

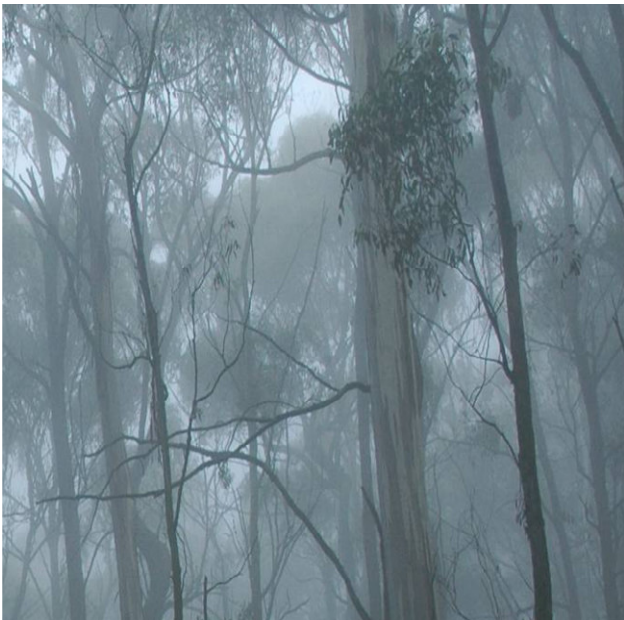


Bushfire Protection Assessment

Proposed Subdivision: Long Gully Road, Singleton

Prepared for
PricewaterhouseCoopers

15 August 2013



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Executive Summary

Eco Logical Australia (ELA) was engaged by PricewaterhouseCoopers on behalf of Long Gully Road Developments Pty Ltd to prepare a Bushfire Protection Assessment to support a proposed 75 lot subdivision at Lots 120, 138, 140, 142 DP 752455, being numbers 6, 8, 11 & 36 Long Gully Road, Singleton.

The aim of this report is to comply with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2008*, and 'Planning for Bush Fire Protection 2006'.

The bushfire hazards were assessed by determining the nature of the vegetation and the prevailing slopes. The vegetation which is most influential to the development is considered to be 'Forest' and 'Low Hazard' with slopes ranging from 'Upslope' to 'Downslope 5-10 degrees'.

The proposed Asset Protection Zones (APZ) vary in size dependant on the bushfire hazard and in some areas the APZs will include an Outer Protection Area (OPA) in the proposed Conservation Area.

The relevant construction standards for future dwellings on the lots will be assessed using method 1 of Australian Standard AS 3959-2009 *Construction of buildings in bushfire-prone area* to be determined to support the individual development applications at a later date.

A hydrant water supply is proposed and where it can be within 90 metres of the entire building envelope will comply with the water requirements. However, if the 90 metres distance cannot be met a static water supply will be required for fire fighting purposes of 20,000 Litres.

Underground electricity is proposed and any future connections to proposed dwellings are recommended to be underground. No gas services are proposed for this development.

The proposed access meets the PBP public roads requirements except there are no perimeter roads. In this regard the performance criteria can be met in that there will be provision for safe access for fire fighting vehicles whilst residents are evacuating.

It is part of the legislative requirements that this document acknowledge any 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. An assessment of the impact of the proposed development on threatened flora and fauna species was conducted (ELA, 2013) which found 29 threatened and/or migratory species and one ecological community, but no evidence requiring further studies.

The future occupants of single dwellings on the proposed lots will be responsible for their emergency management strategies.

In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed subdivision is consistent with the intent of 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.

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1 Property and proposal

Name:	Long Gully Road Developments Pty Ltd		
Postal address:	PO Box 691, Singleton		
Street or property Name:	6, 8, 11 & 36 Long Gully Road		
Suburb, town or locality:	Singleton	Postcode:	2330
Lot/DP no:	Lots 120, 138, 140 & 142 DP 752445		
Local Government Area:	Singleton		
Type of area:	Rural Residential		

1.1 Description of proposal

PricewaterhouseCoopers on behalf of their client, Long Gully Road Developments Pty Ltd, commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed subdivision at Lots 120, 138, 140 & 142 DP 752455, being numbers 6, 8, 11 & 36 Long Gully Road, Singleton (hereafter referred to as the subject land).

The proposed development involves subdividing four large rural lots into 75 rural living lots in varying sizes and the associated infrastructure.

This assessment has been prepared by the ELA Bushfire Consultant, Joshua Calandra (FPAA BPAD Certified Practitioner No. BPD-PD-23276) with a quality assurance review by David Peterson (FPAA BPAD Certified Practitioner No. BPD-PA-18882). Both Josh and David are recognised by the NSW Rural Fire Service as qualified consultants in bushfire risk assessment.

1.2 Location and description of subject land

The subject land is located in the Hunter Valley approximately 4.7 kilometres northeast of the Singleton Town Centre the location of which is shown in **Figure 1**. **Figure 2** shows the subject land and the location of the proposed subdivision in relation to the nearest bush fire prone vegetation. **Figure 3** shows the required Asset Protection Zones for the subdivision. **Figure 4** shows the interfaces which mark areas of differing influencing bushfire hazards.

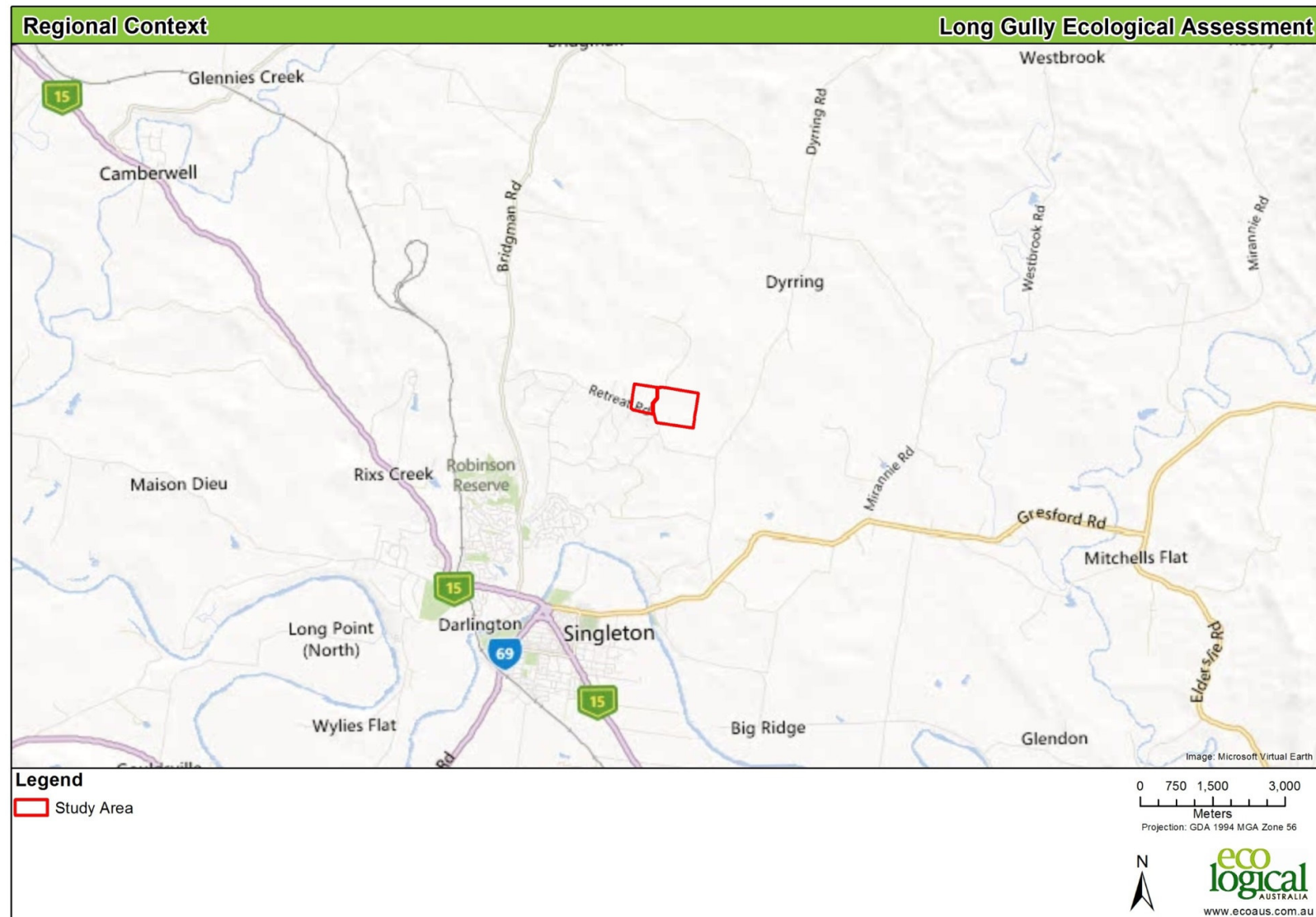


Figure 1: Location



Figure 2: Bushfire hazard assessment

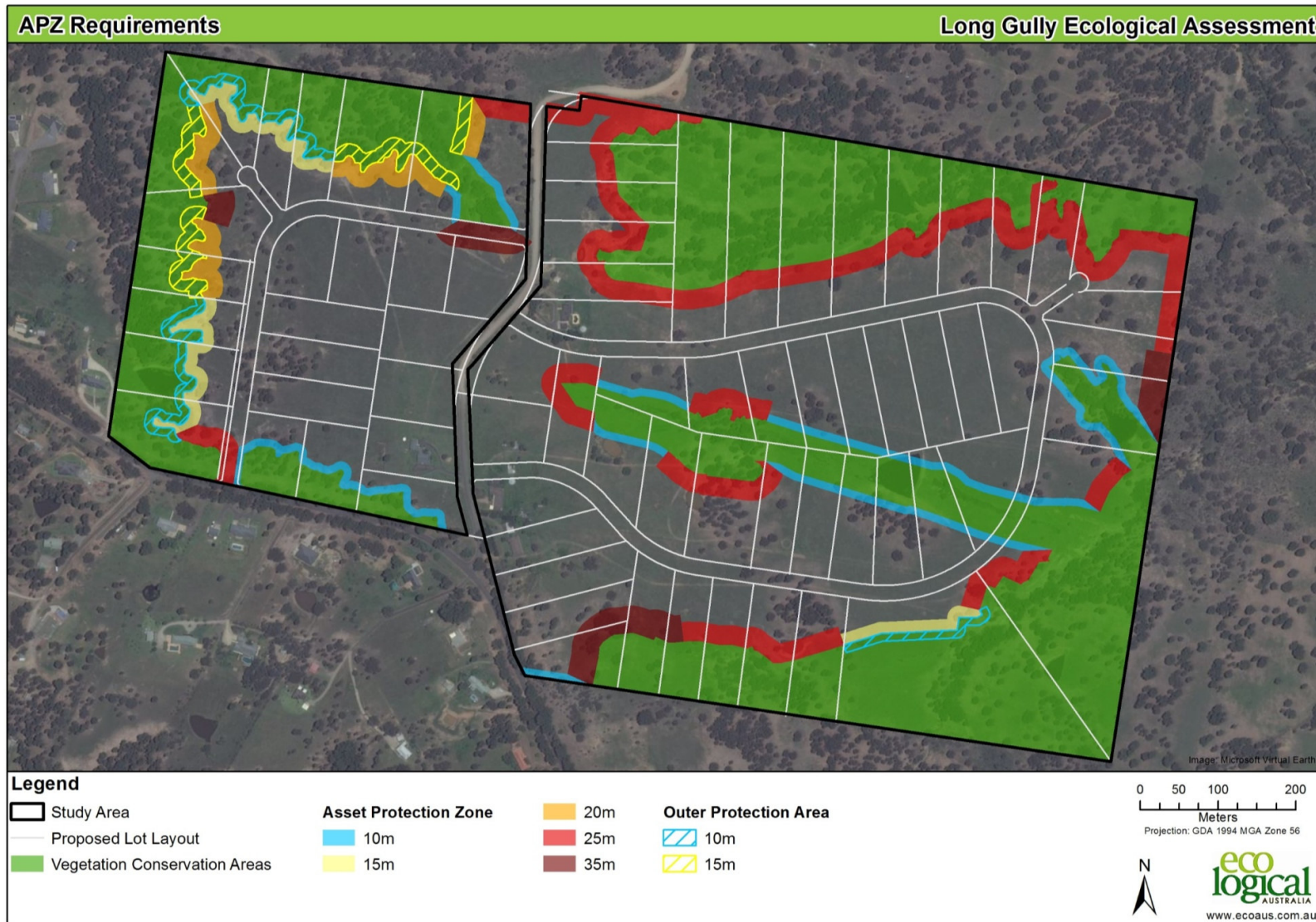


Figure 3: Proposed APZs relating to the bushfire hazard



Figure 4: Interfaces

2 Bushfire threat assessment

The subject land is identified as Bush Fire Prone Land by Singleton Council. The following assessment is prepared in accordance with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2008*, and 'Planning for Bush Fire Protection 2006' (RFS 2006) herein referred to as PBP.

Figure 4 shows the location of the interfaces which are used to accurately pinpoint the areas subject to particular vegetation and slopes.

2.1 Vegetation types and slope

The vegetation and slope have been assessed in all directions for each proposed building envelope. In accord with PBP the predominant vegetation class has been calculated for a distance of at least 140 m out from each effected building envelope and where appropriate out from the boundary of the subject land and the slope class "*most significantly affecting fire behaviour having regard for vegetation found [on it]*" determined for a distance of at least 100 m in all directions.

2.2 Vegetation

Interfaces 1, 9, 11, 17, 19, 21, 23 & 25: are a long narrow corridor of vegetation narrow enough to provide a direct fire run no greater than 50 metres towards the proposed development allowing it to be categorised under PBP as 'Low Hazard' as per page 52 of PBP.

"Remnant vegetation is a parcel of vegetation with a size less than 1 Ha or a shape that provides a potential fire run directly towards the buildings not exceeding 50 metres. These remnants are considered a low hazard and APZ setbacks and building construction standards for these will be the same as for rainforests"

Interfaces 2-8, 15, 18, 20, 22, 24, 26-29: are proposed to be managed and revegetated as a conservation area (refer to ELA VMP 2013) and is categorised under PBP as 'Forest'.

Interfaces 13-14, the portion along the eastern boundary of 15 & 16: occur off site and as such cannot be guaranteed to be managed. This vegetation is categorised under PBP as 'Forest'.

Interface 30: occurs off site and as such cannot be guaranteed to be managed. This vegetation is categorised under PBP as 'Grassland'.

2.3 Slope

Interfaces 1-3, 7, 9, 11, 13-15, 17-28 & 30: The slope of the hazard is in the PBP slope class of 'downslope >0-5 degrees'.

Interfaces 4-6, 8, 10, 12, 16 & 29: The slope of the hazard is in the PBP slope class of 'downslope >5-10 degrees'.

The predominant vegetation and effective slope assessments are shown in **Table 1**.

3 Asset protection zones (APZ)

PBP has been used to determine the width of Asset Protection Zones (APZ) against the vegetation and slope data identified in **Figure 2, Section 2** and **Table 1** of this report.

Table 1: Threat assessment, APZ and category of bushfire attack

Direction	Slope ¹	Vegetation ²	PBP Required APZ ³	Proposed APZ	Comment
Interfaces 1, 9, 11, 17, 19, 21, 23 & 25	0-5 ⁰ downslope	Low Hazard	10 metres	>10 metres	APZ can be achieved between the proposed conservation area and building envelopes
Interfaces 2, 15, 18, 20, 22, 24, 26 & 28	0-5 ⁰ downslope	Forest	25 metres	>25 metres	
Interfaces 5, 10 & 29	5-10 ⁰ downslope	Forest	35 metres	>35 metres	
Interface 13 & eastern portion of 15	0-5 ⁰ downslope	Forest	25 metres	>25 metres	Hazard occurs offsite
Interface 14	0-5 ⁰ downslope	Forest	25 metres	>25 metres	Hazard occurs offsite with 20 metres of the APZ on site as Squirrel Glider Corridor and 5 metres occurring off site as part of the Long Gully Road reserve
Interface 16	5-10 ⁰ downslope	Forest	35 metres	>35 metres	Hazard occurs offsite
Interface 30	0-5 ⁰ downslope	Grassland	10 metres	>10 metres	Hazard occurs offsite
Interfaces 3, 7 & 27	0-5 ⁰ downslope	Forest	25 metres	>25 metres	The APZ is proposed to have 10 metres of OPA inside the Conservation Area (refer to the ELA VMP 2013)
Interfaces 4, 6, 8 & 12	5-10 ⁰ downslope	Forest	35 metres	>35 metres	The APZ is proposed to have 15 metres of OPA inside the Conservation Area (refer to the ELA VMP 2013)

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

² 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".

³ Assessment according to PBP.

4 APZ maintenance plan

The proposed APZ is mostly in place, however, some vegetation clearance or tree removal may be required to provide the proposed Outer Protection Areas (OPA) at Interfaces 3-4, 6-8, 12 & 27 (refer to **Figure 4**) to support the proposed development.

An OPA is the area closest to the hazard and is designed to provide reduced fuel loads and gaps in the canopy to substantially decrease the intensity of an approaching fire reducing the level of direct flame, radiant heat and ember attack on the Inner Protection Area (IPA). Within the OPA any trees and shrubs should be maintained in such a manner that the vegetation is not continuous. Fine fuel loadings within the OPA should be kept to a level where the fire intensity expected will not impact on adjacent developments. Eight tonnes per hectare of fuel is the acceptable level for an OPA. An OPA typically consists of low groundcovers that can be managed such as slashing and trees that are well separated as individuals or clusters (NSW RFS 2001).

An IPA is located between the OPA and the development and ensures minimised available fuels to reduce the impact of direct flame contact and radiant heat on the development. The intention of the IPA is to provide minimal available fuels at the ground level and discontinuous canopy fuels by canopy separation. This is typically achieved through landscaping to provide low groundcovers or mown lawns with few individual trees well separated from each other (NSW RFS 2001).

Fuel management within the APZ (IPAs) is to be as follows:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
 - Are well spread out and do not form a continuous canopy
 - Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
 - Are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter)
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

5 Construction standard

The bushfire construction standards or Bushfire Attack Levels (BALs) as per Australian Standard AS 3959-2009 'Construction of buildings in bushfire-prone areas' will be determined at the Development Application stage for future dwellings within the proposed subdivision (Standards Australia 2009).

6 Water supply

Each lot will require a water supply for fire fighting. The subject land is to be serviced by reticulated water, however, the furthest point from any future dwellings to a hydrant must be less than 90 m (with a tanker parked in line) or a static water supply will be necessary. The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads
- 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. 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; and
- The [PBP] provisions of parking on public roads are met

Due to the large size of the lots, it may not be possible to place building envelopes entirely within 90 m of a hydrant. If this is the case, each dwelling will require a static water supply for fire fighting purposes (minimum 20,000 L). The supply does not need to be dedicated to fire fighting and can double as the potable water supply or other use such as irrigation. The requirements for a static supply will be determined at the DA stage for a dwelling and will include provisions such as accessibility by fire tankers.

7 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies
- No part of a tree should be closer to a powerline than the distance specified in 'Vegetation Safety Clearances' issued by Ausgrid (NS179, December 2010)

Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008).

8 Access

8.1 Public roads

The public road network is compliant with the PBP performance criteria as listed in **Figure 2**. PBP requires a through road for 'dead-end' roads more than 200 m in length, with the proposed dead-end in both the northeast and northwest being approximately 80 metres, this is compliant. The proposed road widths of 6.5 and 8 metres are compliant as these are not perimeter roads. The proposed layout features Long Gully Road and Retreat Road providing access and egress to the subject land in a way that ensures there will always two possible paths of egress. The proposed road to the east crosses the 'Low Hazard' bushfire hazard at one location however, the threat is minimal.

The RFS typically require access to, or perimeter access along, the hazard interface. The assessment of the necessity of perimeter access for fire control is based on the nature of the threat and risk. Due to the size of available cleared land in the proposed lots a perimeter road or fire trail would be unnecessary as tankers can access the hazard beyond each proposed building envelope within each lot. The road design relating to perimeter roads is consistent with the performance criteria of PBP as found in **Table 2**.

"Public road widths and design that allows safe access for firefighters while residents are evacuating an area."

8.2 Access and egress

Future dwellings within the proposed subdivision will be accessed via standard residential driveways. As outlined in **Table 3**, these residential driveways do not need to comply with any specific bushfire access design requirements because the following applies to the proposed subdivision:

- (i) The proposed subdivision will be serviced by reticulated water
- (ii) The furthest point of any future dwellings within the proposed subdivision from the nearest hydrant will be no greater than 90 m; and
- (iii) The speed limit within the proposed subdivision will be less than 50 kph.

Where the proposed building footprints are greater than 90 metres from a hydrant the proposed property access will need to comply with **Table 3**. This particularly relates to the width of the proposed access. These issues will be explored at the individual development application stages of the lots.

8.3 Perimeter road/fire trail

Although it is the preference to provide a through, public perimeter road at the bushland interface for residential subdivision, it is acceptable in some cases not to. The acceptability of which is determined on a case-by-case basis and reasoning to support this approach in this case is based on the following:

- Bushfire risk – The risk will be relatively lower than that of surrounding areas of the region or subdivision. For example, it is not uncommon for an APZ without a perimeter road along low hazard riparian corridors or smaller, more isolated remnants.
- Development type – In this case a public perimeter road will not be economically feasible or work in a design sense as land constraints prevent a continuous, through road. Rural residential subdivisions with larger lot sizes regularly fall into this category.

- Environmental constraints - The shape of the interface and the terrain also prohibit a continuous public road along the interface.

The above factors are commonly accepted reasons for not having a public perimeter road. These reasons are not a deemed-to-satisfy approach within PBP, however they are previously accepted reasons commonly used to meet the performance criteria and are an alternate solution approach to justify not having public perimeter roads.

Table 2: Performance criteria for proposed public roads

Performance Criteria	Acceptable Solutions
<p>The intent may be achieved where:</p> <ul style="list-style-type: none"> • firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources) 	<ul style="list-style-type: none"> • public roads are two-wheel drive, all weather roads
<ul style="list-style-type: none"> • public road widths and design that allows safe access for firefighters while residents are evacuating an area 	<ul style="list-style-type: none"> • 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) • the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas • traffic management devices are constructed to facilitate access by emergency services vehicles • public roads have a cross fall not exceeding 3 degrees • public 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 • curves of roads (other than perimeter roads) are a minimum inner radius of six metres • 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 • there is a minimum vertical clearance to a height of four metres above the road at all times
<ul style="list-style-type: none"> • the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles 	<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered 	<ul style="list-style-type: none"> • public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression • 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
<ul style="list-style-type: none"> • there is clear access to reticulated water supply 	<ul style="list-style-type: none"> • 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 • 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
<ul style="list-style-type: none"> • parking does not obstruct the minimum paved width 	<ul style="list-style-type: none"> • 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 • public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road

*1 PBP page 21

Table 3: Performance criteria for proposed property access roads*¹

Performance Criteria	Acceptable Solutions
<p>The intent may be achieved where:</p> <ul style="list-style-type: none"> • access to properties is provided in recognition of the risk to fire fighters and/or evacuating occupants 	<ul style="list-style-type: none"> • at least one alternative property access road is provided for individual dwelling (or groups of dwellings) that are located more than 200 metres from a public through road
<ul style="list-style-type: none"> • the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles • all weather access is provided 	<ul style="list-style-type: none"> • bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes • roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge)
<ul style="list-style-type: none"> • road widths and design enable safe access for vehicles 	<ul style="list-style-type: none"> • a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint) <i>Note: No specific access requirements apply in a urban area where a 70 metres 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.</i> • 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 with a minimum 12 metre 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 crossfall is not more than 10 degrees • maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads <i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above</i> • access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way

*¹ PBP page 23

9 Assessment of environmental issues

A Flora and Fauna Assessment provided by ELA dated August 2013 found no threatened flora species during the field survey.

However, based on the literature review and site inspection, it was determined that the proposed development has the potential to impact on the following 29 threatened and/or migratory species and one ecological community listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):

- *Anthochaera Phrygia* (Regent Honeyeater) (TSC Act and EPBC Act)
- *Circus assimilis* (Spotted Harrier) (TSC Act)
- *Erythrotriorchis radiates* (Red Goshawk) (TSC Act and EPBC Act)
- *Hieraaetus morphnoides* (Little Eagle) (TSC Act)
- *Lathamus discolor* (Swift Parrot) (TSC Act and EPBC Act)
- *Lophoictinia isura* (Square-tailed Kite) (TSC Act)
- *Glossopsitta pusilla* (Little Lorikeet) (TSC Act)
- *Melanodryas cucullata* (Hooded Robin) (TSC Act)
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) (TSC Act)
- *Pyrrholaemus sagittatus* (Speckled Warbler) (TSC Act)
- *Stagonopleura guttata* (Diamond Firetail) (TSC Act)
- *Ninox strenua* (Powerful Owl) (TSC Act)
- *Tyto novaehollandiae* (Masked Owl) (TSC Act)
- *Petaurus norfolcensis* (Squirrel Glider) (TSC Act)
- *Dasyurus maculatus* (Spotted-tailed Quoll) (TSC Act and EPBC Act)
- *Phascogale tapoatafa* (Brush-tailed Phascogale) (TSC Act)
- *Phascolarctos cinereus* (Koala) (TSC Act and EPBC Act)
- *Chalinolobus dwyeri* (Large-eared Pied Bat) (TSC Act and EPBC Act)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) (TSC Act)
- *Miniopterus australis* (Little Bent-wing Bat) (TSC Act)
- *Miniopterus schreibersii oceanensis* (Eastern Bent-wing Bat) (TSC Act)
- *Mormopterus norfolkensis* (East Coast Freetail Bat) (TSC Act)
- *Pteropus poliocephalus* (Grey-headed Flying-Fox) (TSC Act and EPBC Act)
- *Saccolaimus flaviventris* (Yellow-bellied Sheath-tail-bat) (TSC Act)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) (TSC Act)
- *Vespadelus troughtoni* (Eastern Cave Bat) (TSC Act)
- *Apus pacificus* (Fork-tailed Swift)
- *Merops ornatus* (Rainbow Bee-eater)
- *Ardea ibis* (Cattle Egret)

Threatened ecological community:

- Central Hunter Ironbark - Spotted Gum - Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions (TSC Act)

The results of the application of the EPBC Significant Impact Criteria indicate that a referral to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) is not required.

Singleton Council is the determining authority for this development; they will assess more thoroughly any potential environmental and heritage issues.

10 Bushfire maintenance plans and fire emergency procedures

The areas determined to provide the required separation distances (APZ's) from the hazard are to be maintained in perpetuity for the life of the subdivision.

The future occupants of single dwellings on the proposed lots will be responsible for their emergency management strategies.

11 Recommendations and conclusion

11.1 Recommendations

The following recommendations have been made within this report to ensure the proposed subdivision is compliant with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2008*, and 'Planning for Bush Fire Protection 2006' (RFS 2006):

Recommendation 1- Asset protection zones are to be provided to the proposed subdivision as listed in **Table 1**;

Recommendation 2- Asset protection zone landscaping is to comply with the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' inner protection area requirements as listed in Appendix 2 Section A2.2 of PBP and guided by the fuel management principles listed in Section 4 of this report;

Recommendation 3- Within the OPA (as found at Interfaces 3-4, 6-8, 12 & 27) any trees and shrubs should be maintained in such a manner that the vegetation is not continuous. Fine fuel loadings within the OPA should be kept to a level where the fire intensity expected will not impact on adjacent developments. Eight tonnes per hectare of fuel is the acceptable level for an OPA. An OPA typically consists of low groundcovers that can be managed such as slashing and trees that are well separated as individuals or clusters

Recommendation 4- Landscaping across the subdivision is to comply with the principles listed in Appendix 5 of the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006';

Recommendation 5- Either: A hydrant water supply should be installed in accordance with Australian Standard AS 2419.1 where it can be within 90 metres of the entire building envelope; OR

A static water supply will be provided for fire fighting purposes of 20,000 Litres to be determined at the DA stage for a dwelling. The supply does not need to be dedicated to fire fighting and can double as the potable water supply or other use such as irrigation.

Recommendation 6- Public roads comply with the majority NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' requirements as per **Table 2**. Relating to perimeter roads the design can comply with the performance criteria of PBP found in **Table 2**;

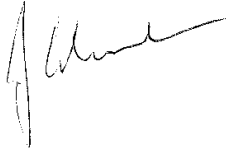
Recommendation 7- Property access roads are to comply with the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' as listed in Section 8 of this report;

Recommendation 8- Electrical services should be underground and if overhead lines are used, overhanging branches should be trimmed according to "Vegetation Safety Clearances" issued by Ausgrid (NS179, December 2010); and

Recommendation 9 Gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008).

11.2 Conclusion

In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed subdivision is consistent with the intent of 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.



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