Bushfire Assessment and Recommendations

Proposed Development
Residential Subdivision
Lot 10 Deposited Plan 263172
15 Greenacre Drive
Tahmoor NSW 2573

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Reviewed by:
Introduction

The following report has been commissioned by Precise Planning, here in ‘the proponent’, to provide a Bushfire Assessment and Recommendations for bushfire safety and design compliance for the proposed residential subdivision development of Lot 10 DP 263172 – 15 Greenacre Drive, Tahmoor NSW 2573 (Wollondilly Shire Council Local Government Area), herein ‘the subject property’ or ‘subject development’.

The development application involves the subdivision of a single rural residential allotment, into 34 separate residential allotments.

This assessment considers the subject development site on the basis of;

- A site specific inspection undertaken on the 7/12/2017,
- An analysis of the subdivision plans as prepared by Australian Survey Solutions, Bowral (Plan of Subdivision – Surveyors Reference 170717, Revision B, Dated 21/02/18); &
- A desktop assessment using licensed or on-line spatial data resources available at the time of this report.

The subject property has been identified as being within, or bounded by, bush fire prone land. In this regard, the NSW legislative requirements for building, or land subdivision development on bush fire prone lands is applicable.

Considering the subject development as being ‘integrated development’, it has been assessed against the requirements and principals (aim and objectives) as outlined in the NSW document ‘Planning for Bushfire Protection (PBP), 2006’.

PBP states;

‘The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment.

More specifically, the objectives are to:

(i) afford occupants of any building adequate protection from exposure to a bush fire;
(ii) provide for a defendable space to be located around buildings;
(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
(iv) ensure that safe operational access and egress for emergency service personnel and residents is available;
(v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and

(vi) ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).’

This assessment includes an analysis of the potential (persisting) bushfire hazard extent and threat to the subject development and recommends standards and bush fire mitigation measures that should be introduced to address the objectives of PBP 2006.

Bushfire safety compliance, as purported by this report, for the subject development site comprises a package of measures in combination including asset protection zones, vehicle access and egress, construction standards & fire fighting water supplies as applicable.

The above measures have been derived from provisions and recommendations as outlined within the document ‘Planning for Bushfire Protection 2006’.

The following bushfire assessment has been prepared in accordance with the NSW Rural Fires Regulation 2002, Clause 44 - Application for a Bushfire Safety Authority.
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Map 2 Subdivision Plan
Appendix 1 Bushfire Constraints / APZs
Appendix 2 Site Photos (7/12/2017)
1.0 Description of the property

1.1 Lot and deposited plan (DP) number of the subject property

Lot: 10 Deposited Plan Number: 263172

1.2 Street address and locality map

15 Greenacre Drive, Tahmoor NSW 2573.

Locality map is as denoted in attached map 1.

1.3 Zoning of the subject land and any adjoining lands

The subject site is currently zoned ‘R2 – Low Density Residential’ (Wollondilly LEP 2011). Adjoining allotments to the North, South & East are also zoned R2, whilst the adjoining allotments to the West, are zoned ‘RU4 – Primary Production – Small Lots’.

The development also adjoins the Greenacre Drive road reserve to the South & East of the subject site.

Extract Wollondilly LEP 2011
1.4  Staging issues, if relevant, and description of the whole proposal

Description of the whole proposal

The subject site is vacant with no improvements or associated infrastructure.

The subject site is currently accessed directly from the public road system (Greenacre Drive). The proposed development (i.e. all new residential allotments) will also be accessed either directly from Greenacre Drive, or by way of a new sealed internal public road, located within the subject site.

The subject development is proposed to be a ‘residential subdivision’, creating 34 new separate residential allotments. The attached plan / Map 2 illustrates the approximate location and extent of the proposed development.

Residential allotments will range in size from 450m² to 970m².

The construction of any new residential buildings (which is not proposed at present) would be subject to another assessment under s79BA of the EP&A Act 1979 (to determine relevant bushfire construction requirements – Bushfire Attack Levels) in due course.
Staging Issues (temporary and reciprocal asset protection zone easements / agreements)

For the purposes of bushfire safety compliance, the subject development will not rely on any temporary or reciprocal asset protection zone (APZ) easements / agreements on adjoining lands.

1.5 Aerial or ground photographs of the subject land, existing and proposed cadastre

An ortho-photo and boundary overlay of the subject property is as shown attached Map 1. Ground / site photos of the subject property, neighbouring lands and existing public access roadway are appended to this report (Appendix 1).

Contours as shown / considered by this report are derived from the Department of Lands SIX Viewer Digital Elevation Model (DEM) data (10m Contour Interval).

The proposed cadastral boundaries are as denoted in attached map 2.

2.0 Classification of vegetation out to 140m from the development

2.1 Structural description consistent with the identification key in Keith D (2004) and PBP

Vegetation extent (bushfire hazard) within the study area is derived from aerial photo interpretation (API), a desktop review of local vegetation classification mapping and an inspection of the subject property.

The subject property has been mapped as bush fire prone land within the Wollondilly Shire Council Bush Fire Prone Land Map. The property is constrained by bush fire vegetation, within the study area, classified as ‘Vegetation Category 2’. The vegetation located adjacent to the subject site, generally to the East – North East, over Greenacre Drive (i.e. within 42 Greenacre Drive and beyond).

This vegetation has been assessed in local planning studies as ‘Shale Sandstone Transition Forest’. This mapped area of vegetation also appears to have a substantial exotic influence.

Based on a determination of vegetation formation using the Keith 2004 Identification Key, the vegetation which constrains the subject development to the East – North East within the residual vegetation, based on available information and a site visit, is most representative of a remnant of ‘Shale Sandstone Transition Forest’.
This vegetation will be assessed as equivalent to ‘Rainforest’ as per Appendix 2 - A 2.3 a) PBP2006.

PBP 2006 states, ‘For the purposes of assessment, the following are not considered a hazard or as a predominant vegetation class/ formation and can be included within an asset protection zone:

(a) non-vegetated areas including roads, footpaths, cycle ways, waterways, buildings, rocky outcrops and the like; and

(b) reduced vegetation including maintained lawns, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries.

Considering the above, this report notes that all adjoining rural residential properties are generally considered ‘cleared and managed lands’, with the exception of the remnant vegetation within the adjacent property to the East – North East.

The subject development also adjoins a managed road reserve (Greenacre Drive).

It is also noted that some adjacent sites, to the East – North East (i.e. 42 & 60 Greenacre Drive), are also currently being assessed for development approval for a similar subdivision, for the creation of 67 new residential lots.

As such, in due course, all ‘Category 2’ bushfire vegetation, is proposed to be removed from within No. 42 Greenacre Drive, however, it will still be assessed as a bushfire risk in the interim, for the purposes of this assessment.
2.2 Past disturbance factors and any future intended land uses that could alter the vegetation classification in the future

Considering the location of the development site, within an established rural residential area, and the zoning of adjacent lands (i.e. within a regional growth corridor), it would be reasonable to suggest that the potential extent of bushfire vegetation that may persist or accumulate adjacent to the subject development site will not increase any further in the future.

3.0 Assessment of the effective slope to a distance of 100m

Slope analysis (used by this assessment) is derived from 10m grid digital elevation model (DEM) and a general inspection of the subject development site. This includes deriving contours for each 10m change in elevation and the approximate areas of slope / gradient based on PBP slope classes. The effective slope surrounding or affecting the subject development site, primarily influencing bushfire behaviour has been assessed as;

- **North East – East**: Maximum >0 – 5 Degrees Downslope

4.0 Identification of any significant environmental features

The proponent has not advised of any constraint, restriction or burden over the subject property for the purposes of land development and associated asset protection zone maintenance.

Based on a brief desktop assessment of the subject property, the following table outlines any significant environmental features potentially affected by the subject development.

**Table 1.0**

<table>
<thead>
<tr>
<th>Present within Subject Property</th>
<th>Present within Study Area</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Forest / Vegetation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Riparian Corridor</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SEPP 14 – Wetland</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 1.0

<table>
<thead>
<tr>
<th></th>
<th>Present within Subject Property</th>
<th>Present within Study Area</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPP 26 – Littoral Rainforest</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>SEPP 44 – Koala Habitat</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Areas of Geological Interest</td>
<td>Undetermined</td>
<td>Undetermined</td>
<td></td>
</tr>
<tr>
<td>Environmental Protection Zones</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Steep Lands (&gt;18°)</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Land Slip Area</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Flood Prone Area</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>National Park / State Forest</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

5.0 Details of threatened species, populations, endangered ecological communities and critical habitat known to the applicant

Some vegetation within the study area is mapped as ‘Shale Sandstone Transition Forest’. This is listed as a threatened ecological community under the *NSW Threatened Species Conservation Act 1995*.

The vegetation community has been significantly disturbed through the previous/current land uses (e.g. grazing and rural residential uses). The entire site currently presents as, and is proposed to be maintained as an ‘Asset Protection Zone’, and there is very little in the way of native vegetation within the subject site.

No other known threatened species, populations or ecological communities identified under the *NSW Threatened Species Conservation Act 1995* have been noted, recorded or advised of as part of this assessment.

For the purposes of this assessment, the proponent has not provided, nor indicated there to be any further threatened species issues or occurrence potentially affecting the subject land / development.
6.0 Details of Aboriginal heritage known to the applicant

No known Aboriginal relics (being a relic within the meaning of the *NSW National Parks and Wildlife Act 1974*) or Aboriginal place (within the meaning of that Act) have been noted, recorded or advised of as part of this assessment.

For the purposes of this assessment, the proponent has not provided nor indicated there to be any items or issues of Aboriginal heritage potentially affecting the subject property / development.

Likewise, this assessment has not considered any past studies, surveys for the area or any documentation supplied to council in relation to any items or issues of Aboriginal heritage potentially affecting the subject property / development.

7.0 Bushfire assessment (including methodology)

Methodology for this site assessment for bushfire attack and recommended mitigation measures (setback distances and construction standards) are based on Appendix 2 of PBP 2006.

Minimum required asset protection zones and other recommended setback measures for bushfire protection are derived from distances outlined by PBP for a residential subdivision development within an **FDI 100** Fire Area (PBP Appendix 2 – A2.4).

The Wollondilly Shire Council LGA is designated as potentially having an **FDI of 100** as a 1:50 year event (PBP Appendices 2 – Table A2.3).

8.0 Asset protection zones (including any management arrangements or easements including those contained on adjoining lands)

The minimum specified APZ / setback required for the above parameters of slope and vegetation as determined from PBP 2006 (for a ‘Residential Subdivision Development’ Table A2.4) for the building siting from any persisting and available bushfire vegetation (hazard) within the study area are as follows.
Table A2.4 Appendix 2 PBP 2006

<table>
<thead>
<tr>
<th>Direction</th>
<th>Vegetation</th>
<th>Minimum APZ</th>
<th>Slope</th>
<th>k/Wm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East – East</td>
<td>Remnant Forest</td>
<td>Min 10m. (Actual Minimum 25m)</td>
<td>&gt;0 – 5 Degrees Downslope</td>
<td>29</td>
</tr>
</tbody>
</table>

PBP 2006 acceptable solutions for APZ compliance require that;

- *an APZ is provided in accordance with the relevant tables / figures [within PBP 2006]*,
- *the APZ is wholly within the boundaries of the development site, &*
- *the APZ is located on lands with a slope less than 18 degrees.*

Considering the above, the subject development site can reasonably facilitate the specified minimum APZ / setback from potentially unmanaged and persisting bushfire vegetation, located within the study area.

Where the minimum specified APZ distance extends beyond the boundary of the subject development site the adjoining land is a managed road reserve or residential (managed / maintained) area.

**9.0 Siting & adequacy of water (in relation to reticulation rates or where dedicated water storage will be required)**

The subject development site is currently connected to a reticulated town water supply which services the residential building development along Greenacre Drive. Apart from the above, the proponent has not provided any specific advice (at the time of this assessment) regarding proposed reticulated water infrastructure and mains size, supply pressure or guarantee of delivery.

This report notes a number of hydrant connection points within Greenacre Drive, which will serve to supply water some of the proposed allotments.

All future residential building within the proposed allotments will be required to be <90 m from the nearest and reasonably available fire hydrant connection, or alternately they will be required to maintain a suitable non-reticulated static water supply, in terms of PBP 2006 Section 4.1.3.

PBP acceptable solutions for a reticulated water supply area (relevant to the subject development) states that:
• Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.

• Hydrants are not located within any road carriageway.

• All above ground water and gas service pipes external to the building are metal, including and up to any taps.

Based on AS2419 requirements, hydrant connection points;

• Fed by mains supply only, should be located so as to be no greater than 90m from the furthest most point of buildings or areas that may require protection or water supply during a fire event

It is recommendation of this assessment that all future services (including water supply) to the proposed residential subdivision are to achieve full compliance with Section 4.1.3 ‘Standards for Bushfire Protection Measures for Residential and Rural Residential Subdivisions (PBP 2006)’.

10.0 Capacity of public roads (especially perimeter roads and traffic management treatments)

The subject development site is currently accessed directly via Greenacre Drive. All new allotments will also be accessed either from Greenacre Drive, or by way of a new sealed internal public access road system, and temporary cul-de-sac, located within the new allotments.

Greenacre Drive is approximately 7m wide (verge – verge, with formed carriageway), two-way access with constructed roadside drainage and verge areas either side. The maximum speed limit along Greenacre Drive is 60 kph. Greenacre Drive will be subject to an upgrade and realignment as part of the development processes within the area.

A new internal road system is proposed, off Greenacre Drive, providing public road access to all proposed allotments (8m – 10m wide carriageways).

The current subdivision plan provides an integrated approach, to facilitate the seamless transition to residential development amongst all adjoining lots, in line with the local planning provisions.
As such, one of the new roads (Road 2) terminates in the Northern Western corner of the subject site, in a temporary cul-de-sac which is only 10m diameter. Although this proposed access road creates only a temporary dead end, the access road provides egress through only ‘managed lands’, and not through any area containing any significant bushfire vegetation (e.g. forest, woodland or heath), and in addition it is located approximately only 25m from the proposed through road (Road 1). All residential building envelopes would also be within 70m of the through road intersection of Road 1 & Road 2.

As a considered opinion, all existing and proposed public roadways servicing the subject development site should have the capacity to handle an increase in traffic associated with the subject development and a potential bushfire emergency.

11.0 Public roads link to fire trails and have two-way access

The subject development site does not propose nor necessarily require any fire trail access to service the subject development site.

12.0 Adequacy of access and egress for emergency response

The subject development site / proposed new residential allotments are to be accessed directly off a new internal public road system, or via Greenacre Drive (see above).

PBP acceptable solutions for property roads (relevant to these allotments) states that;

‘No specific access requirements apply in an urban area where a 70m unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).”

13.0 Adequacy of maintenance plans and emergency procedures

No additional advice or information regarding bushfire maintenance plans & fire emergency procedures has been provided by the proponent. Should a bushfire emergency impact upon this area, the implementation of the existing ‘Wollondilly Local Emergency Management Plan’ should be adequate for bushfire suppression, hazard management and maintenance.
The implementation, and on-going future maintenance, of building construction standards described and recommended section 14.0 (Construction standards to be used) and APZ areas as described section 8.0 (APZ) should reasonably facilitate bushfire maintenance for the subject development.

14.0 Construction standards to be used

No construction is currently proposed as part of this development application. This application relates only to boundary adjustments and civil works.

However, based on the above assessment, APZ recommendations and current separation distances stated by this report, the subject development sites will provide sufficient separation for the existing and for any future proposed residential dwellings to comply with BCA DTS provisions or otherwise the application of AS3959-2009.

Any future proposed residential dwelling, constructed within the proposed residential allotments will be subject to a further assessment under s79BA of the E P & A Act 1979 (in due course).

15.0 Adequacy of sprinkler systems & other fire protection systems

Sprinkler systems are neither recommended nor necessarily required for the subject development site (based on the recommended building safety designs and siting as considered by this report).

Likewise, no other alternate fire protection measures are recommended by this report (over and above AS3959-2009 DTS & PBP requirements).

16.0 An assessment of how the development complies with the acceptable solutions, performance requirements and relevant specific objectives within Chapter 4 of PBP

16.1 Performance criteria / acceptable solution compliance

The following table outlines how the subject development complies with PBP provisions for a residential or rural residential subdivision. Compliance is stated as:

- **YES** – the subject development can facilitate the acceptable solution for bushfire safety,
- **REASONABLY ASSUMED** – the subject development can reasonably facilitate the acceptable solution for bushfire safety, predicated on assumptions of future design and activities likely to occur,
- **NOT CONSIDERED** – the acceptable solution for bushfire safety is considered unnecessary or otherwise overly exceeds the relative risk associated with a bushfire event affecting the subject development. Bushfire safety compliance is based on performance criteria,

- **NOT APPLICABLE (N/A)** – the acceptable solution is not applicable to the design or construction of the subject development,

- **NO** – the subject development will not facilitate the acceptable solution for bushfire safety compliance. Bushfire safety compliance is based on performance criteria.

### Table 3.0 Derived from PBP Chapter 4; 4.1.3 – Standards for Bush Fire Protection Measures for Residential and Rural Residential Subdivision

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solution</th>
<th>Compliance</th>
<th>Assessment / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiant heat levels at any point on a proposed building will not exceed 29 kW/m²</td>
<td>an APZ is provided in accordance with the relevant tables and figures in PBP</td>
<td>Yes</td>
<td>Compliance as per Recommendation No. 1 of this report. Where the minimum specified APZ areas extend beyond the boundary of the proposed allotment, the adjoining land will be road reserves, or managed rural residential properties.</td>
</tr>
<tr>
<td><em>the APZ is wholly within the boundaries of the development site</em></td>
<td><em>the APZ is wholly within the boundaries of the development site</em></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated</td>
<td>the APZ is not located on lands with a slope exceeding 18 degrees</td>
<td>Yes</td>
<td>No part of the proposed APZ is located on slopes exceeding 18 degrees.</td>
</tr>
<tr>
<td><em>APZs are managed and maintained to prevent the spread of a fire towards the building</em></td>
<td>in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005)</td>
<td>Yes</td>
<td>Compliance as per Recommendation No. 1 of this report, and a reasonable assumption that future property maintenance and landscaping would ensure APZ areas remained managed / fuel reduced for the life of the proposed development.</td>
</tr>
<tr>
<td>Fire fighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)</td>
<td>public roads are two-wheel drive, all weather roads</td>
<td>Yes</td>
<td>Greenacre Drive, and the proposed new internal road, and the surrounding road infrastructure are two-wheel drive, all weather sealed roads.</td>
</tr>
<tr>
<td>Public road widths and design that allow safe access for fire fighters while residents are evacuating an area</td>
<td>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</td>
<td>N/A</td>
<td>The subject development will not incorporate any new perimeter roadways. An internal roadway system is able to comply with public road requirements.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solution</th>
<th>Compliance</th>
<th>Assessment / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)</td>
<td>Yes</td>
<td>The existing public roadway system can reasonably support any increased traffic flow due to operational firefighting or emergency evacuations.</td>
<td></td>
</tr>
<tr>
<td>the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas</td>
<td>N/A</td>
<td>An internal roadway system is able to comply with most public road requirements, apart from a temporary turning circle being &lt;12m in diameter.</td>
<td></td>
</tr>
<tr>
<td>roads are through roads. Dead end roads are not more than 200 m in length from a through road, incorporate a minimum 12 m outer radius turning circle, and are clearly sign posted as a dead end</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>traffic management devices are constructed to facilitate access by emergency services vehicles</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>there is a minimum vertical clearance to a height of 4m above the road at all times</td>
<td>Reasonably Assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the minimum distance between inner and outer curves is six metres</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>public roads have a cross fall not exceeding 3 degrees</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes)</td>
<td>Reasonably Assumed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The capacity of public road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles**

<table>
<thead>
<tr>
<th>Acceptable Solution</th>
<th>Compliance</th>
<th>Assessment / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas).</td>
<td>Reasonably Assumed</td>
<td>A new internal roadway system is able to comply with public road requirements. The existing public roadway system can reasonably support any increased traffic flow due to operational firefighting or emergency evacuations.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Acceptable Solution</td>
<td>Compliance</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered</td>
<td>Bridges clearly indicate load rating</td>
<td></td>
</tr>
<tr>
<td>There is clear access to reticulated water supply</td>
<td>public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>public roads up to 6.5 m wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</td>
<td>N/A</td>
</tr>
<tr>
<td>Parking does not obstruct the minimum paved width</td>
<td>parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays</td>
<td>Reasonably Assumed</td>
</tr>
<tr>
<td></td>
<td>public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road</td>
<td>N/A</td>
</tr>
<tr>
<td>Access to properties is provided in recognition of the risk to fire fighters and/ or evacuating occupants</td>
<td>at least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Performance Criteria

<table>
<thead>
<tr>
<th>The capacity of property access road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceptable Solution</strong></td>
</tr>
</tbody>
</table>

**Compliance** | N/A |

**Assessment / Comment** | The current and proposed driveways will provide all-weather access, do not require bridges or traverse wetlands etc. |

<table>
<thead>
<tr>
<th>All weather access is provided</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceptable Solution</strong></td>
</tr>
</tbody>
</table>

**Compliance** | Yes |

### Property road widths and design enable safe access for vehicles

**Acceptable Solution**

- Note: No specific access requirements apply in an urban area where a 70m unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70 kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).
- in forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay
- a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches
- internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle - minimum 12 m outer radius
- curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress
- the minimum distance between inner and outer curves is six metres
- the cross-fall is not more than 10 degrees

**Compliance** | N/A |

**Assessment / Comment** | A 70m unobstructed path can be demonstrated between the most distant external part of the proposed building envelopes in the new allotments and the nearest part of the new public access road. The road speed limit within the local area is not greater than 70 kph. All public access roads, within the study area, support the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply). |
<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Acceptable Solution</th>
<th>Compliance</th>
<th>Assessment / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum grades for sealed roads do not exceed 15 degrees and not more than 10</td>
<td>N/A</td>
<td></td>
<td>The subject development does not incorporate nor require any new or redesigned fire trail access.</td>
</tr>
<tr>
<td>degrees for unsealed roads.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>access to a development comprising more than three dwellings have formalised</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>access by dedication of a road and not by right of way</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**The width and design of the fire trails enables safe and ready access for fire</td>
<td>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</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>fighting vehicles**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the trail is a maximum grade of 15 degrees if sealed and not more than 10 degrees</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>if unsealed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a minimum vertical clearance of 4m to any overhanging obstructions, including tree</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>branches is provided</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the cross-fall of the trail is not more than 10 degrees</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the trail has the capacity for passing by:</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- reversing bays; and/or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- a passing bay every 200 metres, 20 metres long by three metres wide.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**Fire trails are trafficable under all weather conditions. Where the fire trail</td>
<td>the fire trail is accessible to fire fighters and maintained in a serviceable condition by the owner of the land</td>
<td>N/A</td>
<td>The subject development does not incorporate nor require any new or redesigned fire trail access.</td>
</tr>
<tr>
<td>joins a public road, access shall be controlled to prevent use by non authorised</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>persons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriate drainage and erosion controls are provided</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the fire trail system is connected to the property access road and/or to the through</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>road system at frequent intervals of 200 metres or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fire trails do not traverse a wetlands or other land potentially subject to periodic</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>inundation (other than a flood or storm surge)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Acceptable Solution</td>
<td>Compliance</td>
<td>Assessment / Comment</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>gates for fire trails are provided and locked with a key/lock system authorised by the local RFS</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire trails designed to prevent weed infestation, soil erosion and other land degradation</td>
<td>fire trail design does not adversely impact on natural hydrological flows</td>
<td>N/A</td>
<td>The subject development does not incorporate nor require any new or redesigned fire trail access.</td>
</tr>
<tr>
<td>fire trail design acts as an effective barrier to the spread of weeds and nutrients</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fire trail construction does not expose acid-sulphate soils</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Reticulated water supplies)</td>
<td>reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads</td>
<td>Yes</td>
<td>Reticulated water supply is located along Greenacre Drive. Fire hydrant system (to AS2419-2005) to be installed in new subdivision allowing all proposed allotments can achieve compliance for reticulated water supplies, or if required a non reticulated static supply may be installed as part of future development within each site, as per PBP 2006 4.1.3. All services can reasonably achieve the acceptable solutions under s79BA. Any future hydrants are to be located within the pathway areas.</td>
</tr>
<tr>
<td>Water supplies are easily accessible and located at regular intervals</td>
<td>fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005.</td>
<td>Reasonably Assumed</td>
<td>Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. Hydrants are not located within any road carriageway. All above ground water and gas service pipes external to the building are metal, including and up to any taps. The provisions of parking on public roads are met.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>(Electricity Services)</td>
<td>where practicable, electrical transmission lines are underground</td>
<td>Reasonably Assumed</td>
<td>As is the existing practice, any new electrical supplies would be located underground (i.e. to any new residence constructed within new allotment). All services can also achieve the acceptable solutions under s79BA.</td>
</tr>
<tr>
<td>Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings</td>
<td>where overhead electrical transmission lines are proposed: - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and</td>
<td>Reasonably Assumed</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.0 - PBP 2006 specific objective assessment

<table>
<thead>
<tr>
<th>PBP 2006 Specific Objective</th>
<th>Assessment / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) afford occupants of any building adequate protection from exposure to a bush fire</td>
<td>Where all recommendations stated by this report are reasonably and adequately incorporated, occupants remaining within the subject development site during a significant bushfire event would be afforded the benefit of bushfire protection ‘measures in combination’. In this respect, occupants remaining within a dwelling or else defending the dwelling during a potential fire storm should be reasonably protected (shielded) or separated from the effects of a bush fire event.</td>
</tr>
<tr>
<td>PBP 2006 Specific Objective</td>
<td>Assessment / Comment</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| (ii) provide for a defendable space to be located around buildings | Where all recommendations relating to APZ areas stated by this report are reasonably and adequately incorporated and maintained, the proposed residential building would be afforded a defendable space.
Firefighters or occupants undertaking property protection activities in and around any future proposed residential buildings should reasonably be afforded protection and separation from radiant heat and an opportunity to quell small ignitions that may occur on or directly adjacent to the residential buildings. |
| (iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition | Where all recommendations relating to AS3959-2009 Construction standards and APZ areas as stated by this report are reasonably and adequately incorporated, the existing and any future proposed residential building should be afforded appropriate separation to prevent direct flame contact and material ignition. |
| (iv) ensure that safe operational access and egress for emergency service personnel and residents is available | Where all recommendations relating to property roadway access as stated by this report are reasonably and adequately incorporated, emergency services personnel and residents should be afforded safe operational access / egress for the subject development site.
The existing public roadway system should safely facilitate access and egress (early evacuation) from the subject development site for emergency services personnel and residents during a bushfire event. |
| (v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ) | Where all recommendations relating to AS3959-2009 Construction standards & APZ areas stated by this report are reasonably and adequately incorporated, it would be reasonable to assume regular residential property maintenance would ensure ongoing management and maintenance of bush fire protection measures.
Should the standard or upkeep of APZ areas, buildings or vehicle access (required for bushfire safety compliance) become compromised during the life of the subject development site, it would also be reasonable to assume such issues (bushfire hazard) would be addressed by Council or the Fire Authorities through their standard policies and notice procedures. |
| (vi) ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting) | Where all recommendations relating to fire fighting water supplies as stated by this report are reasonably and adequately incorporated, both emergency services personnel and others assisting in bush fire fighting should safely be able to draw on a water supply for property protection purposes.
Similarly, where the installation or connection to electrical services incorporates the associated recommendations as stated by this report, both emergency services personnel and others assisting in bush fire fighting should safely be able to manage any electrical hazards associated during a bushfire event. |
17.0 Bushfire Safety & Compliance Recommendations

The following recommendations (Table 5.0) are made for the bushfire safety & protection measures for the proposed residential subdivision development within 15 Greenacre Drive, Tahmoor NSW 2573.

These recommendations are based upon the relevant provisions (acceptable solutions or performance criteria) for future residential building in bushfire prone areas and the NSW Rural Fire Service guideline entitled *Planning for Bushfire Protection 2006*.

**Table 5.0 – Bushfire Safety / Compliance Recommendations**

<table>
<thead>
<tr>
<th>No.</th>
<th>PBP Standard</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asset Protection Zone</td>
<td><em>The area indicated (within Appendix 1 - Map 2) is to be maintained as an Asset Protection Zone (Inner Protection Area) for the life of the development.</em></td>
</tr>
<tr>
<td>2</td>
<td>Building Construction Standard (BCA DTS)</td>
<td><em>Based on the assessment given within this report, any future residential development, (proposed within any allotment within the subject development), must be assessed as per the requirements of Section 79BA of the Environmental Planning and Assessment Act 1979. This includes complying with AS3959-2009 ‘Construction of buildings in bushfire prone areas’ and the additional construction requirements outlined within PBP Addendum: Appendix 3 (A3.7)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Alternately, each allotment will be required to maintain a suitable non-reticulated static water supply, in terms of PBP 2006 Section 4.1.3, as part of future residential development approvals within the sites.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Within the subject development site, all above ground water pipes external to the buildings should be metal including and up to any taps.</td>
</tr>
<tr>
<td>No.</td>
<td>PBP Standard</td>
<td>Recommendation</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| 4   | Electrical Services| *Electrical supply connections to service any proposed residential building should be designed & located in accordance with PBP, including;*  
|     |                    | • New or re-positioned electrical transmission lines are located underground (from supply point). |
| 5   | Gas Services       | *Any future gas service connection/installation should comply with the acceptable solutions of PBP, including:*  
|     |                    | • Reticulated gas is installed and maintained in accordance with AS1596 and the requirements of the relevant authorities  
|     |                    | • Metal piping is to be used and polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used. |
| 6   | Access & Egress    | *New Roadways, within subject allotment, to be constructed/maintained in compliance with provisions of PBP 4.1.3 Access (1) Public roads; as denoted above in section 16.1 of this report (with the exception of the temporary dead end, terminating in a temporary turning circle, with a reduced radius of 10m. |

18.0 Conclusion

Provided that the proposed residential building development, APZ areas, access and water supply facilities within the subject development site are constructed / designed / maintained in accordance with the recommendations as described by this report, it is a considered opinion that the subject development can satisfy the aims, objectives and performance requirements of Planning for Bushfire Protection 2006 that are considered relevant to the development under Section 100B of the NSW Rural Fires Act and Section 79BA of the EP&A Act.
Bushfire safety compliance and mitigation (as recommended and/or purported by this report) for the subject development site comprises a package of ‘measures in combination’ primarily including asset protection zoning, construction standards, property roadway access & adequate water supply for fire fighting purposes.

The above measures have been derived from provisions and recommendations as outlined within the document ‘Planning for Bushfire Protection Guidelines, 2006’, engineered judgment, considered opinion, and previous advice from the NSW Rural Fire Service Development Control Unit.

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Sydney Bushfire Consultants

Graduate Diploma Design for Bushfire Prone Areas  
Diploma of Building Surveying  
Diploma of Public Safety (Fire Fighting Management) (Dip PSFM)  
Cert. IV Residential Building Studies  
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Mob: 0414 808 295  Ph/Fax.: (02) 9369 5579  
Email: scott@sydneybushfireconsultants.com.au
19.0 References


Environmental Planning and Assessment Act (1979) – NSW Government Printer.
- Section 79BA Consultation and Development Consent Certain Bushfire Prone Land
- Section 146 Bushfire Prone Land

Rural Fires Act (1997) – NSW Government Printer


Standards for Asset Protection Zones – NSW Rural Fire Service
Map 1 – Overview & Access

Study Area

Bushfire Vegetation

Subject Property

Tahmoor

N

PROGRESS STREET
CURTAIN AVENUE
COURT STREET
GREAT STREET
GREENACRE DRIVE
CROSS STREET
Map 2 – Subdivision Plan
Appendix 1 - Bushfire Constraints
Appendix 2 – Site Photos (7/12/2017)

Subject site, looking W from SE corner

Subject site, looking NW from SE corner

Subject site, looking N from SE corner

Greenacre Drive, looking N

Greenacre Drive, looking N

Existing electrical supply
Reticulated water supply

Managed land, beyond Greenacre Drive, looking SE

Remnant Vegetation, within 42 Greenacre Drive, looking NE

Remnant Vegetation, within 42 Greenacre Drive, looking N