

15 Old Glenhaven Road, Glenhaven

APPENDIX B

BUSHFIRE REPORT

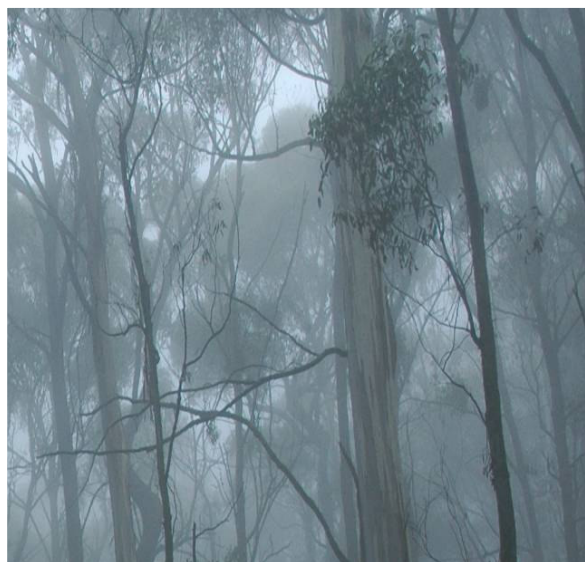


Bushfire Protection Assessment

Glenhaven Retirement Village – Stage 3, Glenhaven

Prepared for
Living Choice Australia Limited

25 July 2013





DOCUMENT TRACKING

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Contents

List of Figures	iii
List of Tables	iii
1 Property and proposal	1
1.1 Description of proposal	1
1.2 Location and description of subject land	1
2 Bushfire threat assessment	6
2.1 Bushfire protection assessment requirements	6
2.2 Vegetation types and slopes	6
3 Asset Protection Zones (APZ)	8
4 APZ maintenance plan	9
5 Construction standard	10
6 Water supply	11
7 Gas and electrical supplies	11
8 Access	12
9 Bushfire maintenance plans and fire emergency procedures	13
10 Assessment of environmental issues	13
11 Recommendations & conclusion	14
11.1 Recommendations	14
12 References	16

List of Figures

Figure 1: Location of subject land	2
Figure 2: The Hills Shire Council Bush Fire Prone Land Map	3
Figure 3: Proposed Stage 3 development concept	4
Figure 4: Proposed development area with vegetation types and slope classification	5

List of Tables

Table 1: Threat assessment, APZ and bushfire attack level.....	8
Table 2: BAL separation distances in relation to the proposed development	10
Table 3: Performance criteria for Internal Access Roads* ¹	12

1 Property and proposal

Name:	Living Choice Australia Limited		
Street or property name:	Glenhaven Retirement Village – Stage 3, Glenhaven Road		
Suburb, town or locality:	Glenhaven	Postcode:	2156
Lot/DP no:	Lot 301 DP1160437		
Local Government Area:	The Hills Shire Council		
Type of development:	Integrated - Special Fire Protection Purpose		

1.1 DESCRIPTION OF PROPOSAL

Living Choice Australia Limited, commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for the proposed Stage 3 expansion of the existing Glenhaven Retirement Village, situated to the north of the intersection between Glenhaven Road and Old Glenhaven Road, Glenhaven (hereafter referred to as the subject land).

Stages 1 and 2 of the existing retirement village are either completed and occupied, or are currently under construction. These previous stages occupy the majority of the overall site, with only the south western-most portion adjacent to Holland Road remaining vacant – this is where Stage 3 will be constructed. The original site masterplan provided for higher care 'assisted-living' within the Stage 3 area, however, this has since been modified and it is now proposed to provide 100 beds in an aged care facility. Stage 3 will have direct access onto Old Glenhaven Road via a new access point close to Glenhaven Road, but will also be accessible via the main site entrance further to the east, also situated off Old Glenhaven Road. The details of the proposal are shown in Figure 3 (below).

1.2 LOCATION AND DESCRIPTION OF SUBJECT LAND

The subject land is located within the northern portion of the suburb of Glenhaven, and to the north of Glenhaven Road and east of Holland Road (Figure 1). The site is further bound by existing rural residential properties to the west and north, and residential development to the south and east. Old Northern Road is situated approximately 2 km to the south east of the site, with Sydney CBD being approximately 25 km to the south east. Whilst the site is generally surrounded by extensive areas of existing residential or rural residential development, there are areas of notable vegetation beyond the subject site to the west and north-west.

An inspection of the development site and bushfire hazard occurred on the 7th September 2012 and this report was prepared by ELA Senior Bushfire Consultant, Daniel Copland. The report has been reviewed by ELA Principal Bushfire Consultant David Peterson (FPAA BPAD-A Certified Practitioner No. BPD-PA-18882). David is recognised by the NSW Rural Fire Service as a qualified bushfire consultant in bushfire risk assessment.

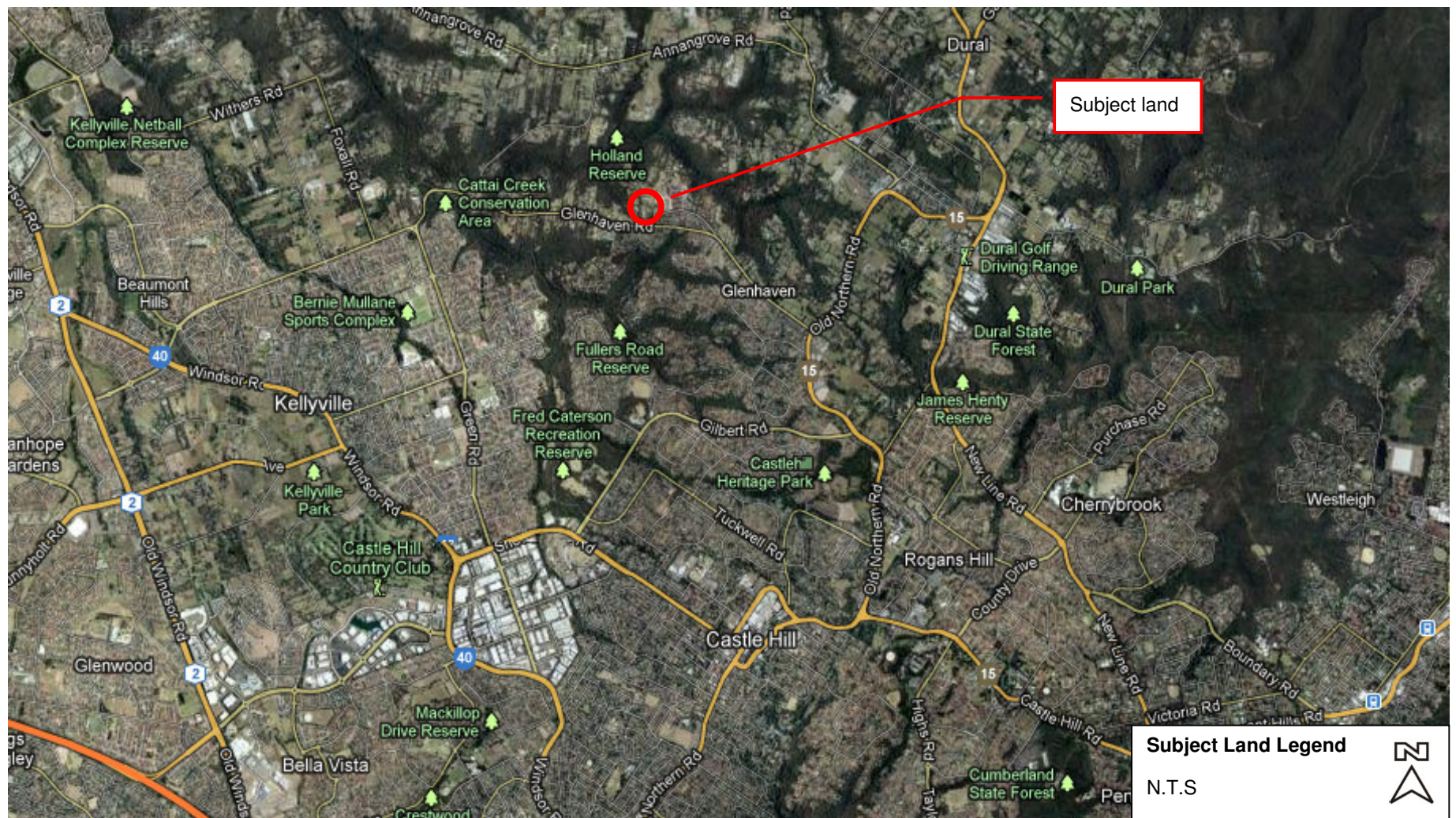


Figure 1: Location of subject land

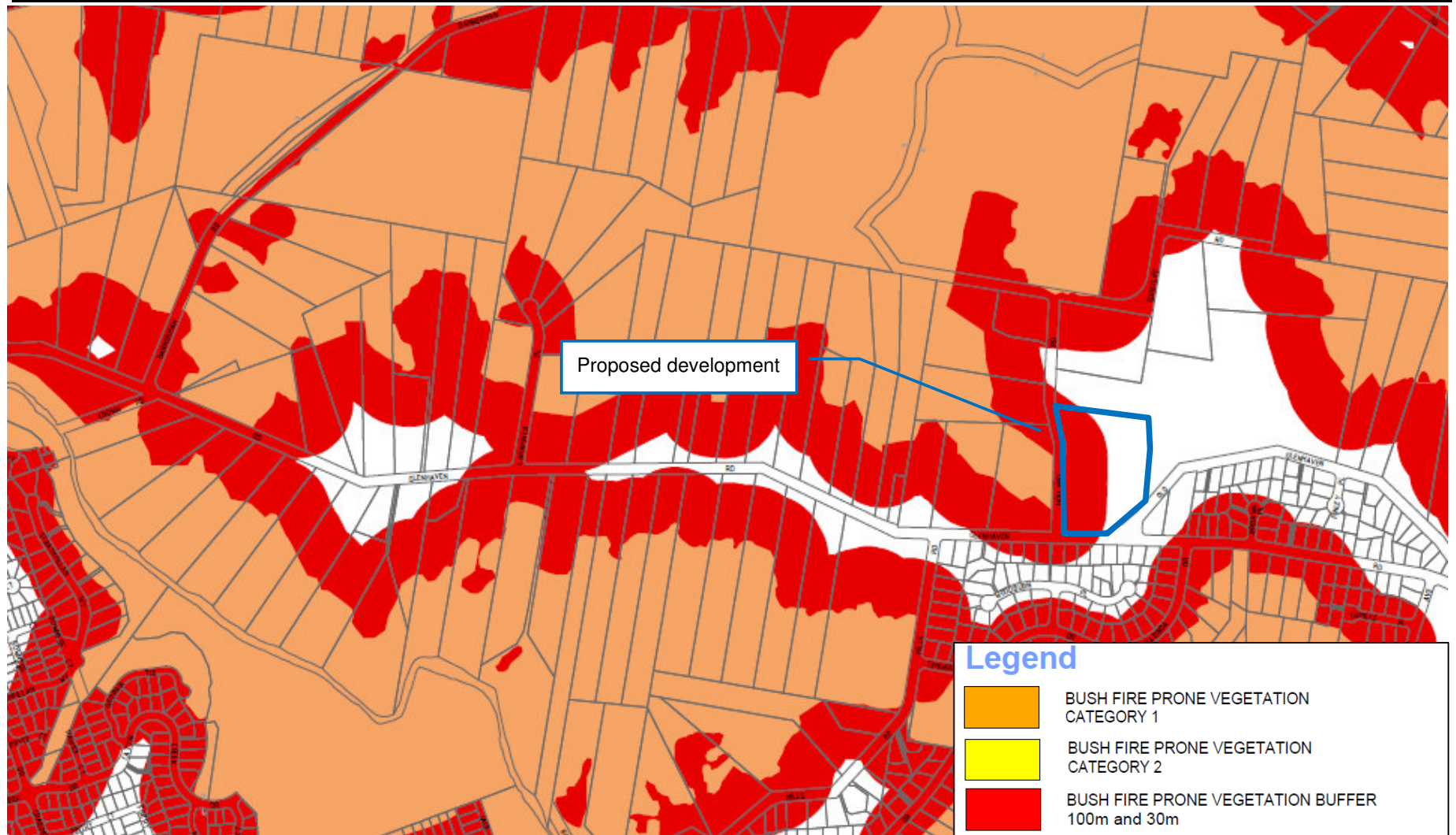


Figure 2: The Hills Shire Council Bush Fire Prone Land Map

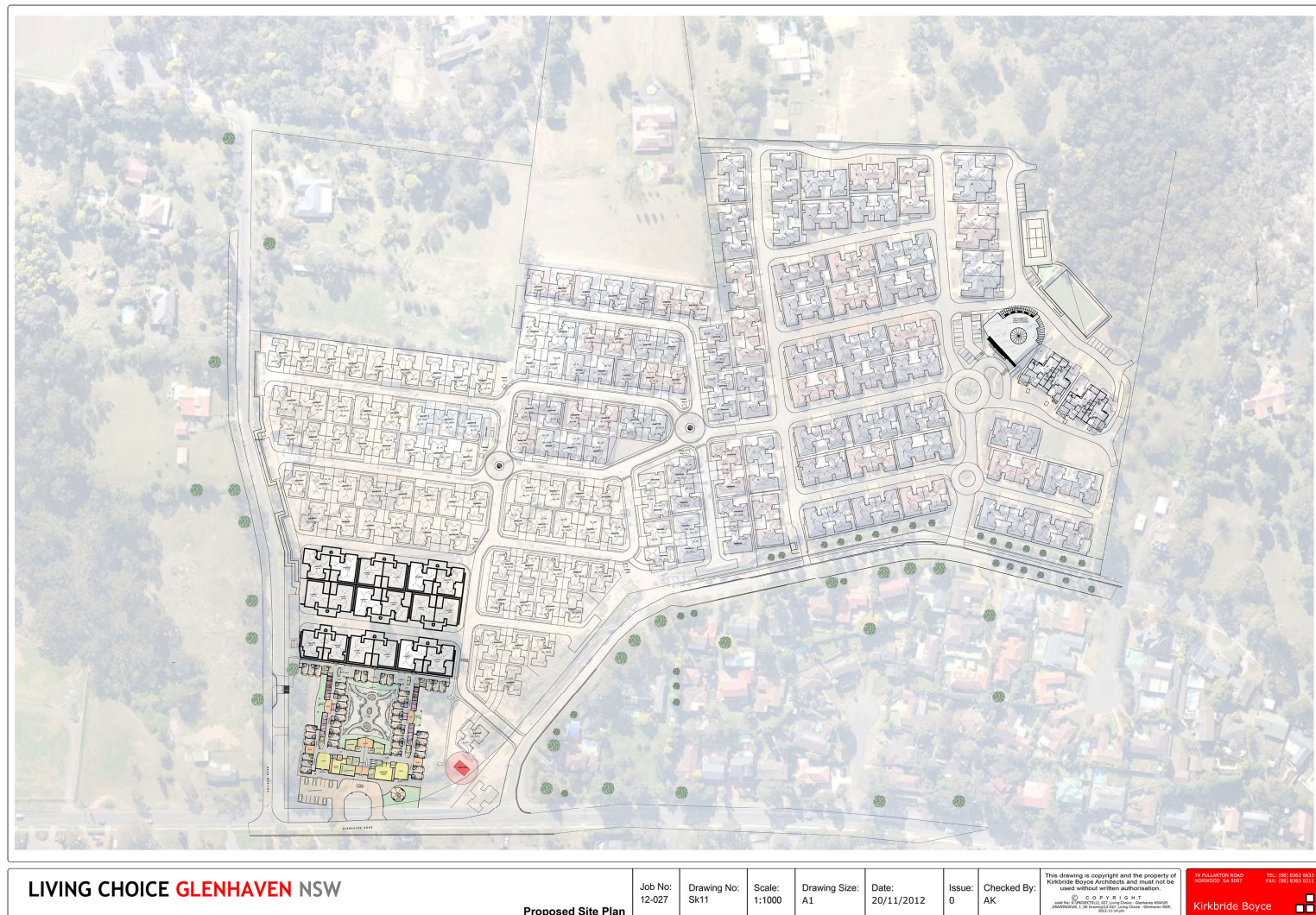


Figure 3: Proposed Stage 3 development concept

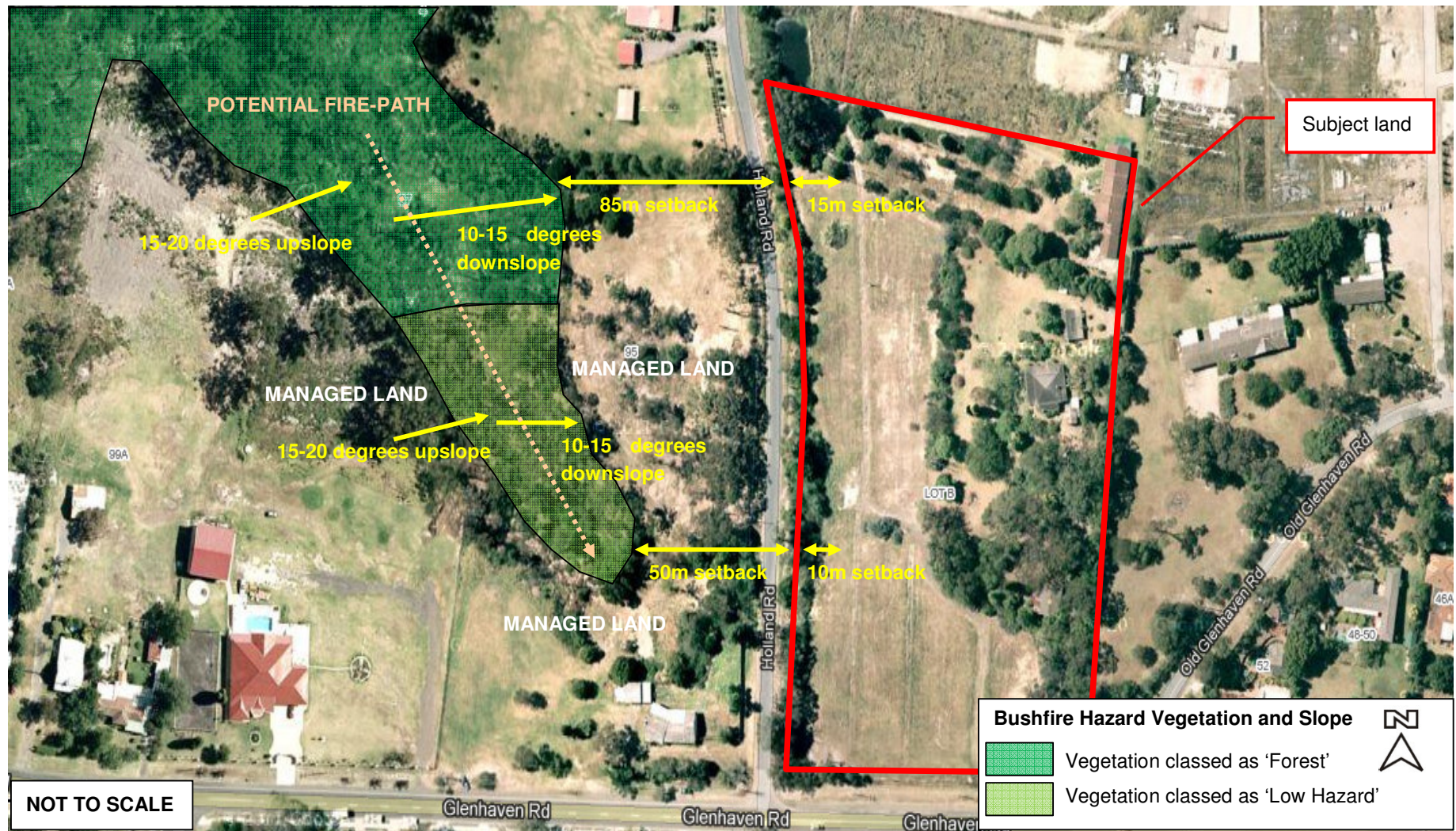


Figure 4: Proposed development area with vegetation types and slope classification

2 Bushfire threat assessment

2.1 BUSHFIRE PROTECTION ASSESSMENT REQUIREMENTS

The subject land is identified as Bush Fire Prone Land by The Hills Shire Council (Refer to Figure 2). 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 Bushfire Protection 2006' (RFS 2006) herein referred to as PBP.

The proposal constitutes Special Fire Protection Purpose (SFPP) development. SFPP developments are treated and assessed differently to other developments, and they require a higher standard of bushfire protection due to one or more of the following reasons:

- Occupants may not originate from the area and therefore may be less educated in relation to bushfire impacts
- They may have a reduced capacity to evaluate risk and respond adequately to the bushfire threat
- They may be more vulnerable to stress arising from bushfire threat; and
- They may present logistical difficulties for evacuation, due to reduced mobility, larger numbers of people, communication barriers and the requirement for increased supervision

The PBP specific objectives for SFPP development are to:

- *Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to withstand the fire event, enabling occupants and firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated*
- *Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to firefighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bushfire is imminent.*

2.2 VEGETATION TYPES AND SLOPES

The vegetation and slope have been assessed in all directions for the proposed retirement living facility subdivision. In accord with PBP the predominant vegetation class has been calculated for a distance of at least 140 m 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. The predominant vegetation and effective slope assessments are shown in Table 1.

The areas of significant hazard within proximity of the proposed development are a mixture of both Forest vegetation and 'low-hazard' forested riparian vegetation.

An extensive area of Forest vegetation exists adjacent to and within a small drainage line/riparian corridor area immediately to the west of the subject site. The riparian corridor or 'low-hazard vegetation' (as shown within Figure 4) has the characteristics of a forest structure, particularly on the eastern side of the drainage line, however, the vegetation is also highly constrained both through past disturbances causing weed infestation, and current management practices implemented by the landholders of these rural-residential properties. The surrounding management has resulted in the corridor becoming quite narrow in certain areas, with the areas of low-hazard within Figure 4 having a width and potential fire run directly towards the development of less than 50 m. The slopes associated within this low-hazard vegetation are short in length but reasonably steep – with a 10-15 degree downslope on the eastern side of the drainage line, followed by an even steeper 15-20 degree upslope on the western side, up to the existing residential properties.

Beyond the low-hazard areas, the riparian corridor becomes wider and broadens into areas of extensive forest vegetation further to the north-west. As shown in Figure 4, once the potential fire run towards the development has been assessed as greater than 50 m, the vegetation is no longer considered to be low-hazard, and as such, has been assessed as forest vegetation. The slopes within the forest vegetation and within 100 m of the subject site are similar to those noted above, with a 10-15 degree downslope on the eastern side of the drainage line, followed by an even steeper 15-20 degree upslope on the western side, up to the existing residential properties

Some aerial photos of the areas to the immediate west of the subject site show vegetation being more dense and widespread than is actually the case on the ground. There is some retained road-side trees, however, the remaining areas between the site and the low-hazard and forest areas to the west is completely managed grasslands throughout, encroaching within the corridor vegetation areas, and therefore are not considered to constitute a hazard.

All other areas surrounding the subject site, including rural residential properties further to the north, south and east, have all been inspected and constitute managed lands.

3 Asset Protection Zones (APZ)

PBP has been used to determine the width of Asset Protection Zones (APZ) for the proposed Special Fire Protection Purpose (SFPP) development. Table 1 below shows the APZ calculation, which is also depicted within Figure 4.

Table 1: Threat assessment, APZ and bushfire attack level

Direction	Slope ¹	Vegetation ₂	PBP required APZ ³	Proposed APZ ³	AS3959 BAL ⁴	Comment
West (adjacent to low-hazard riparian corridor)	Downslope >10-15 degrees	Low-hazard vegetation (Forest corridor)	60m	>60m (50m managed land + 10m building setback within property)	BAL-12.5* and additional ember proofing measures as outlined in PBP, 2010 Appendix 3 Addendum	APZs consists of existing cleared/managed areas within adjoining properties, in conjunction with building setbacks implemented within the subject site. No further clearing is required.
West / North West (adjacent to Forest vegetation)	Downslope >10-15 degrees	Forest	100m	>100m (85m managed land + 15m building setback within property)	BAL-LOW*	
All other directions are considered to be managed lands and consist primarily of existing portions of the retirement living facility or neighbouring managed lands.						

¹ Slope most significantly influencing the fire behaviour according to PBP.

² Predominant vegetation is identified according to PBP.

³ Assessment according to PBP.

⁴ Assessment according to AS 3959-2009.

4 APZ maintenance plan

The proposed APZ may require some minor vegetation clearance and tree removal within the subject site and within the vicinity of Holland Road to support the proposed development. Fuel management within the APZ is to be as follows:

- No tree or tree canopy is to occur within 2 m of future dwelling rooflines
- 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; and
 - are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission
- Any landscaping or 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); and
- Any structures storing combustible materials such as firewood (*e.g.* sheds) must be sealed to prevent entry of burning debris

5 Construction standard

Method 1 of the AS 3959-2009 '*Construction of buildings in bushfire-prone areas*' has been used to determine the bushfire construction levels required for the SFPP development (Standards Australia 2009). In response to the predicted bushfire attack as indicated within Table 1 above, portions of the proposed development will be required to be constructed to BAL-12.5 under Australian Standard AS 3959-2009 '*Construction of buildings in bushfire-prone areas*' (Standards Australia 2009).

In addition to the requirements of AS 3959-2009, NSW has a variation to the Standard (as outlined within the PBP Appendix 3 Addendum 2010) and requires some additional measures to be implemented when BAL-12.5 or BAL-19 are applied.

The Bushfire Attack Level (BAL) as per AS 3959 Table 2.4.2 varies dependant on the separation distances as in Table 2 below.

Table 2: BAL separation distances in relation to the proposed development

Subject land area and Vegetation and Slope	BAL-FZ Distance	BAL-40 Distance	BAL-29 Distance	BAL-19 Distance	BAL-12.5 Distance	BAL-LOW Distance
West Low-hazard Vegetation (Riparian Corridor) situated on >10-15° downslope	<17 m	17-<23 m	23-<33 m	33-<45 m	45-<100 m*	>100 m*
West / North west Forest Vegetation situated on >10-15° downslope	<39 m	39-<49 m	49-<64 m	64-<82 m	82-<100 m	>100 m*
All other Directions Managed lands	BAL Low (separation distance exceeds 100 metres due to existing management or development)					

Information according to AS3959-2009 '*Construction of buildings in bushfire-prone areas*' Table 2.4.2 pg. 29, and PBP revised Appendix 3.

6 Water supply

Reticulated water and hydrants are available along both Glenhaven Road and Old Glenhaven Road to the south and south east respectively. A reticulated network also exists within the existing portions of the aged care facility however this will be expanded to accommodate the proposed new portions of the facility, including Stage 3.

The reticulated water supply is to comply with the following acceptable solutions within Section 4.2.7 of PBP:

- access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal 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; and
- The [PBP] provisions for parking on public roads (as contained within section 4.1.3) are met. For road widths of 8m this includes, but is not limited to, having no parking permitted on the side of the road where services (i.e. hydrants) are located

7 Gas and electrical supplies

In accordance with PBP, electricity lines are required to be installed underground.

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

8 Access

The subject land is accessed via Old Glenfield Road, with the existing internal road network, within the eastern portion of the site, being fully sealed access roads with sufficient widths for the access and egress of the site by occupants and fire fighters.

The new proposed internal access roads are to comply with standards contained within section 4.2.7 of PBP for the design and construction of roads within SFPP developments, as listed in Table 3.

Table 3: Performance criteria for Internal Access Roads*¹

Performance Criteria	Acceptable Solutions	Complies
The intent may be achieved where:		
internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	internal roads are two-wheel drive, sealed, all-weather roads;	Complies
	internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions;	Complies
	roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	Complies
	traffic management devices are constructed to facilitate access by emergency services vehicles.	Complies
	a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.	Complies
	curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.	Complies
	the minimum distance between inner and outer curves is six metres.	Complies
	maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.	Complies
	crossfall of the pavement is not more than 10 degrees.	Complies
	roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).	Complies
	roads are clearly sign-posted and bridges clearly indicate load ratings.	Complies
	the internal road surfaces and bridges have a capacity to	Complies
	carry fully-loaded firefighting vehicles (15 tonnes).	Complies

*¹ PBP page 35

9 Bushfire maintenance plans and fire emergency procedures

The APZs will be managed by either the development owners or management. In these instances, the role of the responsible party is to manage not only the APZs around the proposed retirement living buildings, but also the other landscaped areas throughout the facility.

Furthermore, the preparation of both bushfire emergency/evacuation procedures and vegetation maintenance plans is the responsibility of the abovementioned parties, and is recommended as part of this assessment. Where an emergency/evacuation management plan already exists for the development, it shall be updated to include the new areas within Stage 3.

10 Assessment of environmental issues

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

The Hills Shire Council is the determining authority for this SFPP integrated development and they will assess more thoroughly any potential environmental and heritage issues.

11 Recommendations & conclusion

The existing Asset Protection Zones (APZs) are consistent with the minimum requirements for Special Fire Protection Purpose (SFPP) development according to *'Planning for Bush Fire Protection'*, with only minor further APZ establishment works or vegetation clearing, adjacent to Holland Road, likely to be required. A portion of the proposed retirement living buildings, situated within 100 m bushfire hazard areas, will require the implementation of BAL-12.5 construction standards in accordance with AS 3959-2009 with additional ember proofing requirements set by the NSW Rural Fire Service where noted.

11.1 RECOMMENDATIONS

The following recommendations have been made within this report to ensure the proposed SFPP development 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 Special Fire Protection Purpose development 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- Future landscaping across the development is to comply with the principles listed in Appendix 5 of PBP;

Recommendation 4- Construction standards of future proposed buildings shall comply with the requirements as listed within Table 2, in accordance with AS3959-2009 – *'Construction of Buildings in Bushfire prone areas'*;

Recommendation 5- A reticulated hydrant water supply should be installed throughout the proposed development in accordance with Australian Standard AS 2419.1;

Recommendation 6- Internal 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 7- Electrical services should be installed underground;

Recommendation 8 Gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008);

Recommendation 9- Adequate bushfire evacuation / emergency procedures and vegetation management plans should be prepared by the parties responsible for the ongoing management and maintenance of the proposed development. These plans should be prepared prior to the occupation on the retirement living buildings.

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, a standard that is consistent with 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.



Daniel Copland

Senior Bushfire Consultant



Eco Logical Australia (ELA) is recognised by the NSW Rural Fire Service and the NSW Department of Planning as a suitably qualified consultant as the company is listed as a Certified Business (BPD-BA-18882) under the Fire Protection Association of Australia's BPAD program.

12 References

NSW Rural Fire Service (RFS). 2006. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners*. Australian Government Publishing Service, Canberra.

Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2008. *The storage and handling of LP Gas*, AS/NZS 1596-2008, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia. 2009. *Construction of buildings in bushfire-prone areas*, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

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