

A decorative background on the left side of the page consisting of light green topographic contour lines. The lines are irregular and wavy, representing elevation changes. They are most dense in the lower-left quadrant and become sparser towards the top and right.

Bushfire Protection Assessment

Subdivision and Mixed-use Development

25 Moss Vale Road, Bomaderry

Southern Cross Community Housing Ltd

DOCUMENT TRACKING

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LIMITATIONS

The bushfire protection measures recommended in this report do not completely remove the risk to life and property, and they do not guarantee that a development will not be impacted by a bushfire event. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of fire, and extreme weather conditions.

ACKNOWLEDGEMENTS

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Template 2.1.2

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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
CDC	Complying Development Certificate
DA	Development Application
DtS	Deemed-to-Satisfy
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
FDI	Fire Danger Index
FDR	Fire Danger Rating
IPA	Inner Protection Area
LEP	Local Environmental Plan
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bush fire Protection 2019
RF Act	<i>Rural Fires Act 1997</i>
RMS	Roads and Maritime Services
RFS	NSW Rural Fire Service
VB	Vegetation Buffer
VMP	Vegetation Management Plan

1. Property and Proposal

Table 1 identifies the subject property and outlines the type of development proposed.

Table 1: Subject site and development proposal summary

Street address:	25 Moss Vale Road, Bomaderry
Postcode:	2541
Lot/DP no:	Lot 110 DP131219, Lot 129 DP 3060, Lot 1 DP520502
Local Government Area:	Shoalhaven City Council
Fire Danger Index (FDI)	100
Current land zoning:	MU1 – Mixed Use
Type of development proposed:	Subdivision and construction of mixed-use development

1.1 Description of Proposal

The proposal is for subdivision of a recently approved 6 superlot subdivision (SF10851) into 48 developable lots, 1 carparking lot, 2 open space lots and 1 residue lot (Figure 1). The development includes residential subdivision, construction of residential and commercial development, open space areas, associated roads and infrastructure (Figure 2). Table 1 (overleaf) details the development type(s) and associated Building Class under the Building Code of Australia (BCA).

Residue Lot 1 within the south-east of the subject land (Figure 1) will be developed in the future under a separate Development Application (DA) therefore, is not included in this assessment.

There is potential for the development to accommodate a childcare centre in the future however, if proposed it will be subject to a future DA.

The proposed development is located on land identified as bush fire prone land (BFPL) on the Bushfire Prone Land layer within the ePlanning Spatial Viewer¹.

1.2 Assessment Process

This report has been prepared to support a State Significant Development Application and assesses the proposed development against *Planning for Bush Fire Protection* (RFS 2019), specifically Chapter 6 and *Appendix B of Addendum to Planning for Bush Fire Protection* (RFS 2022), collectively referred herein to as 'PBP'.

This assessment is based on the following information sources:

- Background documentation provided by Southern Cross Community Housing Ltd;
- Information contained within the site plan from SPARC Development (Job No. SYB01 Rev. F dated 12 August 2024); and

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

- GIS analysis including online spatial resources (i.e. Google Earth, SIX Maps, Nearmap and the NSW Government Planning Portal).

Table 2 identifies the bushfire protection measures assessed and whether an acceptable or performance-based solution is proposed.

Table 2: Summary of Bushfire Protection Measures Assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.1
Landscaping	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2
Construction	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.3
Access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.4
Water supply	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.5
Electrical services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.6
Gas services	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.7

1.2.1 Residential Subdivision and Multi-dwelling Development

In accordance with PBP, residential subdivisions require assessment against the BPM in Chapter 5 of PBP and must demonstrate all future dwellings do not exceed 29 kW/m² radiant heat threshold (i.e. BAL-29).

Multi-dwelling residential developments (i.e. townhouses, dual occupancy and boarding housing units etc.) are considered ‘increased density’ under Section 8.2.1 of PBP, and whilst they do not require subdivision approval (i.e. Bush Fire Safety Authority), the same principals and criteria associated with subdivisions in bushfire prone areas will apply including demonstration buildings do not exceed a Bushfire Attack Level (BAL) of BAL-29.

1.2.2 Commercial and Other

Class 5-8 buildings (commercial/industrial buildings with no attached dwelling/residence) are assessed under Chapter 8 of PBP and must demonstrate the development is able to meet the aim and objectives of PBP and specific aim and objectives for industrial/commercial development with Chapter 7 (infill residential) as a baseline.

Table 1 below provides a summary of each development type proposed and the corresponding development type under PBP.

Table 3: Summary of applicable bushfire requirements

Development Area	Development Type	BCA Building Class	PBP Development Type	PBP Requirements
A	1 bedroom apartment	4	Residential/increased density	Chapters 5, 7 and 8
	Retail	6	Commercial	Chapter 8
	Commercial (offices)	5	Commercial	Chapter 8
	Carpark	7a	Commercial	Chapter 8

Development Area	Development Type	BCA Building Class	PBP Development Type	PBP Requirements
B	Boarding house	3	Residential/Increased density	Chapter 5 and 7
C to E and G to H	Attached residential housing	1a	Residential/Increased density	Chapter 5 and 7
	Dual occupancy			
F	Residential apartments	2	Residential/Increased density	Chapters 5 and 7
	Carpark	7a	Commercial	Chapter 8
J	Attached dwellings	1a	Residential/Increased density	Chapters 5 and 7
K	Medical centre/retail	5	Commercial	Chapter 8
	Retail	6	Commercial	Chapter 8
	1 bedroom unit	2	Residential	Chapters 5, 7 and 8
	Carpark	7a	Commercial	Chapter 8
L	Commercial Premises (workshop)	7b/8	Commercial	Chapter 8
M to N	Residential flat building	2	Residential/Increased density	Chapters 5, 7 and 8
	Carpark	7a	Commercial	Chapter 8

1.3 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 DA process.

The impact footprint of the bushfire protection measures (e.g. Asset Protection Zone [APZ]) is identified within this report and therefore capable of being assessed by a suitably qualified person. The Department of Planning, Housing and Industry is the determining authority for this development; they will assess more thoroughly any potential environmental issues.

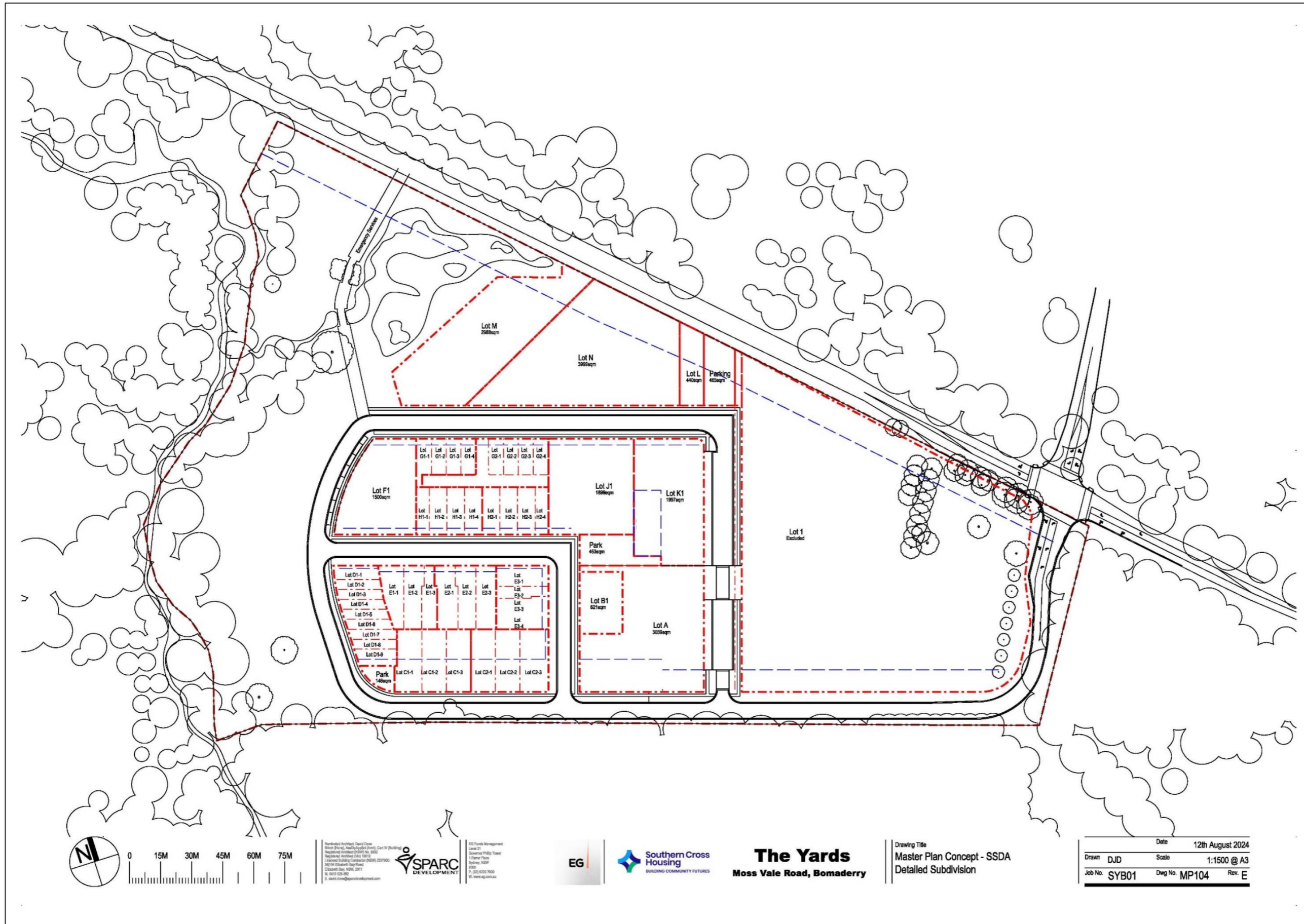


Figure 1: Proposed Subdivision



Figure 2: Proposed Mixed-use Development

2. Bushfire Hazard Assessment

2.1 Process

The site assessment methodology from Appendix 1 of PBP has been applied in this assessment to determine the required APZ and construction requirements.

Figure 3 and Table 4 show the effective slope and predominant vegetation representing the highest bushfire threat potentially posed to the proposed development from various directions.

2.2 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 the site assessment and previous ecological surveys by Eco Logical Australia (ELA 2020) and the current Vegetation Management Plan (VMP) prepared by EcoPlanning (2023).

2.3 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.

2.4 Summary of Assessment

As shown in Figure 3 the bushfire prone vegetation is to the north/north-east (roadside and adjoining residential properties), north-west/west (riparian vegetation along Bomaderry Creek) and south/south-east (undeveloped forest connecting to the Bomaderry Creek Regional Park).

North/north-east (roadside hazard, Transect 2)

Whilst the vegetation to the north/north-east is 'Wet Sclerophyll Forest', it is less than 50 m wide and is part of existing APZ (in some cases) and meets the definition of 'low hazard vegetation' under A1.1.11 of PBP. Low hazard vegetation uses 'rainforest' APZ setbacks and building construction levels because of the reduced fire behaviour expected from small and/or narrow areas of vegetation. The effective slope under this hazard falls within the PBP slope category of 'all upslopes and flat land'.

Bomaderry Creek Riparian (Transect 1 and 5-6)

The vegetation to the west/north-west, along the north-south orientated Bomaderry Creek, is identified as Illawarra Lowland Wet Vine Forest (EcoPlanning 2023) which falls within the North Coast Wet Sclerophyll Forests vegetation class (Keith 2004) and classified 'forest' under PBP. As this watercourse is identified as Category 1 under the Shoalhaven Local Environmental Plan (LEP), it requires a reserved riparian area consisting of a 40 m Vegetation Buffer (VB) either side of the watercourse measured from the top of bank, thus the riparian vegetation will be greater than 50 m wide and classified as 'forest' under PBP. The effective slope under this hazard falls within the PBP slope category of '>0-5 degrees downslope'.

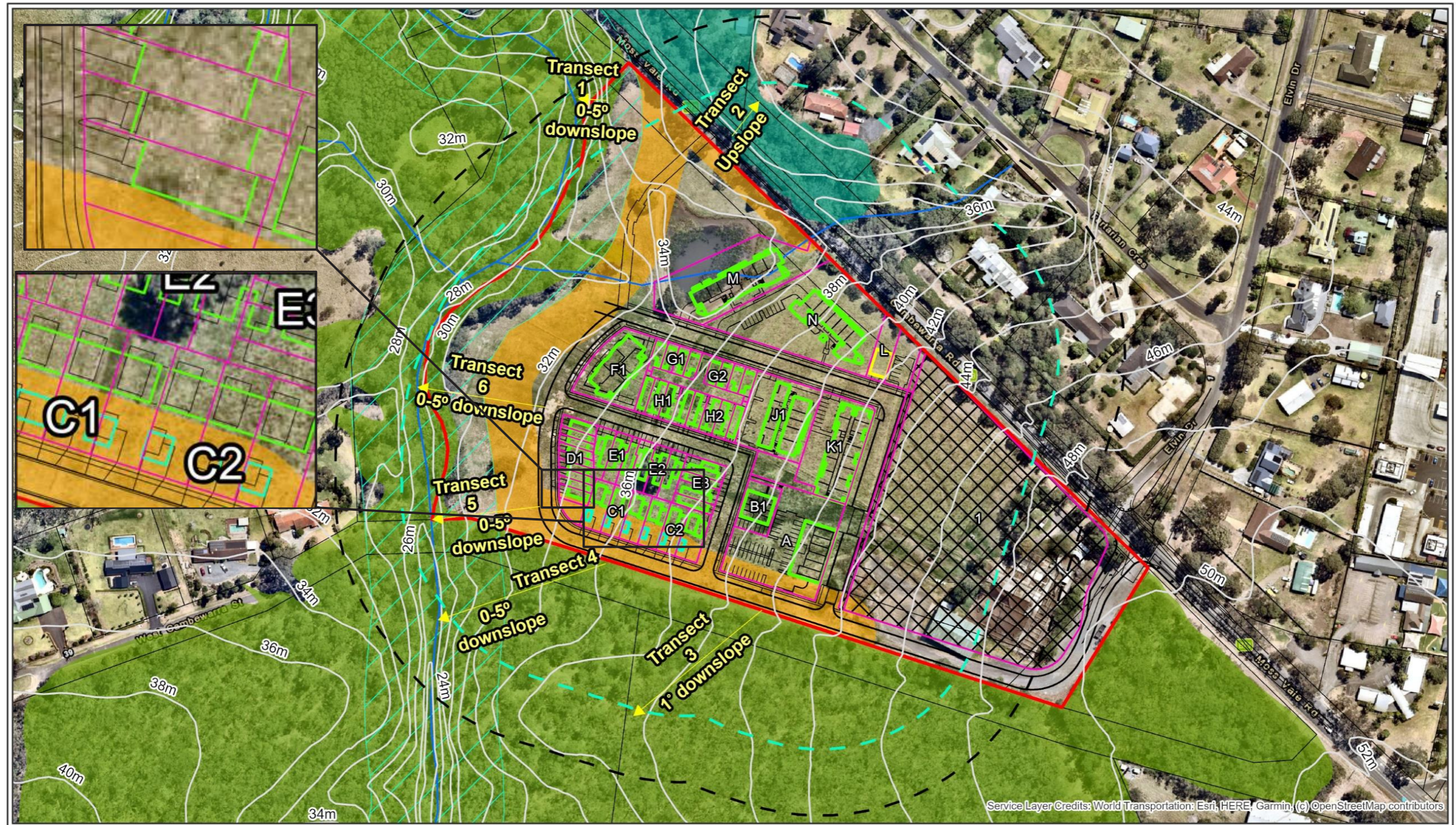
South and south-west hazard (Transect 3-4)

The vegetation to the south and south-east is also identified as 'Wet Sclerophyll Forest' and classified as 'forest' under PBP. The effective slope under the south-east hazard falls within the PBP slope category of 'all upslopes and flat land' and to the south '>0-5 degrees downslope'.

Residue Lot 1 within the south-east of the development will be managed to Inner Protection Area (IPA) specifications in accordance with superlot subdivision DA consent (SF10851).

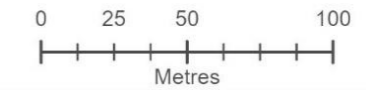
Table 4: Bushfire hazard assessment, APZ requirements and BALs

Transect #	Slope	Vegetation Formation	Required Residential APZ	Proposed APZ	Bushfire Attack Level (BAL)	Comments
1	>0° to 5° downslope	Forest	29 m	≥29 m	BAL-29: 29 m to <40 m BAL-19: 40 m to <54 m BAL-12.5: 54 m to <100 m	APZ located within the development site and future public open space/drainage reserves as detailed in the VMP (Ecoplanning 2023).
2	All upslope and flat land	Low Hazard (Rainforest)	11 m	≥11 m	BAL-29: 11 m to <16 m BAL-19: 16 m to <23 m BAL-12.5: 23 m to <100 m	APZ located within the development site and public road infrastructure (Moss Vale Road).
3	1° downslope	Forest	29 m	≥24 m*	BAL-29: 24 m to <34 m* BAL-19: 34 m to <46 m* BAL-12.5: 46 m to <100 m*	*APZ and BAL calculated using a performance solution based on a 1 degree downslope and fuel loads from PBP for Forest. Modelling report included in Appendix D. The APZ is provided wholly within development site.
4	>0° to 5° downslope	Forest	29 m	≥29 m	BAL-29: 29 m to <40 m BAL-19: 40 m to <54 m BAL-12.5: 54 m to <100 m	APZ located within the development site and proposed public road infrastructure.
5	>0° to 5° downslope	Forest	29 m	≥29 m	BAL-29: 29 m to <40 m BAL-19: 40 m to <54 m BAL-12.5: 54 m to <100 m	APZ located within the development site and future public open space/drainage reserves as detailed in the VMP (Ecoplanning 2023).
6	>0° to 5° downslope	Forest	29 m	≥29 m	BAL-29: 29 m to <40 m BAL-19: 40 m to <54 m BAL-12.5: 54 m to <100 m	APZ located within the development site and future public open space/drainage reserves as detailed in the VMP (Ecoplanning 2023).
All other directions	Managed land for greater than 100 m					



Bushfire Hazard Assessment - Asset Protection Zone (APZ)

- | | | | |
|------------------------------------|--|-------------------------------|---|
| Subject Land | Subdivision Boundaries | Watercourse | Vegetation Formation |
| Layout | Proposed Building Type | Indicative Riparian Corridor | Forest |
| Contours (2m) | Class 10 associated with residential housing | Asset Protection Zones | Low Hazard (Rainforest) |
| 100 m Slope assessment buffer | Residential | Residential APZ (11-29 m) | Managed to IPA as per approved DA (SF10851) |
| 140 m Vegetation assessment buffer | Commercial premises (workshop) | | |



Datum/Projection:
GDA 1994 MGA Zone 56
Project: 7136-EH/ML Date: 9/10/2024



Figure 3: Bushfire Hazard Assessment

3. Bushfire Protection Measures

The proposal includes subdivision and construction of residential (increased density) and commercial development as such the proposed subdivision and future development is assessed against Chapter 5 and Chapter 7 of PBP.

All commercial buildings contain a residential component aside from the commercial premises (workshop) within Lot L which is solely commercial.

3.1 Asset Protection Zones

Table 4 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 3.

The APZ to the west along Bomaderry Creek is located within future public open space and will be secured under the VMP prepared by Ecoplanning (2023) with the management responsibility either by SCC or Roads and Maritime Services (RMS) as agreed by parties (currently still under discussion).

Residue Lot 1 within the south-east of the development will be managed to IPA specifications in accordance with superlot subdivision DA consent (SF10851).

The compliance of the proposed APZ for the development is documented in Table 5, with residential and commercial development assessed under Section 7.4 of PBP.

The NBC Bushfire Attack Assessor was used to determine the APZ requirements for Transect 3 (see Figure 3). This approach is in accordance with Appendix B: Detailed Methodology for Determining the Bushfire Attack Level (BAL) – Method 2 of *Australian Standard 3959: Construction of buildings in bushfire-prone areas’ 2018*. The results of this performance solution assessment are shown in Appendix D.

NB: As outlined in CB3 of Appendix B of AS 3959-2018 a vegetation classification system specific to a relevant State or accepted as an alternate to the national system. This assessment utilises the fuel loadings for Forest in accordance with Section A1.12.8 of PBP.

Table 5: APZ requirements and compliance (adapted from Table 5.3a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
Potential building footprints will not be exposed to radiant heat levels exceeding 29 kW/m ² on each proposed lot.	APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FDI.	<p>Achieves Acceptable Solutions and Satisfies Performance Criteria</p> <p><i>Transects 1-2 and 4-6</i></p> <p>APZ provided in accordance with Table A1.12.2 as shown in Table 4 and Figure 3.</p> <p><i>Transect 3</i></p> <p>APZ provided in accordance with a performance solution using Method 2 of AS3959:2018 as outlined in Section 3.1 of this report.</p>

Performance Criteria	Acceptable Solutions	Compliance Notes
APZs are managed and maintained to prevent the spread of a fire towards 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 B.
The APZ is provided in perpetuity.	APZs are wholly within the boundaries of the development site.	Complies All APZ provided within boundaries of development site.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	APZs are located on lands with a slope less than 18 degrees.	Complies APZ is not located on slopes greater than 18°.

3.2 Landscaping

The compliance of the proposed landscaping with Section 5.3.1 of PBP is documented in Table 6.

Table 6: Landscaping requirements and compliance (adapted from Table 5.3a of PBP)

Performance Criteria	Acceptable Solutions	Compliance Notes
The intent may be achieved where:		
Landscaping is managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4 of PBP; and	To comply APZ / Landscaping is to be designed and managed in accordance with PBP. Landscaping specifications provided in Appendix B.
	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 3.3.3 for further details).

3.3 Construction Standards

The building construction standard for the proposed residential and residential/commercial buildings are determined by their Bushfire Attack Level (BAL) and then applying the appropriate construction specifications. The BAL is generally determined in accordance with Appendix 1 of PBP and 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 of buildings with Section 7.4 of PBP is documented in Table 7.

As demonstrated in Figure 5, the proposed development is assessed as requiring construction standards outlined in Table 14 (Appendix A).

All attached dwellings (Lots C1-E3 and G1-H2) will be separated from each other by a fire rated wall extending to the underside of the non-combustible roof covering compliant with Section 3.2.1(a) of AS 3959:2018 (SA 2018). Consequently, BALs are applied to individual dwellings based on BAL exposure in terms of distance from the hazard.

Table 7: 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 A1.12.7 of PBP.	<p>Complies with Performance Criteria</p> <p><i>Transects 1-2 and 4-6</i></p> <p>BAL determined in accordance with Table A1.12.5 as shown in Figure 3.</p> <p><i>Transect 3</i></p> <p>BAL determined using Method 2 Assessment under AS3959:2018 as outlined in (Appendix D).</p>
	Construction provided in accordance with the National Construction Code (NCC) and as modified Section 7.5 of PBP.	<p>To comply</p> <p>Construction in accordance with AS 3959 OR NASH standard as modified by Section 7.5 of PBP is required.</p>
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.	<p>To comply</p> <p>Specification detailed in Section 3.3.3 of this report.</p>
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.	<p>To comply</p> <p>Specification detailed in Section 3.3.4 of this report.</p>

3.3.1 Residential Construction Requirements

The Deemed-to-Satisfy (DtS) provisions of the NCC for construction requirements for buildings in designated bush fire prone areas are specified in:

- AS 3959:2018 Construction of buildings in bushfire prone areas (SA 2018); and
- NASH NS 300 – NASH Standard for Steel Framed Construction in Bushfire Areas 2021 (NASH 2021).

Construction for all residential buildings shall comply with Sections 3 (General requirements) and 5 (BAL-12.5), 6 (BAL-19), 7 (BAL-29) of AS 3959:2018 or NASH Standard (NS300) as appropriate and detailed in Table 14.

3.3.1.1 Additional Residential Construction Requirements

Additional construction measures over and above that required under AS 3959:2018 and NASH, including ember protection provisions, are identified in Section 7.5 of PBP, and may apply.

3.3.2 Class 5-8 Construction Requirements

The commercial premises (workshop) in Lot L is a Class 7b/8 building and does not contain a residential component. As stated within Section 8.3.1 of PBP, 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 2021) 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 3.3.2.1 below.

3.3.2.1 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.

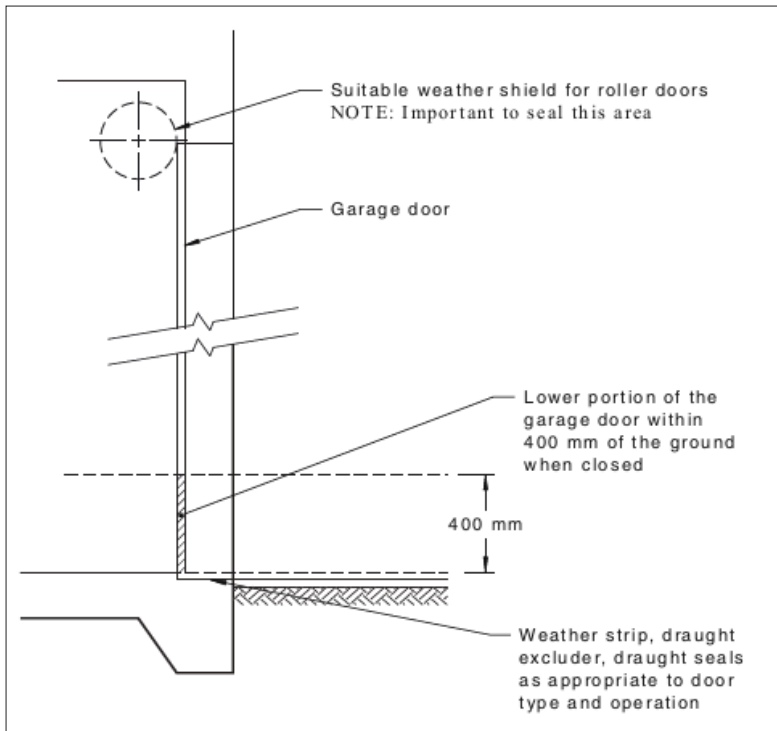


Figure 4: Roller shutter door installation (SA 2018)

3.3.3 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 is within 6 m of a building or in areas of BAL-29, they should be made of non-combustible material only.

3.3.4 Class 10a Buildings (garages etc.)

To comply with Section 8.3.2 of PBP, proposed detached Class 10a structures (garages) within 6 m of any proposed dwelling must be constructed in accordance with the NCC. Where the structure is greater than 6 m, no bushfire requirements apply.

The proposed detached garages within Lots C1-1 to C1-3 and C2-1 to C2-3 (identified in Figure 5) do not contain any habitable spaces and are within 6 m of proposed dwellings and require either:

1. BAL-29 construction in accordance with Figure 5 and Table 14; OR
2. Comply with cl. 3.2.3(b)-(c) of AS 3959:2018.

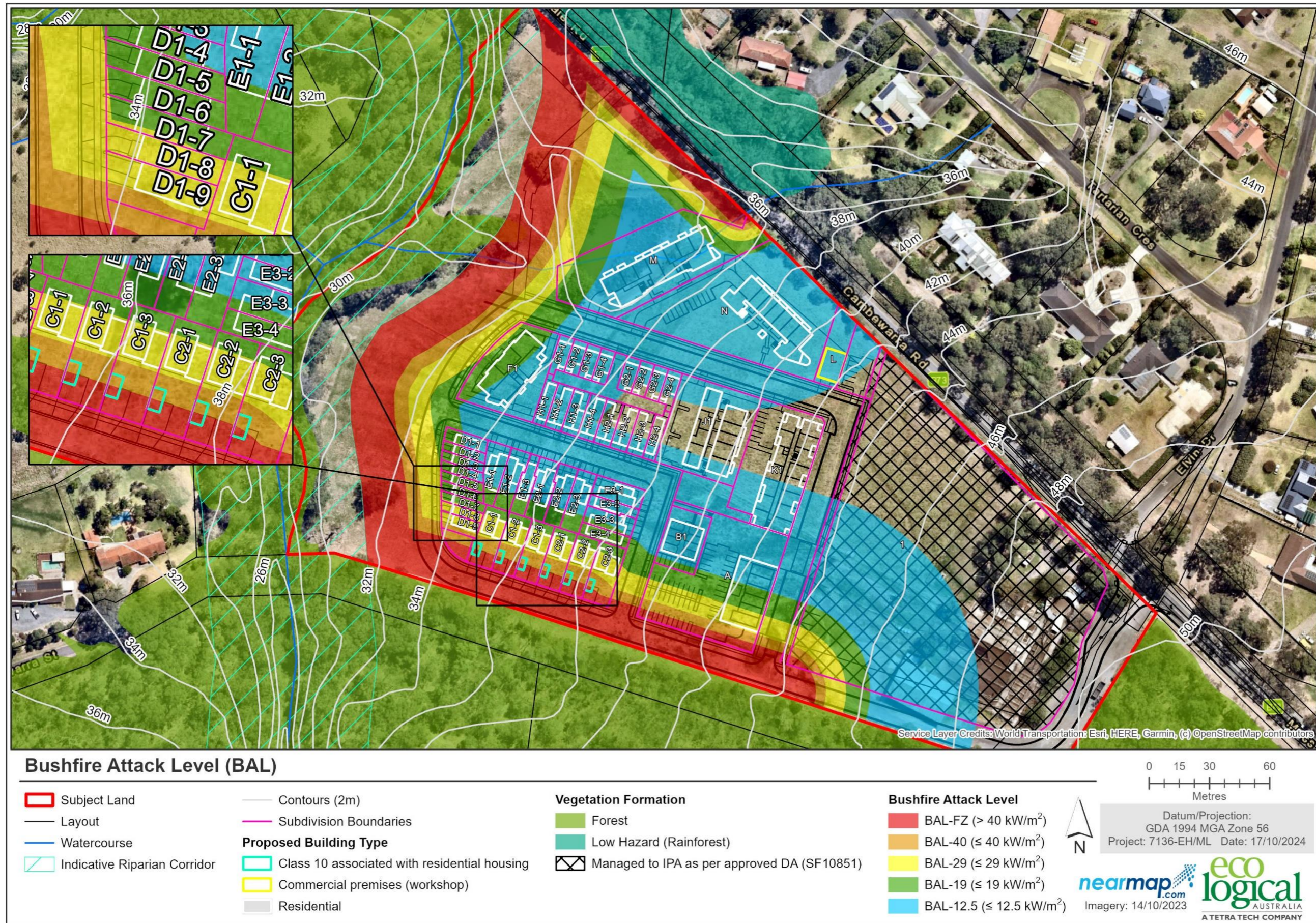


Figure 5: Bushfire Attack Level (BAL)

3.4 Access

Public road access to the subdivision is via Moss Vale Road (Figure 6). The proposed development is located within an approved subdivision (SF10851) with the perimeter Road 01 currently under construction and not assessed under this DA. All other roads are to be constructed as part of this DA therefore, have been assessed against the PBP subdivision road design requirements.

The road design generally complies with the approved subdivision (SF10851) aside from the removal of the turning area at the termination of the public road infrastructure and beginning of the emergency perimeter access road. The turning area is no longer required as the proposed road network now provides through roads connecting at intervals <500 m. Figure 6 shows the internal and perimeter access within the development and how they have been assessed under PBP:

- Road 01 Internal: Non-perimeter Road
- Road 02: Non-Perimeter Road
- Private Laneway 01: Non-perimeter Road
- Private Driveway (Lots M and N): Non-perimeter Road
- Emergency Perimeter Access Road: Perimeter Road (design as per parent subdivision approval SF10851).

3.4.1 Road Typology Parking design

Parking is either provided outside of carriageway or prohibited to one or both sides, road typical sections are detailed as follows:

- Non-perimeter Road 01 (CH560-745) complies with PBP and provides a total width of 8 m consisting of:
 - 5.9 m carriageway;
 - 2.1 m parking to one side;
 - Parking prohibited to one side.
- Non-perimeter Road 01 CH745 onwards complies with PBP and provides a total width of >10 m, the design allows for:
 - Minimum 5.5 m carriageway; and
 - 2.1 m parking either side.
- Non-perimeter Road 02 (CH0-105) provides a total width of 8 m consisting of:
 - 5.9 m carriageway;
 - 2.1 m parking to one side;
 - Parking prohibited to one side.
- Non-perimeter Road 02 (CH105 onwards) provides a total width of 8.5 m consisting of:
 - 6.4 m clear carriageway;
 - 2.1 m parking to one side;
 - Parking prohibited to one side.
- Laneway 01 provides a 5.5 m wide carriageway with parking prohibited.
- Private Driveway to Lots M and N provides a 5.8 wide carriageway and designated parking bays outside of carriageway width.

The performance criteria and acceptable solutions for each of these access types are shown in Table 16, Table 17 and Table 18 (Appendix C), along with comment on the road design compliance or otherwise.

A summary of the compliance assessment with PBP can be found in Table 8 below whilst all access performance solutions are detailed in Table 9.

Table 8: Access summary of compliance

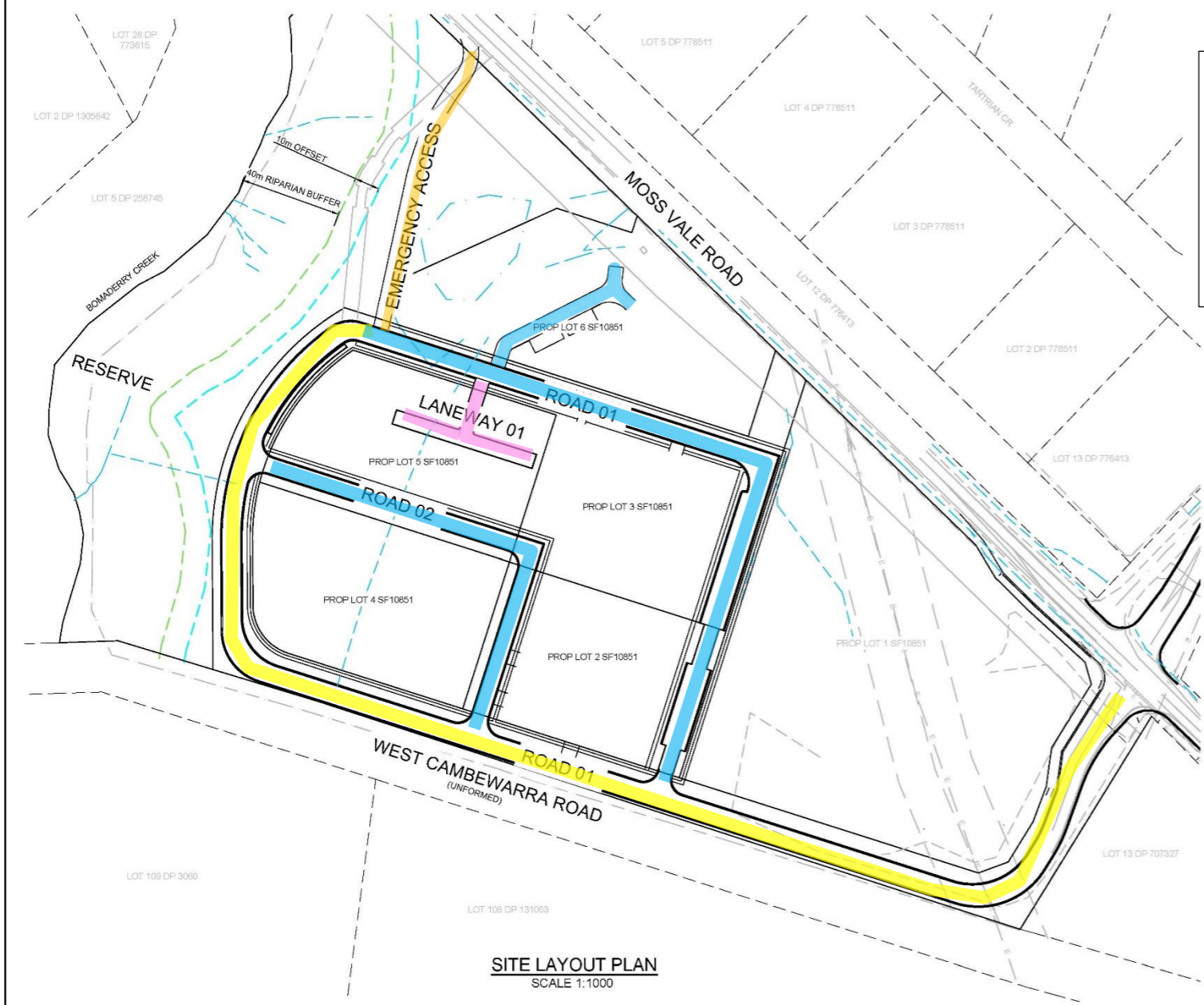
Access type	Acceptable Solution	Performance Solution	Further details
General	☑	☑	Table 9 and Table 16
Perimeter road	☑	☑	Table 9 and Table 17
Non-perimeter road	☑	☑	Table 9 and Table 18
Property Access	N/A	N/A	N/A – no property access roads proposed

Table 9: Access performance solution

Assessment Item #	Access Type	Description	Performance Criteria	Acceptable Solution	Comments
1	General	Private Laneway 01 and Private Driveway	Firefighting vehicles are provided with safe, all-weather access to structures	<p>All roads are through roads;</p> <p>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;</p>	<p>All roads are through roads aside from Private Laneway 01 and Private Driveway (Figure 6). The PBP performance criteria is met based on the following:</p> <p><u>Laneway 01</u></p> <ul style="list-style-type: none"> The laneway is two-way, ~130 m in length and 3.5 m wide with parking prohibited and provides rear access to garages in Area’s G and H; Structures will be within 70 m (from the furthest point) from the nearest part of Road 01; Firefighting vehicles will not need to use these roads as they are afforded access to the structures from Road 01 (north) and Road 02 (south) which are both provide a minimum 5.5 m clear carriageway (refer assessment item #5). <p><u>Private Driveway</u></p> <ul style="list-style-type: none"> The driveway is two-way, ~48 m in length and 5.8 m carriageway width with designated parking area outside of carriageway width; Provides a ‘T’ turning area before the entry to basement carparking at Lot N. The ‘T’ turning area <u>does not</u> meet the PBP vehicle turning head requirements of Figure A3.3 however, the PBP performance criteria is met based on the following: The ‘T’ turning area provides 10 m long arms, 6 m inner radius curves and is suitable for a Category 1 firefighting vehicle to manoeuvre, refer swept path diagram (Figure 7).
3	General	All roads	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	15t capacity is proposed, the PBP performance criteria is achieved based on the following:

Assessment Item #	Access Type	Description	Performance Criteria	Acceptable Solution	Comments
				tonnes); bridges/causeways are to clearly indicate load rating.	<ul style="list-style-type: none"> Capacity is suitable for a Cat 1 tanker, the site is unlikely to be serviced by anything larger than a Cat 1 tanker given these are the largest most used in urban scenarios, therefore 15t is considered sufficient.
4	Perimeter Road	Emergency Perimeter Access Road	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.	Minimum 8m carriageway width kerb to kerb; and Parking provided outside of the carriageway width;	The Emergency Perimeter Access Road acts as a perimeter road for Area M and provides a 6 m wide carriageway and parking prohibited to both sides. The road is to be constructed in accordance with the drawing prepared by Allen Price & Scarratts Pty Ltd numbered N27790-04, revision 13, dated 7 February 2023 <u>as per the approved performance solution for subdivision SF10851 (RFS GTAs issued DA20210127000311-CL55-4).</u>

PROPOSED MIXED USE SUBDIVISION FOR SOUTHERN CROSS COMMUNITY HOUSING



Legend

- Perimeter Road (approved under SF10851)
- Non-perimeter Road
- Private Laneway (non-perimeter)
- Emergency Perimeter Access Road



LOCALITY PLAN
MAP DRAWN & PUBLISHED BY CARTODRAFT AUST P/L

SITE LAYOUT PLAN
SCALE 1:1000

BEWARE!
THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE, AT THE CONTRACTOR'S EXPENSE, FOR ANY REPAIRS TO DAMAGE CAUSED DURING CONSTRUCTION.



RATIO: 1:1000 (AT A1 ORIGINAL)	DATUM: AUSTRALIAN HEIGHT DATUM	SURVEY	APS	REV	DESCRIPTION	BY	DATE	 allen price & scarratts pty ltd land and development consultants Nowra Office: 75 Plunkett Street, Nowra NSW 2541 Kiama Office: 1/28 Bong Bong Street, Kiama NSW 2533 phone: (02) 4421 6544 consultants@allenprice.com.au www.allenprice.com.au
	ORIGIN: PM15204 RL52.718	DESIGN	BI	0	ISSUED FOR CONCEPT APPROVAL	BI	25/09/2024	
	DATE OF PLAN: SEPTEMBER 2024	DRAWN	BI					
		CHECKED	CEG					

COVER SHEET & DRAWING INDEX
PROPOSED MIXED USE SUBDIVISION
OVER LOT 129 DP3060 LOT 110 DP131219 & LOT 1 DP520502
AT 25 MOSSVALE ROAD
FOR SOUTHERN CROSS COMMUNITY HOUSING

DRAWING STATUS	PRELIMINARY	
	NOT TO BE USED FOR CONSTRUCTION PURPOSES	
DRAWING NUMBER	SHEET	REVISION
N27790-407	1	P0
	OF	
	9	

PROFESSIONAL STANDARDS SCHEME
Liability limited by a scheme approved under Professional Standards Legislation

SCALE: 1:1000

Figure 6: Access

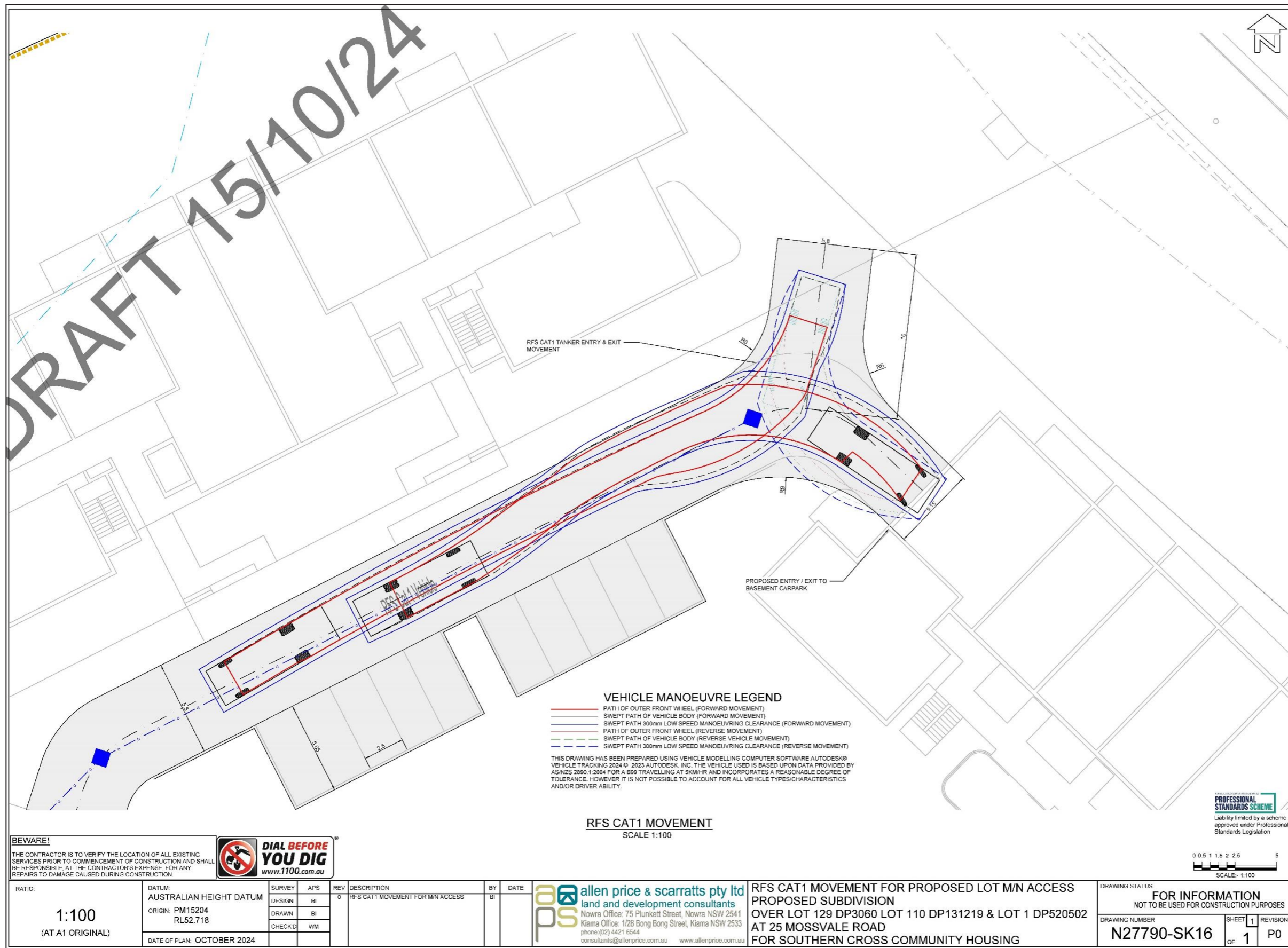


Figure 7: Swept Path Cat 1

3.5 Water Supplies

The proposed development will be serviced by reticulated water supply.

The compliance assessment of the proposed water supply with Section 5.3 of PBP is documented in Table 10.

Table 10: Water supply requirements (adapted from Table 5.3c of PBP)

Performance Criteria	Acceptable Solution	Compliance Notes
An adequate water supply is provided for firefighting purposes	<ul style="list-style-type: none"> Reticulated water is to be provided to the development, where available; A static water supply is provided where no reticulated water is available. 	<p>Complies</p> <p>Proposal serviced by a reticulated water supply.</p>
Water supplies are located at regular intervals; and The water supply is accessible and reliable for firefighting operations	<ul style="list-style-type: none"> Fire hydrant spacing, design and sizing comply with the Australian Standard AS 2419.1 (SA 2021); Hydrants are not located within any road carriageway; Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. 	<p>To comply</p> <p>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 5.3c of PBP.</p>
Flows and pressure are appropriate	<ul style="list-style-type: none"> Fire hydrant flows and pressures comply with AS 2419.1 (SA 2021). 	<p>To comply</p>
The integrity of the water supply is maintained	<ul style="list-style-type: none"> 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. 	<p>To comply</p> <p>Not applicable</p>

3.6 Electricity Services

The compliance of the proposed electricity services with Section 5.3 of PBP is documented in Table 12.

Table 11: Assessment of requirements for the supply of electricity services (adapted from Table 5.3c 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.	<p>Where practicable, electrical transmission lines are underground;</p> <p>Where overhead, electrical transmission lines are proposed as follows:</p> <ul style="list-style-type: none"> 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 <i>ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets</i> (ISSC3 2016). 	<p>Complies</p> <p>Electricity services within the development will be located underground.</p>

3.7 Gas Services

The compliance of the proposed gas services with Section 5.3.1 of PBP is documented in Table 12.

Table 12: Assessment of requirements for the supply of gas services (adapted from Table 5.3c 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.	<p>Reticulated or bottled gas is installed and maintained in accordance with <i>AS/NZS 1596:2014 The Storage and handling of LP Gas</i> (SA 2014), the requirements of relevant authorities, and metal piping is used;</p> <ul style="list-style-type: none"> • 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; • Polymer-sheathed flexible gas supply lines are not used; and • Above-ground gas service pipes are metal, including and up to any outlets. 	<p>To comply (if installed)</p> <p>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 5.3c of PBP.</p>

4. Conclusion

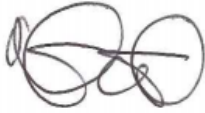
The proposed development has been assessed against the specifications and requirements of PBP, as outlined in Table 13.

Table 13: Development bushfire protection measures and associated recommendations

Bushfire Protection Measures	Recommendations	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	APZ dimensions are detailed in Table 4 and shown in Figure 3. Identified APZ to be maintained in perpetuity to the specifications detailed in Appendix B.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.1
Landscaping	Any future landscaping to meet the requirements of PBP listed in Appendix B.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.2
Construction	The proposed buildings are constructed to the BAL ratings as per Figure 5 and as detailed in Table 14 based on the construction specifications detailed in either AS 3959-2018 or the NASH standard, including additional ember provisions detailed in section 7.5 of PBP as required.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.3
Access	Emergency Perimeter Access Road shall be designed in accordance with accordance with the drawing prepared by Allen Price & Scarratts Pty Ltd numbered N27790-04, Revision 13, dated 7 February 2023 as per the approved performance solution for subdivision SF10851 (RFS GTAs issued DA20210127000311-CL55-4). All other roads shall be designed in accordance with drawing prepared by Allen Price & Scarratts Pty Ltd numbered N27790, Revision P0, dated September 2024.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3.4
Water supply	Reticulated water supply to meet PBP acceptable solution specifications for a subdivision.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.5
Electricity service	Electricity supply located underground.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.6
Gas service	Gas services (if installed) are to be installed and maintained in accordance with AS/NZS 1596:2014.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3.7

5. Recommendations

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



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6. References

Australian Building Codes Board (ABCB). 2022. *National Construction Code (NCC) 2022 Volume One – Building Code of Australia Class 2 to 9 buildings*. Australian Building Codes Board, Canberra.

Ecoplanning. 2023. *Vegetation Management Plan - 25 Moss Vale Road (Lot 1 DP 520502, Lot 110 DP 131219 and Lot 129 DP 3060), Bomaderry NSW*. Version 1.0 dated 7 November 2023. Ecoplanning, Woonona.

Eco Logical Australia (ELA). 2020. *Flora and Fauna Assessment – 25 Moss Vale Road, Bomaderry*. 15 June 2020.

Industry Safety Steering Committee 3 (ISSC3). 2016. *ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Assets*. November 2016. NSW.

Keith, D. 2004. *Ocean Shores to Desert Dunes*. Department of Environment and Conservation, Sydney.

National Association of Steel Framed Housing (NASH). 2021. *Steel Framed Construction in Bush Fire Prone Areas (NS300)*. NASH, Melbourne.

NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW). 2022. *NSW State Vegetation Type Map*. Updated 30 November 2023. State Government of NSW.

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.

NSW Rural Fire Service (RFS). 2022. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers – Addendum November 2022*. NSW RFS, Sydney.

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 (including Amdt 1 and 2), AS 3959:2018*. SAI Global, Sydney.

Standards Australia (SA). 2021. *Fire hydrant installations - System design, installation and commissioning, AS 2419.1:2021*. SAI Global, Sydney.

Appendix A – Bushfire Attack Level

Table 14: Bushfire Attack Level

Lot #	Elevation				
	Roof and Sub-floor	North	South	East	West
Lot A	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot B1	BAL-12.5				
Lot C1-1	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot C1-2	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot C1-3	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot C2-1	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot C2-2	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot C2-3	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot D1-1	BAL-19	BAL-19	BAL-19	BAL-12.5	BAL-19
Lot D1-2	BAL-19	BAL-19	BAL-19	BAL-12.5	BAL-19
Lot D1-3	BAL-19	BAL-19	BAL-19	BAL-12.5	BAL-19
Lot D1-4	BAL-19	BAL-19	BAL-19	BAL-12.5	BAL-19
Lot D1-5	BAL-19				
Lot D1-6	BAL-19				
Lot D1-7	BAL-29	BAL-19	BAL-29	BAL-29	BAL-29
Lot D1-8	BAL-29				
Lot D1-9	BAL-29				
Lot E1-1	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot E1-2	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot E1-3	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot E2-1	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot E2-2	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot E2-3	BAL-19	BAL-12.5	BAL-19	BAL-19	BAL-19
Lot D1	BAL-19	BAL-19	BAL-19	BAL-12.5	BAL-19
Lot G1-1	BAL-12.5				
Lot G1-2	BAL-12.5				
Lot G1-3	BAL-12.5				
Lot G1-4	BAL-12.5				
Lot G2-1	BAL-12.5				
Lot G2-2	BAL-12.5				
Lot G2-3	BAL-12.5				
Lot G2-4	BAL-12.5				
Lot H1-1	BAL-12.5				
Lot H1-2	BAL-12.5				
Lot H1-3	BAL-12.5				
Lot H1-4	BAL-12.5				
Lot H2-1	BAL-12.5				
Lot H2-2	BAL-12.5				

Lot #	Elevation				
	Roof and Sub-floor	North	South	East	West
Lot H2-3	BAL-12.5				
Lot H2-4	BAL-12.5				
Lot J1	BAL-12.5				
Lot K1	BAL-12.5				
L	BAL construction not applicable – refer Section 3.3.2				
M	BAL-19	BAL-19	BAL-12.5	BAL-19	BAL-12.5
N	BAL-12.5				

Appendix B - Asset Protection Zone and Landscaping Standards

The following APZ management specifications in apply to the APZ specified in Table 4 and shown in Figure 3. The identified APZ 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.

These APZ management specifications should be considered for any future landscaping and maintenance.

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

Table 15: APZ management specifications

Vegetation Strata	Inner Protection Area (IPA)
Trees	<ul style="list-style-type: none"> • 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 2 m above ground; • Canopies should be separated by 2 to 5 m; and • Preference should be given to smooth barked and evergreen trees.
Shrubs	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Should be kept mown (as a guide grass should be kept to no more than 100 mm in height); and • Leaves and vegetation debris should be removed.

Appendix C - Access Standards

Table 16: 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;	Not applicable No property access roads proposed.
	Perimeter roads are provided for residential subdivisions of three or more allotments;	Complies Perimeter roads are provided to the entire development (refer Figure 6).
	Subdivisions of three or more allotments have more than one access in and out of the development;	Complies Development provides public access onto Moss Vale Road in the south, with emergency perimeter access road provided onto Moss Vale Road in north as per subdivision approval SF10851 (refer Figure 6).
	Traffic management devices are constructed to not prohibit access by emergency services vehicles;	To comply Detail not provided at this stage.
	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;	To comply Detail not provided at this stage.
	All roads are through roads;	Complies with performance criteria Refer performance solution in Table 9.
	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 with performance criteria Refer performance solution in Table 9.
	Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;	Complies with performance criteria Refer performance solution in Table 9.
	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 Development provides public access onto Moss Vale Road in the south, with emergency perimeter access road provided onto Moss Vale Road in north as per subdivision approval SF10851 (refer Figure 6).

Performance Criteria	Acceptable Solutions	Compliance notes
	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.	Not applicable No one-way public roads proposed.
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.	Complies with performance criteria Refer performance solution in Table 9.
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 Detail 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 Detail not provided at this stage.
	There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	Not applicable Development will be serviced by reticulated water.

Table 17: 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 perimeter roads are two way and sealed.
	Minimum 8m carriageway width kerb to kerb;	Complies with performance criteria Refer performance solution in Table 9.
	Parking provided outside of the carriageway width;	Complies Parking is either provided outside of carriageway or prohibited to one or both sides. Refer detail in Section 3.4.1.
	Hydrants are located clear of parking areas;	To comply Detail 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 500m;	Complies All perimeter roads connect to internal road system at intervals <500 m.
	Curves of roads have a minimum inner radius of 6m;	To comply The advice of a relevant authority or suitably qualified professional
	The maximum grade road is 15 degrees and average grade is 10 degrees;	

Performance Criteria	Acceptable Solutions	Compliance Notes
	The road crossfall does not exceed 3 degrees; A minimum vertical cleared of 4m to any overhanging obstructions, including tree branches, is provided.	should be sought, for certification of design and installation in accordance with relevant legislation, Australian Standards and Table 5.3b of PBP.

Table 18: Non-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.	Minimum 5.5m width kerb to kerb;	Complies All non-perimeter roads provide minimum 5.5 m wide carriageways.
	Parking is provided outside of the carriageway width;	Complies Parking is either provided outside of carriageway or prohibited to one or both sides. Refer detail in Section 3.4.1.
	Hydrants are located clear of parking areas;	To comply Detail not provided at this stage.
	Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m;	Complies All non-perimeter roads connect to internal road system at intervals <500 m.
	Curves of roads have a minimum inner radius of 6m	To 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 road crossfall does not exceed 3 degrees;	
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	

Appendix D – Modelling Results

 NBC Bushfire Attack Assessment Report V4.1 <small>AS3959 (2018) Appendix B - Detailed Method 2</small> Print Date: 20/08/2024 Assessment Date: 12/12/2023	
Site Street Address:	25 Moss Vale Road, Bomaderry
Assessor:	Bruce Horkings; Eco Logical Australia (ELA)
Local Government Area:	Shoalhaven Alpine Area: No
Equations Used	
Transmissivity: Fuss and Hammins, 2002 Flame Length: RFS PBP, 2001/Vesta/Catchpole Rate of Fire Spread: Noble et al., 1980 Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005 Peak Elevation of Receiver: Tan et al., 2005 Peak Flame Angle: Tan et al., 2005	
Run Description:	T3 - Resi
<u>Vegetation Information</u>	
Vegetation Type:	Forest (including Coastal Swamp Forest)
Vegetation Group:	Forest and Woodland
Vegetation Slope:	1 Degrees Vegetation Slope Type: Downslope
Surface Fuel Load(t/ha):	22 Overall Fuel Load(t/ha): 36.1
Vegetation Height(m):	2 Only Applicable to Shrub/Scrub and Vesta
<u>Site Information</u>	
Site Slope:	0 Degrees Site Slope Type: Downslope
Elevation of Receiver(m):	6 APZ/Separation(m): 24
<u>Fire Inputs</u>	
Veg./Flame Width(m):	100 Flame Temp(K): 1090
<u>Calculation Parameters</u>	
Flame Emissivity:	95 Relative Humidity(%): 25
Heat of Combustion(kJ/kg)	18600 Ambient Temp(K): 308
Moisture Factor:	5 FDI: 100
<u>Program Outputs</u>	
Level of Construction:	BAL 29 Peak Elevation of Receiver(m): 9.84
Radiant Heat(kW/m2):	28.45 Flame Angle (degrees): 56
Flame Length(m):	22.72 Maximum View Factor: 0.447
Rate Of Spread (km/h):	2.83 Inner Protection Area(m): 13
Transmissivity:	0.838 Outer Protection Area(m): 11
Fire Intensity(kW/m):	52758
<u>BAL Thresholds</u>	
Asset Protection Zone(m):	BAL-40: 19 BAL-29: 24 BAL-19: 34 BAL-12.5: 46 10 kw/m2: 69 Elevation of Receiver: 6

