



## Bushfire Protection Assessment

Proposed Subdivision: Stage 1 Fairways North, Bingara Gorge, Wilton

Prepared for  
**Lend Lease**

24 May 2017



**BPAD**  
Bushfire  
Planning & Design  
Accredited Practitioner  
Level 3

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## ACKNOWLEDGEMENTS

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# 1 Property and proposal

<b>Name:</b>	Lend Lease		
<b>Postal address:</b>	Level 2, 88 Phillip Street, Parramatta NSW 2150		
<b>Street or property Name:</b>	Fairway Drive		
<b>Suburb, town or locality:</b>	Wilton	<b>Postcode:</b>	2571
<b>Lot/DP</b>	Lot 34 DP 270536		
<b>Local Government Area:</b>	Wollondilly Shire		
<b>Type of development:</b>	Residential subdivision		

## 1.1 Description of proposal

Lend Lease commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed 240 lot residential subdivision referred to as 'Stage 1 Fairways North', Lot 34 DP 270536 Fairway Drive, Bingara Gorge, Wilton (hereafter referred to as the subject land).

This bushfire protection assessment was prepared by Senior Bushfire Planner, Susan Courtney, with quality assurance from Bruce Horkings (FPAA BPAD Level 3 Certified Practitioner No. BPAD29962-L3). Bruce Horkings is recognised by the NSW Rural Fire Service as a qualified bushfire consultant in bushfire risk assessment.

The Bingara Gorge development has been the site of previous site inspections for other elements of the development and the following BPA has been prepared using data collected from the site inspections and other spatial resources (i.e. SIX Maps and Google Earth).

## 1.2 Location and description of subject land

The Bingara Gorge site is located at Wilton within the Wollondilly Shire Local Government Area (LGA) as shown in **Figure 1**.

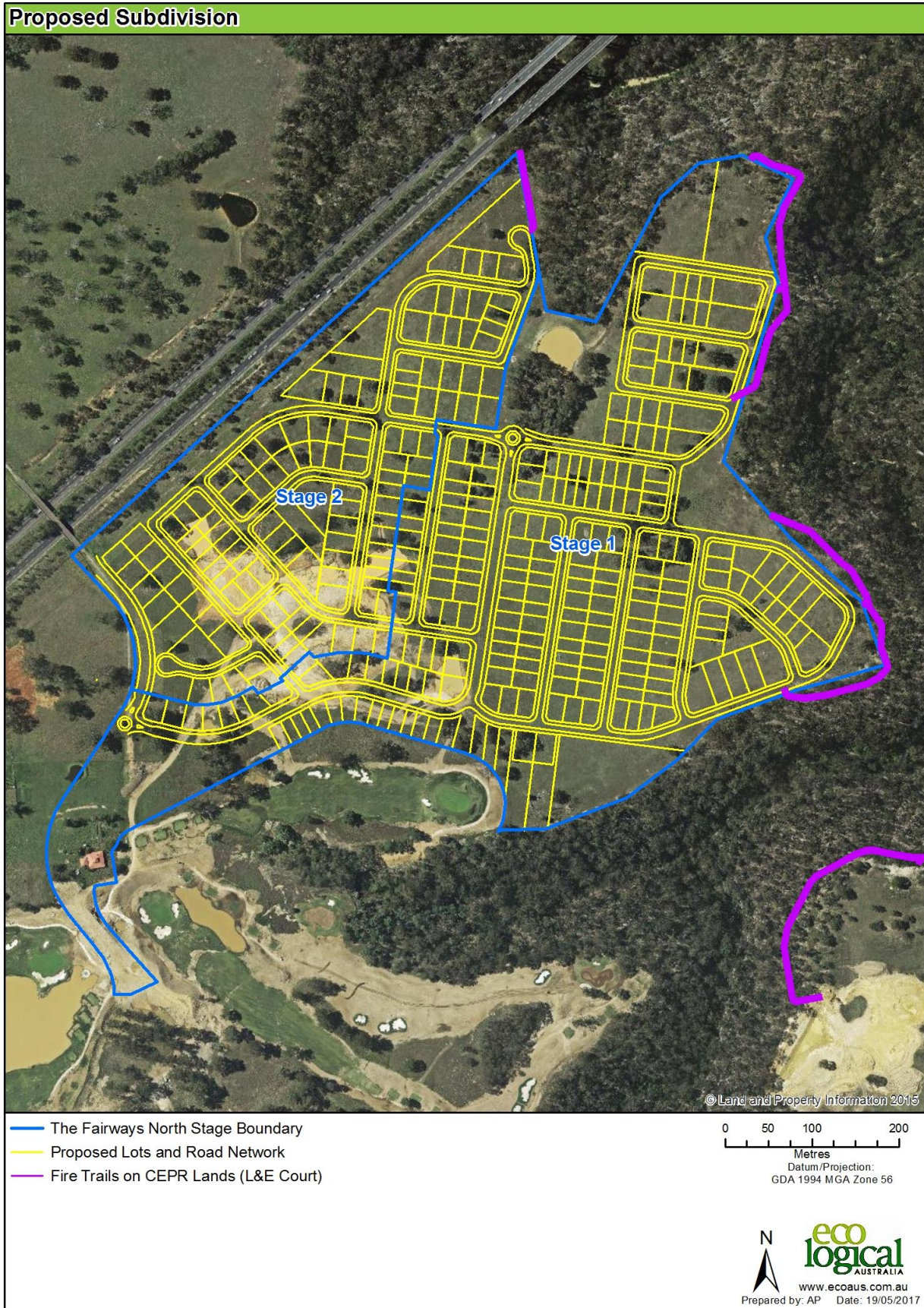
The proposed subdivision is located at the very northern end of the Bingara Gorge development and the proposed subdivision layout is included as **Figure 2**. Previous APZ advice has been provided in relation to the overall Bingara Gorge development, but this report provides an assessment specific to the development proposal and based on a detailed analysis of the bushfire hazard at this particular location.





Figure 1: Location of proposed Stage 1 Fairways North subdivision





**Figure 2: Proposed subdivision layout**



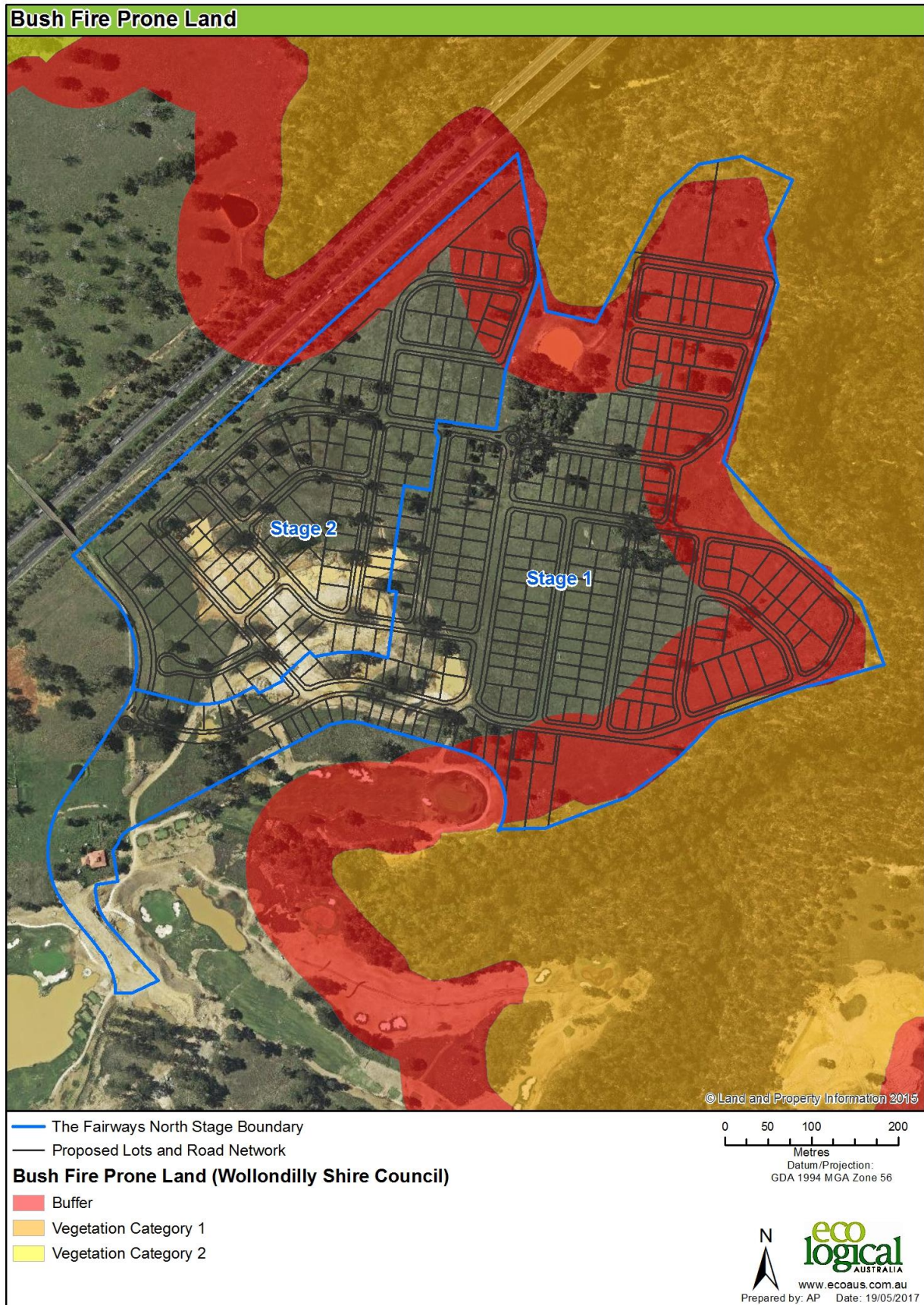


Figure 3: Excerpt of Wollondilly Bush Fire Prone Land Map



## 2 Bushfire hazard assessment

### 2.1 Assessment requirements

The subject land is identified as bush fire prone land by Wollondilly Shire Council as shown in the excerpt from their Bush Fire Prone Land Map in **Figure 3**. The following assessment is prepared in accordance with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fire Regulation 2013* and 'Planning for Bush Fire Protection' (RFS 2006), herein referred to as PBP.

### 2.2 Predominant vegetation classification

In accord with PBP the predominant vegetation class has been assessed for a distance of at least 140 m out from the boundary of the subdivision and the slope class most significantly affecting fire behaviour has been determined for a distance of at least 100 m in all directions.

The bushfire hazard is primarily forest vegetation within gully system of Stringybark Creek that flows south to north through the centre of the Bingara Gorge site and Allens Creek which runs from west to east across the northern side of the site. The majority of the gully system will be conserved within the Community Environmental Protection and Recreation Lands (CEPR Lands) which will be managed via a community title arrangement.

On the western side of the Fairways North Stage 1 subdivision, the development abuts unmanaged grassland.

**Figure 4** shows the location and hazard attributes of the gully system to the north, east and south of the proposed subdivision. The vegetation within this entire gully system is classified as 'forest' by PBP.

### 2.3 Effective slope determination

The effective slope within the gully was measured along its length in accordance with the slope assessment criteria within PBP. As shown in **Figure 4** the effective slopes along the entire forest interface are downslopes ranging from PBP slope category '>5-10 degrees downslope' through to slopes exceeding the scope of PBP (>18 degrees).

The unmanaged grassland along the western boundary of the proposed subdivision is on flat land which falls into the PBP slope category 'all upslopes and flat land'.

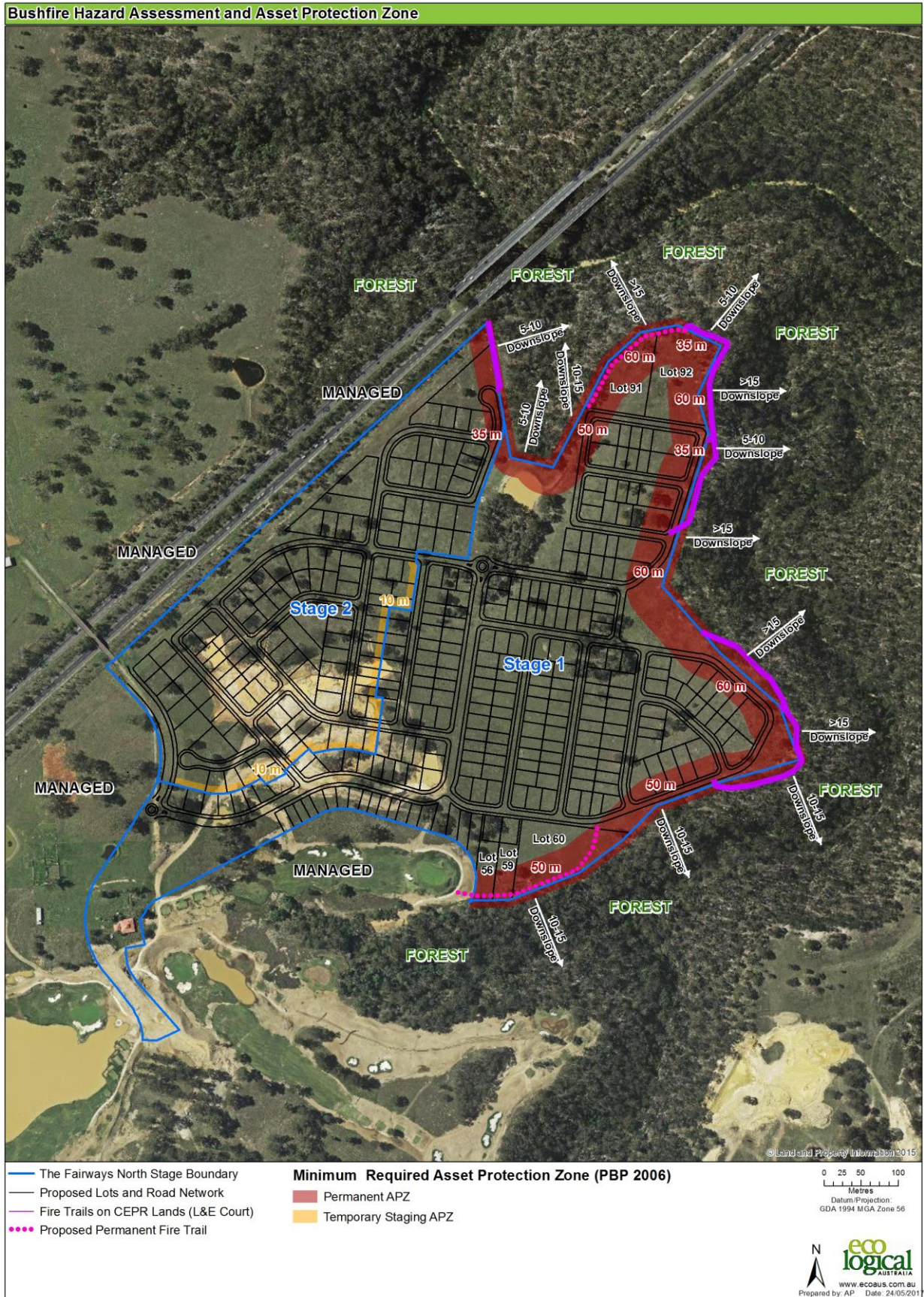


Figure 4: Bushfire hazard assessment and APZs



## 3 Asset Protection Zones (APZ)

### 3.1 Zone compliance

PBP has been used to determine the width of the Asset Protection Zone (APZ) using the vegetation and slope data identified in **Section 2**.

While there are downslopes under the forest vegetation within the gully to the north and east of the proposed subdivision which exceed the scope of PBP. PBP allows the maximum APZ for the highest slope category (downslope >15-18 degrees) to be applied to situations where the downslope exceeds 18 degrees.

The required APZ along the northern, eastern and southern perimeter of the subdivision varies from 35 m to 60 m in accordance with the PBP acceptable solutions for residential subdivision (PBP Table A2.4 based on forest vegetation). **Table 1** overleaf summarises the APZ calculation for the subdivision.

The majority of the APZ will be located within the subject land as shown in **Figure 4** however a small but variable amount of the APZ (between 10 m and 24 m) will be located within the adjoining CEPR lands. This is consistent with the management plan for the CEPR lands where the area affected by the APZ for the proposed subdivision was already being managed to Outer Protection Area (OPA) APZ standards or was covered by a fire trail (see **Section 3.2** for further information on APZ management and **Section 4** relating to access).

A temporary staging APZ 10 m wide will be required over the residual allotment to the west in areas where the Stage 2 subdivision is not bounded by public roads. Management of this APZ will need to be ensured via a Section 88b bushfire easement over the residual allotment which may be extinguished when Stage 2 of this development proceeds in the future.

**Figure 5** shows the BAL zoning across the subdivision. In the case of the proposed development, the proponent has elected to avoid all potential BAL-40 construction and consequently, the total APZ proposed will consist of the minimum APZ within PBP and any additional distance required to achieve BAL-29 or lower within AS 3959-2009.

The BAL rating is required to be undertaken at the development application stage for a dwelling. Alternatively the building envelope can be certified prior to sale.

**Table 1: Threat assessment and APZ calculation**

Direction	Slope <sup>1</sup>	Vegetation <sup>2</sup>	PBP required APZ <sup>3</sup>	Proposed APZ (to achieve ≤ BAL-29)	Comment
North, east and south	>5°-10° downslope	Forest	35 m	39 m (IPA 24 m, OPA 15 m)	The required APZs will be provided within the subject land with a small amount of the OPA (10 m to 24 m) within adjoining CEPR lands and will ensure dwellings are not subject to 29 kW/m <sup>2</sup> of radiant heat in accordance with proponent requirements.
	>10°-15° downslope		50 m	50 m (IPA 25 m, OPA 25 m)	
	>15° downslope		60 m	61 m (IPA 31 m, OPA 30 m)	
West	All upslope and flat land	Unmanaged grassland	10 m	10 m	Temporary staging APZ to be provided within Section 88b easement over residual allotment.
All other directions	Managed land				

<sup>1</sup> Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

<sup>2</sup> Predominant vegetation is identified, according to PBP and "Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate".

<sup>3</sup> Assessment according to Table A2.4 of PBP.

### 3.2 APZ fuel management

The majority of the APZ is currently in place with some vegetation clearance required both in proposed allotments and in the adjoining CEPR lands (to create the 10 – 24 m of Outer Protection Area (OPA) for the development). Maintenance of the APZ including grass and ground fuels is to continue for the life of the development in a manner to achieve an Inner Protection Area (IPA) or OPA standard as described by PBP (as per the distances specified in **Table 1** above).

The management of vegetation within the IPA portion of the APZ is to be undertaken as outlined below:

- No tree or tree canopy is to occur within 2 m of dwelling rooflines;
- The presence of a few scattered trees in the APZ is acceptable provided that they are well spread out, do not form a continuous canopy, and are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission;
- Any landscaping or garden beds should be located away from the house;
- The ground fuel is to be maintained to less than 4 tonnes per hectare of fine fuel (4 t/ha is equivalent to a 1 cm thick layer of leaf litter and fine fuel means any dead or living vegetation of less than 6 mm in diameter, e.g. twigs less than a pencil in thickness) by regular mowing or slashing.

Within the OPA portion of the APZ, the ground fuel is to be maintained to less than 8 tonnes per hectare of fine fuel (8 t/ha is equivalent to a 2 cm thick layer of leaf litter and fine fuel means any dead or living vegetation of less than 6 mm in diameter, e.g. twigs less than a pencil in thickness) by regular mowing or slashing and there is to be no greater than 30% tree canopy coverage.





## 4 Access

### 4.1 Public road access to the subdivision

The proposed Stage 1 Fairways North subdivision will be accessed from the south-west via an extension of the existing Fairways Drive. This road has a minimum pavement width of 7.2 m with parking located outside the pavement on each side of the road. It is a fully sealed road allowing for two-way traffic with fire tankers comfortably able to pass one another or cars.

The subdivision is a subsequent stage in an already approved subdivision masterplan (Bingara Gorge) and there are at least two public roads providing access to the estate both from Picton Road to the south (via Pembroke Parade) and from the existing township of Wilton to the east (via Hornby, Almond and Argyle Streets).

In the future, existing access crossing the Hume Highway will be upgraded to service future subdivisions and will provide an alternate access point to the proposed subdivision.

The proposed access to the Stage 1 Fairways North subdivision is considered appropriate in this instance given that the public road system within the proposed subdivision will transport evacuating residents in a south-westerly direction away from the forest bushfire hazards within the gorge to the north and east. There are a number of different routes that residents will be able to utilise to evacuate the proposed subdivision and the majority of these roads will not be located within bush fire prone land.

### 4.2 Public roads within the subdivision

The subdivision roads are to comply with the PBP design and construction standards listed in **Table 2**. An assessment of compliance provided within **Table 2** demonstrates that the proposed public roads as shown in the current plans and as advised by the client (Robert Curlewis on behalf of Lend Lease) are capable of complying with all of the Acceptable Solutions in PBP for public roads.

### 4.3 Property access roads

Future dwellings within the proposed subdivision will be accessed via standard residential driveways. These driveways have no specific bushfire construction specifications as the speed limit within the subdivision will be less than 70 kph, the dwellings will be located no greater than 70 m from the nearest hydrant (or 90 m in cases where a fire tanker can park in a direct line between the hydrant and the dwelling) and the public roads will be serviced with a reticulated water supply with hydrants at appropriate intervals in accord with AS 2419.1:2005 'Fire hydrant installations - System design, installation and commissioning' (Standard Australia 2005).

### 4.4 Perimeter fire trails

As shown in **Figure 4** and **Figure 5**, there are two areas around the north-eastern and eastern sides of the proposed subdivision where perimeter fire trails are to be established within the Community Environmental Protection and Recreation Lands (CEPR Lands) as determined by the outcome of a Land and Environment Court case relating to the proposed subdivision. These trails are to be constructed in accord with the PBP specifications for fire trails as outlined in **Table 3**.



The perimeter fire trails within the CEPR Lands will be managed in perpetuity via a community title arrangement.

There are five (5) larger allotments (Lots 56, 59, 60, 91 and 92) that are either partially or wholly not encompassed by a fire trail within CEPR Lands or by a public perimeter road. These allotments will require perimeter fire trails to be constructed to the PBP specifications outlined in **Table 3**. The management of these trails to PBP standards in perpetuity is to be ensured via Section 88b easements over these private properties and no boundary fencing is to be placed such that it restricts access within these fire trails.

The fire trail surrounding Lots 91 and 92 will link back into the public road to the south while the fire trail surrounding Lots 56, 59 and 60 will link from the Golf Course to the south-west to the public perimeter road to the north-east.

**Table 2: Design and construction for public roads**

Performance Criteria	Acceptable Solutions	Compliance
The intent may be achieved where:		
Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources).	<ul style="list-style-type: none"> <li>Public roads are two-wheel drive, all weather roads.</li> </ul>	<ul style="list-style-type: none"> <li>Complies</li> </ul>
Public road widths and design that allows safe access for firefighters while residents are evacuating an area.	<ul style="list-style-type: none"> <li>Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).</li> <li>The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas.</li> <li>Traffic management devices are constructed to facilitate access by emergency services vehicles.</li> <li>Public roads have a cross fall not exceeding 3 degrees.</li> <li>All 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 and direct traffic away from the hazard.</li> <li>Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.</li> <li>The minimum distance between inner and outer curves is 6 metres.</li> <li>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.</li> <li>There is a minimum vertical clearance to a height of four metres above the road at all times.</li> </ul>	<ul style="list-style-type: none"> <li>Complies. Perimeter road adjoining forest vegetation will be 8 m pavement – internal roads to be 7.2 m wide pavement.</li> <li>Complies.</li> <li>N/A. Devices not proposed.</li> <li>Can comply.</li> <li>Complies.</li> <li>Complies.</li> <li>Can comply.</li> <li>Can comply.</li> </ul>
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	<ul style="list-style-type: none"> <li>The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating.</li> </ul>	<ul style="list-style-type: none"> <li>Can comply.</li> </ul>
Roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered.	<ul style="list-style-type: none"> <li>Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.</li> </ul>	<ul style="list-style-type: none"> <li>Complies. Hydrants will not be located within the road surface, carriageway or parking areas. They will be located along nature strip.</li> </ul>



	<ul style="list-style-type: none"> <li>Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable. The hydrants will be located on the nature strip therefore cars will not park over them and they will be accessible.</li> </ul>
There is clear access to reticulated water supply.	<ul style="list-style-type: none"> <li>Public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.</li> <li>One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable. Roads will be <math>\geq 7.2</math> m wide.</li> <li>Not applicable – roads will be two way.</li> </ul>
Parking does not obstruct the minimum paved width.	<ul style="list-style-type: none"> <li>Parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays.</li> <li>Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable. Parking bays not proposed.</li> <li>Complies - as advised by client 17.05.17</li> </ul>

**Table 3: Performance criteria for fire trails\*<sup>1</sup>**

Performance Criteria	Acceptable Solutions
<p>The intent may be achieved where:</p> <ul style="list-style-type: none"> <li>the width and design of the fire trails enables safe and ready access for firefighting vehicles</li> </ul>	<ul style="list-style-type: none"> <li>A minimum carriageway width of four metres with an additional one metre wide strip on each side of the trail (clear of bushes and long grass is provided).</li> <li>The trail is a maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed.</li> <li>A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided.</li> <li>The crossfall of the trail is not more than 10 degrees.</li> <li>The trail has the capacity for passing by: <ul style="list-style-type: none"> <li>reversing bays using the access to properties to reverse fire tankers, which are six metres wide and eight metres deep to any gates, with an inner minimum turning radius of six metres and outer minimum radius of 12 metres; and / or</li> <li>a passing bay every 200 metres, 20 metres long by three metres wide, making a minimum trafficable width of seven metres at the passing bay.</li> </ul> </li> <li><i>Note: Some short construction in the access may be accepted where they are not less than the minimum (3.5m) and extend for no more than 30m and where obstruction cannot be reasonably avoided or removed</i></li> </ul>
<ul style="list-style-type: none"> <li>fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by non-authorised people.</li> </ul>	<ul style="list-style-type: none"> <li>The fire service is accessible to firefighters and maintained in a serviceable condition by the owner of the land.</li> <li>Appropriate drainage and erosion controls are provided.</li> <li>The fire trail system is connected to the property access road and / or to the through road system at frequent intervals of 200 metres or less.</li> <li>Fire trails do not traverse a wetlands or other land potentially subject to periodic inundation (other than a flood or storm surge).</li> <li>Gates for fire trails are provided and locked with a key / lock system authorised by the local RFS</li> </ul>
<ul style="list-style-type: none"> <li>Fire trails designed to prevent ween infestation, soil erosion and other land degradation.</li> </ul>	<ul style="list-style-type: none"> <li>Fire trail does not adversely impact on natural hydrological flows.</li> <li>Fire trail design acts as an effective barrier to the spread of weeds and nutrients.</li> <li>Fire trail construction does not expose acid-sulphate soils.</li> </ul>

\*<sup>1</sup> PBP page 25



## 5 Utilities

### 5.1 Water supply

The subject land is to be serviced by reticulated water. The furthest point from the majority of dwellings to a hydrant will be less than 90 m with a tanker parked in line in accordance with the provisions outlined within Australian Standard (AS) 2419.1–2005 'Fire hydrant installations - System design, installation and commissioning' (Standards Australia 2005).

### 5.2 Electricity

The electricity will be provided underground and therefore will comply with PBP.

### 5.3 Gas

Reticulated natural gas will not be installed. Installation of LP gas as part of future dwelling applications is to occur in accordance with AS/NZS 1596-2014 'The storage and handling of LP Gas' (Standards Australia 2014).

## 6 Assessment of environmental issues

At the time of assessment, a number of environmental reports including an Ecological Assessment (ELA 2015), a Vegetation Management Plan (ELA 2017a) and a Commonwealth EPBC Assessment (ELA 2017b) had been prepared by Eco Logical Australia for the proposed subdivision.

These assessments determined that there were no known significant environmental features, threatened species or Aboriginal relics identified under the *Threatened Species Conservation Act 1995* or the *National Parks Act 1974* that will affect or be affected by the bushfire protection proposals in this report.

Wollondilly Shire Council is the determining authority for this proposed subdivision; they will assess more thoroughly any potential environmental and heritage issues.

## 7 Recommendations & conclusion

The proposed subdivision can comply with the aim and objectives of PBP for residential subdivision. In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed subdivision, a standard that is consistent with 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.

The following recommendations/requirements apply and should be adopted by the NSW Rural Fire Service in the issuing of the Bush Fire Safety Authority:

1. The proposed APZ at the interface of the lots adjoining the CEPR lands as shown in **Figure 5** and as described in **Table 1** is to be managed to the relevant IPA and OPA standards as outlined in **Section 3.2** of this report;
2. A temporary 10 m staging APZ is to be maintained along the western boundary of the proposed subdivision where allotments do not adjoin a public road and ensured by a Section 88b bushfire easement over the residual allotment as shown in **Figure 5**;
3. Outside of the proposed APZs, the portion of the subdivision mapped as bush fire prone land is to be maintained to comply with an Inner Protection Area (IPA) standard in accordance with PBP as guided by **Section 3.2**;
4. Reticulated water and hydrants are to comply with AS 2419.1–2005 and must ensure that the furthest point of any future dwelling is located no further than 90 m from the nearest hydrant;
5. Any bottled gas supplies are to comply with AS/NZS 1596:2014;
6. Public road design and construction is to comply with PBP Section 4.1.3(1) as detailed in **Section 4** and **Table 2**;
7. Perimeter fire trail design and construction is to comply with PBP Section 4.1.3 (3) as detailed in **Section 4** and **Table 3**; and
8. Larger allotments (Lots 56, 59, 60, 91 and 92) will be surrounded by perimeter fire trails either within surrounding CEPR Lands or within the allotments themselves and ensured via Section 88b easements.



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**Senior Bushfire Planner**



## References

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