BLACKASH
BUSHFIRE CONSULTING

Bushfire Hazard Assessment

2B Aldington Rd, Kemps Creek - proposed Rural Residential Subdivision

Prepared for
Calibre Group

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

1 October 2019

Version V1.1

Document Tracking

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Version	Primary Author(s)	Description	Date Completed
1.1	Lew Short	Final	1 October 2019

Document Control

[redacted]

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Glossary of Terms

APZ	Asset protection zone
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2009*
BAL	*Bushfire Attack Level*
BCA	*Building Code of Australia*
BFSA	Bush Fire Safety Authority
EPA Act	*Environmental Planning & Assessment Act 1979*
FDI	Fire Danger Index
ha	Hectare
m	Metres
PBP	*Planning for Bush Fire Protection 2018*
RF Act	*Rural Fires Act 1997*

1. Introduction

The Calibre Group have commissioned Blackash Bushfire Consulting (Blackash) to prepare a Bushfire Hazard Assessment for a new 16 Lot residential subdivision and a residual Lot at Horsley Road, Kemps Creek (Figure 1) which is legally known as LOT A IN DP 392643 & LOT 21 DP 1010514 (the site).

The site has been cleared and managed for agricultural purposes with existing farm infrastructure (sheds, internal roads) throughout the site. The 16 proposed rural residential Lots are large (minimum 2ha) with the residual Lot being 68.57ha (Figure 2). The application does not include provision for residential houses, and these will be assessed in future development applications.

The site is not isolated development and is accessed by existing road networks. The proposed 16 Lot subdivision is not rural subdivision as the Lots will not be utilised for primary production. A perimeter road has been provided to the 16 residential Lots that complies with PBP 2018.

The site is designated as being Category 2 Bushfire Prone Land and as such is categorised as Integrated Development, under Section 4.46 of the *Environmental Planning and Assessment Act (*EPA Act). The application does not include provision for residential houses, and these will be assessed in future development applications.

Land surrounding the proposed development has been intensively developed and bushfire risk affecting the site is considered to be low risk. Existing commercial and industrial development adjoin the site to the west and north. A quarry is located to the north east and south east of the site and residential development to the east. The south of the site is a rural property that is extensively grazed and cleared of trees.

The NSW Rural Fire Service (RFS) have issued a new version of *Planning for Bushfire Protection 2006* (PBP 2006) known as *Planning for Bushfire Protection 2018* (PBP 2018). The new document has been released and gazettal is due in September 2019. Both versions of the document can be used in the transitional period. This assessment has been completed against PBP 2018 to ensure best practice is reflected in the assessment.

This proposal has been prepared in accordance with the pre-release version of PBP 2018 in its entirety and the development complies with all relevant Acceptable Solutions in this version of PBP. All Lots have been created to demonstrate that future houses will not receive radiant heat levels at any point on a proposed building will not exceed 29 kW/m^2.

This assessment has been prepared by Lew Short (BPAD Level 3 BPAD 16373). The report has been completed by desktop assessment.

Figure 1 Location

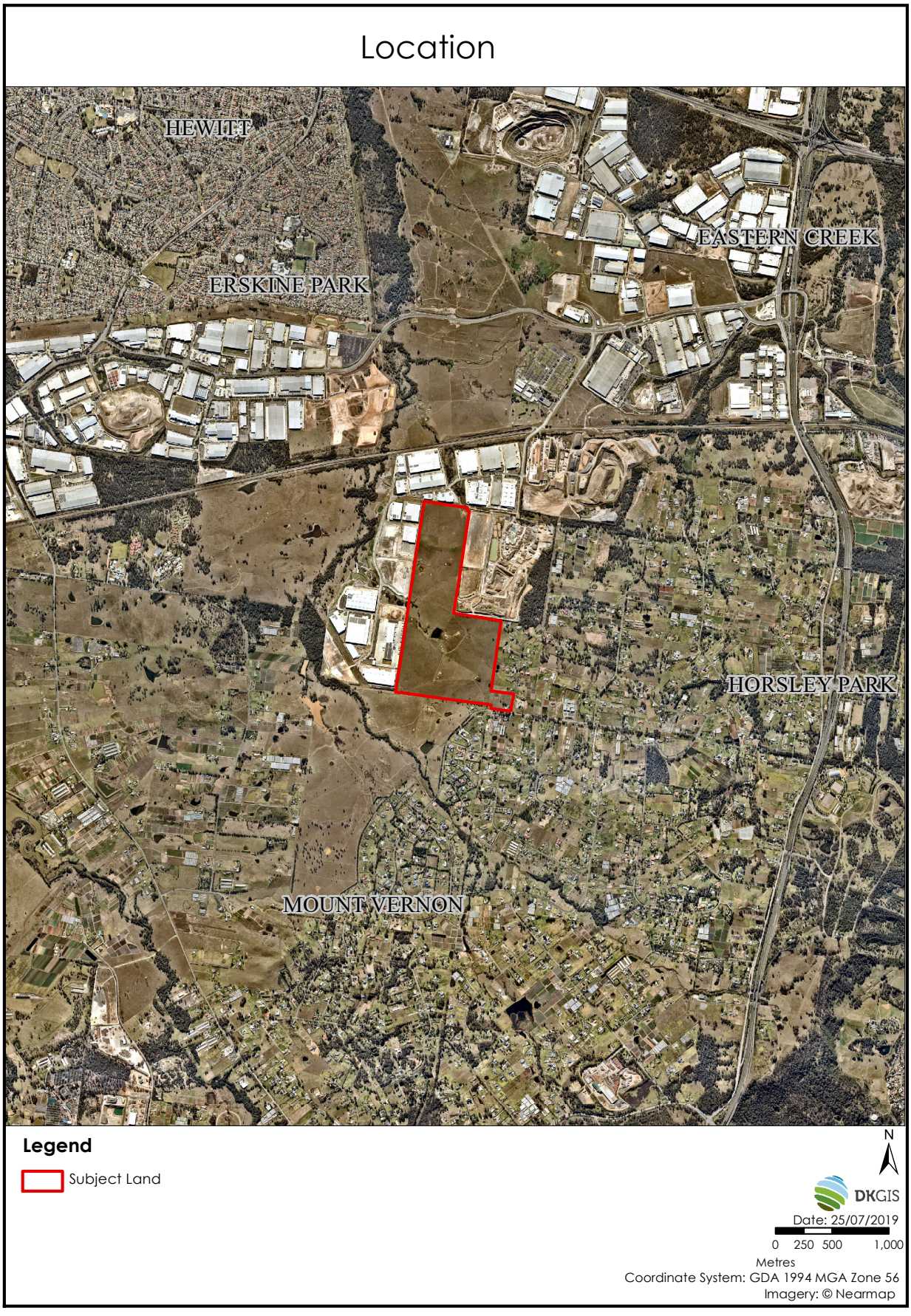
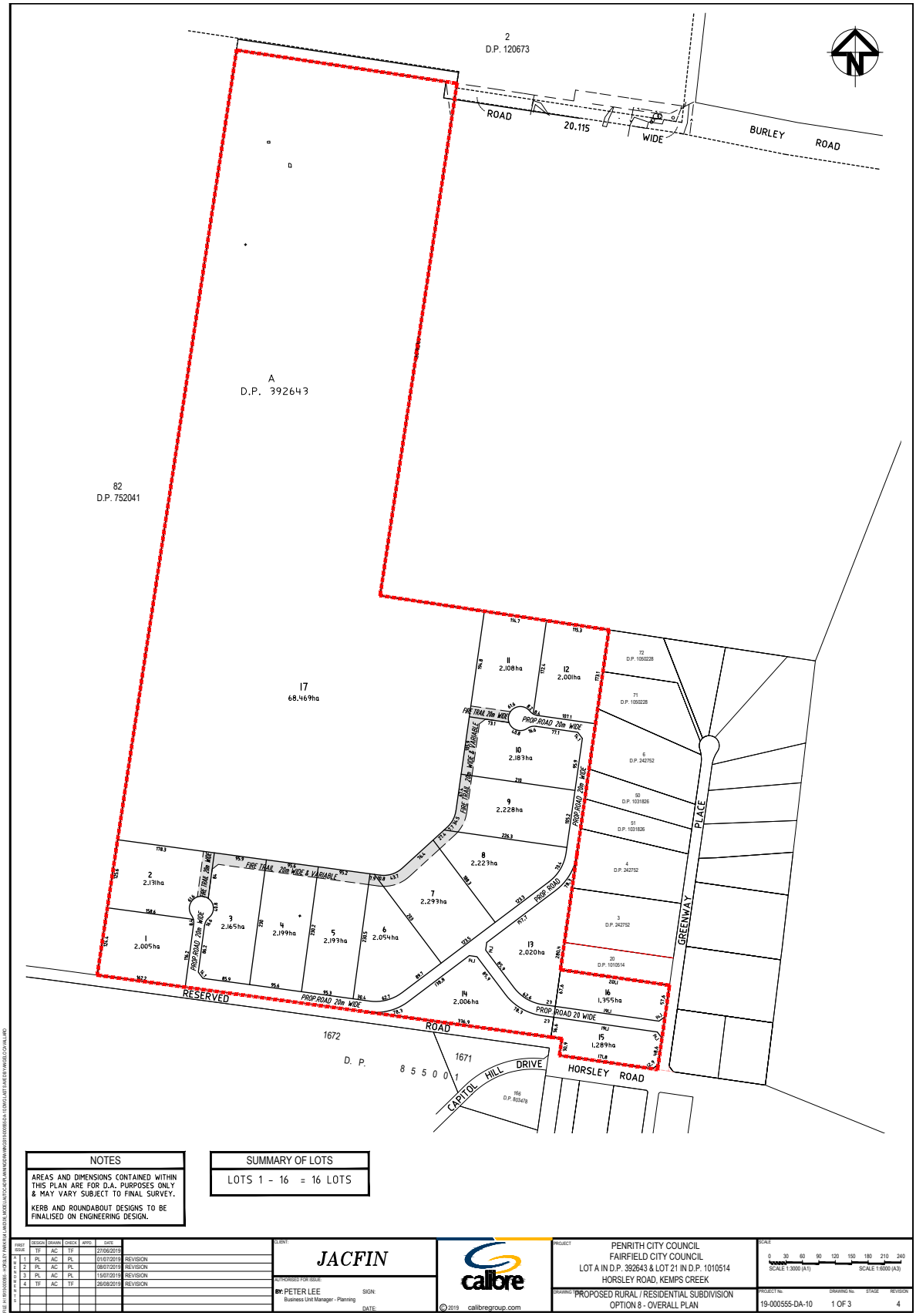


Figure 2 Proposed subdivision layout (source Calibre)



2. Legislative Framework

Residential subdivision is categorised as Integrated Development, under Section 4.46 of the **EPA Act**. Integrated development requires development consent from Council and General Terms of Approval from the **RFS**. Any development applications for such a purpose must obtain a Bush Fire Safety Authority (**BFSA**) from the Commissioner of the RFS, in accordance with Section 100B of the Rural Fires Act 1997 (**RF Act**).

A BFSA authorises development to the extent that it complies with *Planning for Bush Fire Protection 2018* (**PBP 2018**) including standards regarding setbacks, provision of water supply and other measures in combination considered by the Commissioner necessary to protect persons, property or the environment from danger that may arise from a bushfire. Other measures include policy documents that the RFS releases on its web site such as Fast Facts and Policy Notes.

Clause 44 of the *Rural Fires Regulation* (**RF Reg**) prescribes the requirements for an application for a BFSA. This Bushfire Hazard Assessment has been completed in accordance with the RF Reg and the requirements of *PBP 2018*. It has demonstrated the requirements of PBP 2018.

The subdivision has been designed to meet PBP 2018 specific objectives for subdivision:

- *minimise perimeters of the subdivision exposed to the bush fire hazard. Hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided.*
- *minimise bushland corridors that permit the passage of bush fire*
- *provide for the siting of future dwellings away from ridge-tops and steep slopes - particularly up-slopes, within saddles and narrow ridge crests.*
- *ensure that separation distances (APZ) between a bush fire hazard and future dwellings enable conformity with the deemed- to-satisfy requirements of the BCA. In a staged development, the APZ may be absorbed by future stages.*
- *provide and locate, where the scale of development permits, open space and public recreation areas as accessible public refuge areas or buffers (APZs)*
- *ensure the ongoing maintenance of asset protection zones*
- *provide clear and ready access from all properties to the public road system for residents and emergency services*
- *ensure the provision of and adequate supply of water and other services to facilitate effective firefighting.*

3. Bushfire Prone Land

The site is identified as 'bushfire prone land' (see Figure 3) as mapped by Council for the purposes of Section 10.3 of the EPA Act and the legislative requirements for building on bushfire prone lands are applicable.

Bushfire prone land maps provide a trigger for the development assessment provisions and consideration of sites that are bushfire prone.

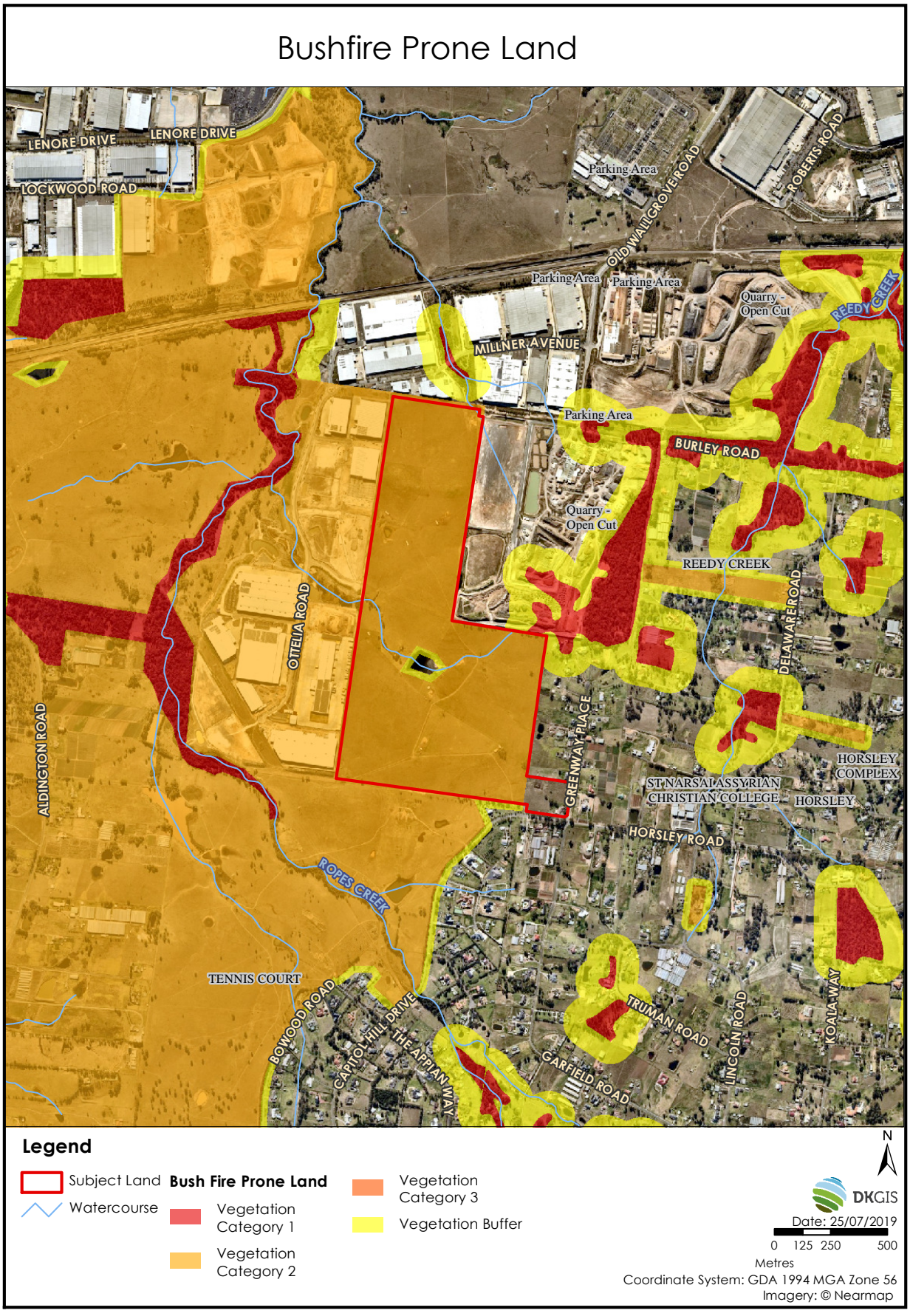
Bushfire prone land (**BFPL**) is land that has been identified by council, which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the RFS.

Figure 3 shows that the site is affected by **Category 2 vegetation**. The RFS Guide for Bushfire Prone Mapping (version 5B Nov 2015) notes that:

> *Vegetation **Category 2** is considered to be a lower bush fire risk than Category 1 and Category 3 but higher than the excluded areas. It is represented as light orange on a bush fire prone land map and will be given a 30 metre buffer. This vegetation category has lower combustibility and/or limited potential fire size due to the vegetation area shape and size, land geography and management practices.*

The Category 2 land designation is supported by Blackash as representing a lower risk to the site.

Figure 3 Bushfire Prone Land Map



4. Bushfire Threat Assessment

4.1.Methodology

PBP 2018 provides a methodology to determine the bushfire threat and commensurate size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation. For new residential subdivision, APZ requirements are based on keeping radiant heat levels at new buildings below 29kW/m^2.

The following assessment is prepared in accordance with Section 100B of the RF Act, Clause 44 of the RF Reg and PBP 2018. This assessment is based on detailed GIS mapping and desktop assessment of the site utilising the following resources:

- Planning for Bush Fire Protection (NSW RFS, 2018);
- Council Bushfire Prone Land Map;
- Aerial mapping;
- Detailed GIS analysis;

The methodology used in this assessment is in accordance with PBP 2018 and is outlined in the following sections.

4.2.Fire Danger Index

As the site is in Penrith Council area, a Fire Danger Index (FDI) of 100 has been utilised in the assessment.

4.3.Bushfire Hazard

An assessment of the Bushfire Prone Land is necessary to determine the application of bushfire protection measures such as APZ locations and future building construction levels. The vegetation formations (bushfire fuels) and the topography (effective slope) combine to create the bushfire threat that may affect bushfire behaviour at the site and which determine the planning and building response of PBP 2018.

4.4.Vegetation Assessment

The RF Regulation requires a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in PBP 2018.

Predominant Vegetation is classified by structure or formation using the system adopted by Keith (2004) and by the general description using PBP 2018 and is shown in Figure 4 as grassland.

Vegetation types give rise to radiant heat and fire behaviour characteristics. The predominant vegetation is determined over a distance of at least 140 metres in all directions from the proposed site boundary or building footprint on the development site. Where a mix of vegetation types exist, the type providing the greater hazard is said to predominate.

The relevant vegetation types found to be within and adjacent to the site includes grazed farming land that is grassland in accordance with PBP 2018 (p. 120):

> *Grassed areas capable of sustaining a fire. Under Australian Standard for 3959, this is identified as low open shrubland, hummock grassland, closed tussock grassland, tussock grassland, open tussock, sparse open tussock, dense sown pasture, sown pasture, open herbfield, and sparse open herb field.*

4.5.Slopes Influencing Bushfire Behaviour

The RF Reg requires an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property or from the proposed development footprint.

The effective slope' influencing fire behaviour approaching the sites has been assessed in accordance with the methodology specified within PBP 2018.

This is conducted by measuring the worst-case scenario slope where the vegetation occurs over a 100m transect measured outwards from the development boundary or the existing/ proposed buildings.

The slopes are shown in Figure 4 as ranging from upslope to 0 – 5 degrees down slope.

Figure 4 Vegetation & Slope Assessment

4.6.Asset Protection Zones

For proposed new residential subdivision, PBP 2018 requires that a minimum separation is provided in the form of Asset Protection Zones (**APZ**). The APZ is a fuel-reduced, physical separation between buildings and bush fire hazards.

For residential developments, APZ requirements are based on keeping radiant heat levels at buildings below 29kW/m2 as the maximum exposure on all sides of the building.

APZs have been determined using PBP 2018. APZs can be provided within the 16 proposed residential Lots and the residual Lot.

The construction requirements for future residential dwellings will be determined during future development applications. Based on the APZ requirements noted above, and within Figure 6, a maximum rating of BAL 29 can be achieved for future dwellings.

4.7.Subdivision in grassland hazard areas

PBP 2018 notes that special considerations apply to subdivision in grassland areas (PBP 2018 p. 41). The risk posed by grassfires is different to that of fires in other vegetation classifications. Grass fires burn at a higher intensity and spread more rapidly with a shorter residence time. Embers produced by grass fires are smaller and fewer in number than those produced from forest fires.

Figure 5 shows the APZs required from adjoining unmanaged grassland areas. A narrow section of woodland comes into the residual Lot and a 16m APZ is required into the site which then becomes grassland.

Table 1 APZs from PBP 2018

Table A1.12.2

Minimum distances for APZs – residential subdivision development, FDI 100 areas (<29kW/m2)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	11	14	18	23	30
Forest (Shrubby and Grassy) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	24	29	37	45	57
Woodland (grassy and woody)	12	16	20	25	32
Forested Wetland	10	12	16	20	26
Tall Heath	15	16	18	21	23
Short Heath	10	11	13	14	16
Arid-Shrublands (acacia and chenopod)	7	8	9	10	11
Freshwater Wetlands	6	7	8	9	10
Alpine Complex	7	8	8	10	11
Grassland	10	12	13	15	17

This assessment has demonstrated that an APZ can be provided around the proposed development to avoid flame contact. Subdivision will not be supported where the resultant development would be within BAL-FZ.

The APZ distances identified in Tables A1.12.2 which provides the acceptable solutions for meeting this threshold. All future houses will be able to provide a minimum APZ of 9m that will provide a Bushfire Attack Level of BAL 12.5 in accordance with table A1.12.5 of PBP 2018. AS3959 will require an APZ of 22m to achieve BAL 12.5. Building construction levels will be determined with future DAs for construction of houses.

Figure 5 Asset Protection Zones from adjoining lands

5. Water Supplies

The precinct will be serviced by reticulated water. The extension of services will comply with AS2419. Future dwellings will be connected to the reticulated town's water main for domestic needs.

6. Gas and electrical supplies

Electricity supply for the new development will comply with PBP 2018. Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008). This complies with PBP.

7. Access

The site is accessed by Greenway Place off Horsley Drive. The proposed road reserve is 20m wide and provides a perimeter road around Lots 3, 4, 5, 6, 7, 8, 9 and 10. Lots 1, 2, 11, 12, 13 and 14 will have access to the road and perimeter road access is not required for these Lots as the site is grassland and low risk.
The proposed road will be 8m wide. The proposed road network provides good linkage and opportunities for heavy fire tanker access to the site with perimeter road access provided. Roads will be able to comply with PBP 2018.

PBP 2018 provides a specific objective for residential subdivision (PBP 2018 p. 42):

> *provide access to hazard vegetation to facilitate bush fire mitigation works and property protection*

Similarly, the performance requirement is that:

> *firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation*

Due to the low risk of the site and surrounding developed and developing lands, a perimeter road has not been provided. However, a perimeter fire trail has been provided that facilitates access to the edge of the site if required.

The fire trail will be provided with constructed gravel surface to allow all weather access.

Table 2 Access Requirements & Compliance with PBP 2018 Table 5.3b

Performance Criteria PBP 2018		Acceptable Solution	Meets PBP 2018	Comment
Access General Requirements	firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation	property access roads are two-wheel drive, all-weather roads	✓	
		perimeter roads are provided for residential subdivisions of three or more allotments	✓	Due to the low risk of the site and surrounding developed and developing lands, a perimeter road has not been provided. However, a perimeter fire trail has been provided that facilitates access to the edge of the site if required.
		subdivisions of three or more allotments have more than one access in and out of the development	✓	Single access provided of the adjoining public roads into the site. Perimeter road provided within the site. Meets the performance requirement.
		traffic management devices are constructed to not prohibit access by emergency services vehicles	✓	Yes
		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	✓	Yes
		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	✓	
		where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road	✓	
		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	✓	Grassland – not applicable
	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	✓	Not applicable – no internal bridges

	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	✓	Mains water will be provided to each of the Lots
		hydrants are provided in accordance with AS 2419.1:2005;	✓	hydrants are provided in accordance with AS 2419.1:2005
Perimeter Roads	access roads are designed to allow safe access and egress for medium rigid 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	perimeter roads are two-way sealed roads; and 8m carriageway width kerb to kerb	✓	All roads will be 8.0m wide including the fire trail
		parking is provided outside of the carriageway width	✓	Yes
		hydrants are located clear of parking area		Yes
		there are through roads, and these are linked to the internal road system at an interval of no greater than 500m	✓	All roads will be 8.0m wide including the perimeter fire trail
		curves of roads have a minimum inner radius of 6m; and the maximum grade road is 15° and average grade is 10°; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided	✓	Yes
Non perimeter roads	access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating	minimum 5.5m width kerb to kerb;	✓	All roads will be 8.0m wide including the perimeter fire trail
		and parking is provided outside of the carriageway width; and	✓	Not required
		hydrants are located clear of parking areas; and	✓	Yes
		roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; and curves of roads have a minimum inner radius of 6m; and the road crossfall does not exceed 3°; and a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	✓	Yes

8. Significant Environmental Features

There are no known significant environmental features on the property.

9. Threatened Species

There are no known threatened species on the property.

10. Aboriginal Objects or Places

There are no known Aboriginal objects or Aboriginal places (within the meaning of the National Parks and Wildlife Act 1974) that is known to the applicant to be situated on the property.

11. Bushfire Protection Measures

In a development assessment context, the six key Bush Fire Protection Measures have been met for the development including:

a) The provision of clear separation of buildings and bush fire hazards, in the form of fuel- reduced APZ (and their subsets, inner and outer protection areas and defendable space);
b) Construction standards and design that will be addressed at construction stage;
c) Appropriate access standards for residents, fire fighters, emergency service workers and those involved in evacuation;
d) Adequate water supply and pressure;
e) Emergency management arrangements for fire protection and/or evacuation; and
f) Suitable landscaping, to limit fire spreading to a building.

12. Recommendations

The following recommendations are made for the bushfire protection measures for the Concept DA:

1. **Asset Protection Zones:** Future houses will provide a minimum asset protection zone of 22m as per Planning for Bushfire Protection 2018 and Australian Standard for Construction of Buildings in Bushfire Prone Areas. Only the area designated as an asset protection zone for any future house shall be managed as per Rural Fire Service Standards for Asset Protection Zones.
2. **Construction:** where a 22m asset protection zone is provided to future houses, a Bushfire Attack Level of BAL 12.5 shall be provided to the house in accordance with Australian Standard for Construction of Buildings in Bushfire Prone Areas.
3. Asset protection zones of less than 22m shall require a Bushfire Hazard Assessment Report or complying development certificate to determine the level of construction in accordance with Australian Standard for Construction of Buildings in Bushfire Prone Areas
4. Any **gas** services are to be installed and maintained in accordance with AS/NZS 1596:2008 The storage and handling of LP gas (Standards Australia, 2008).
5. Fire hydrant spacing, sizing and pressure complies with AS2419.1
6. A perimeter fire trail is provided as per figure 2. That complies with NSW *RFS NSW Rural Fire Service Fire Trail Design, Construction and Maintenance*

13. Conclusion

The proposal for the residential subdivision is categorised as Integrated Development, under Section 4.46 of the *Environmental Planning and Assessment Act*. Integrated development requires development consent from Council and General Terms of Approval from the NSW Rural Fire Service.

The site is afforded adequate setbacks and bushfire protection measures that can provide for compliance with *Planning for Bush Fire Protection* 2018.

No buildings have been proposed with the subdivision and future applications will be lodged to determine suitability of subdivision layout and construction requirements with AS3959.

The proposal complies with *Planning for Bushfire Protection 2018* and the RFS ought to issue a Bushfire Safety Authority for the proposal.

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Fire Protection Association of Australia BPAD Level 3 BPD-PA 16373

Appendix 1 References

Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bushfire-prone areas*

Councils of Standards Australia AS2419 (200) – *Fire Hydrant Installations*

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