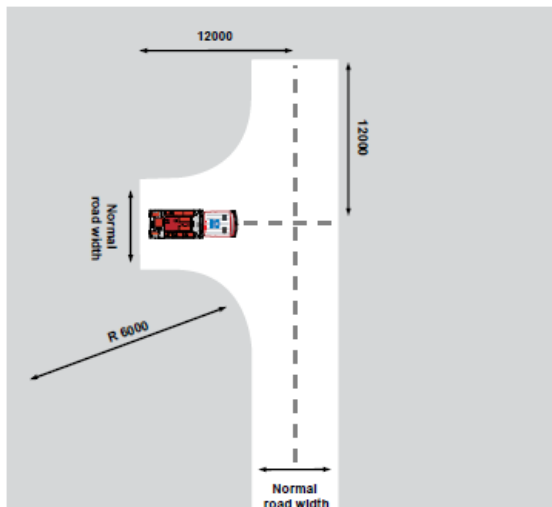
Type A



Type B



Type C



Type D

