

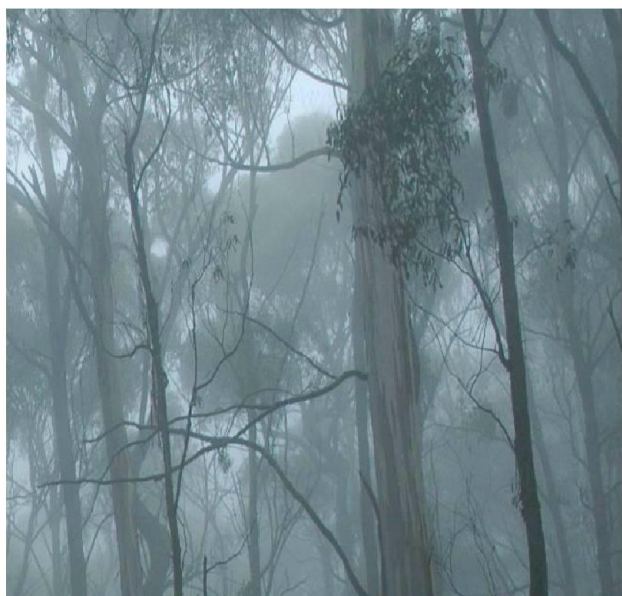


## Bushfire Protection Assessment

### Proposed Subdivision: St Marys Central Precinct Stage 1

Prepared for  
**Lend Lease**

18 December 2014



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# 1 Property and proposal

|                                  |                                   |                  |      |
|----------------------------------|-----------------------------------|------------------|------|
| <b>Name:</b>                     | Maryland Development Company      |                  |      |
| <b>Street or property Name:</b>  | St Marys Central Precinct Stage 1 |                  |      |
| <b>Suburb, town or locality:</b> | St Marys                          | <b>Postcode:</b> | 2760 |
| <b>Local Government Area:</b>    | Penrith City Council              |                  |      |
| <b>Type of development:</b>      | Residential subdivision           |                  |      |

## 1.1 Introduction

Maryland Development Company commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for the first stage residential subdivision at the St Marys Central Precinct (hereafter referred to as the subject land).

This assessment has been prepared by the 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.

The bushfire protection requirements for residential subdivision throughout the Central Precinct have been previously determined and approved at the Precinct Plan stage as described within the report '*Bushfire Protection Assessment – St Marys Western and Central Precincts*' prepared by BES (2009). This assessment follows and builds upon the findings of the initial bushfire report.

## 1.2 Location and description of subject land

The subject land is located within the southern section of the Central Precinct as shown in **Figure 1**. The subject land is bounded by the Wianamatta Regional Park to the west and managed Regional Open Space to the east. Future stages within the Central Precinct lay to the north and existing residential development abuts Stage 1 to the south.

## 1.3 Description of proposal

The proposal is for residential subdivision consisting of residential lots and associated public roads, open space, riparian corridor and infrastructure. A subdivision layout plan is shown in **Figure 2**.



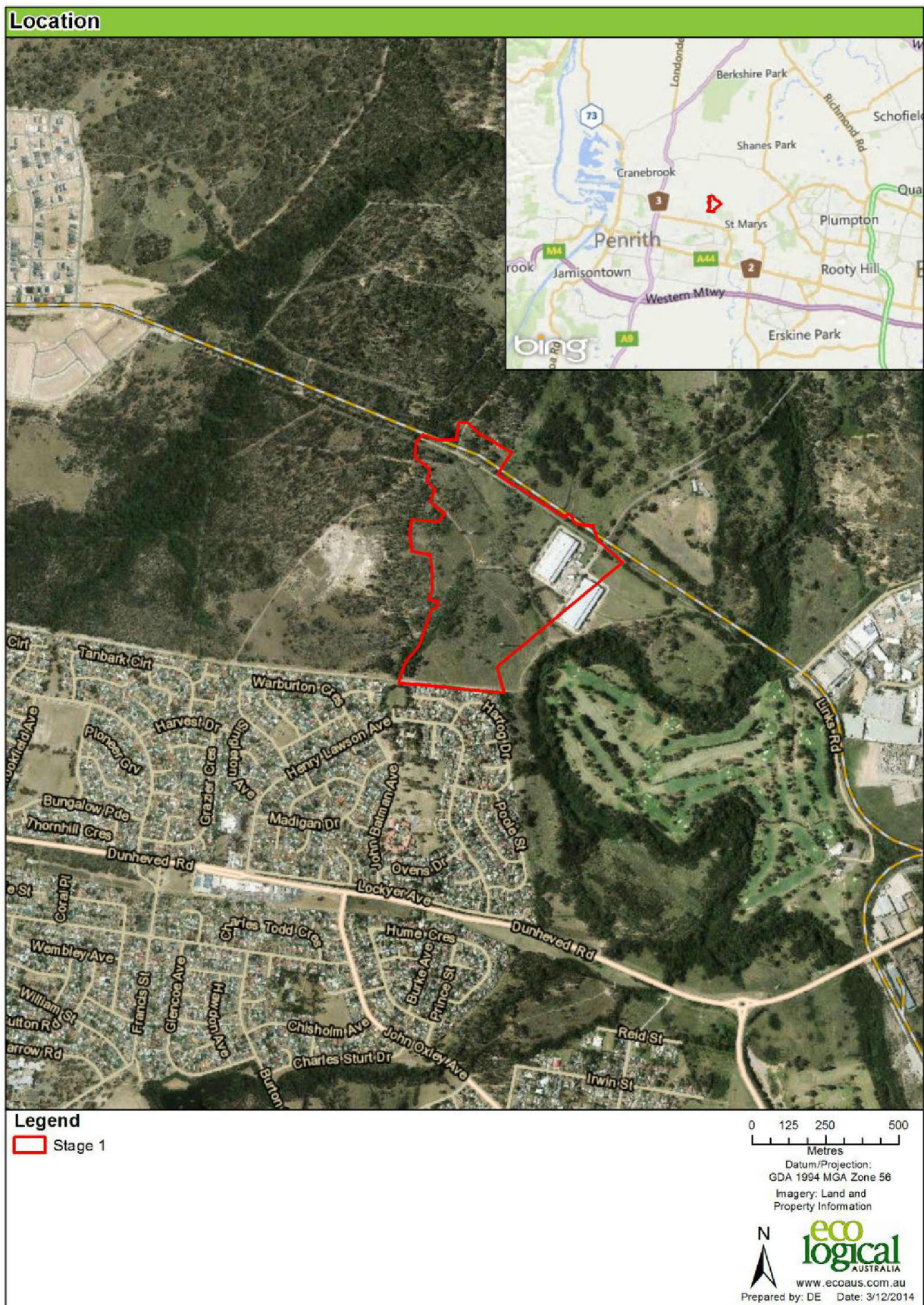


Figure 1: Location of Stage 1



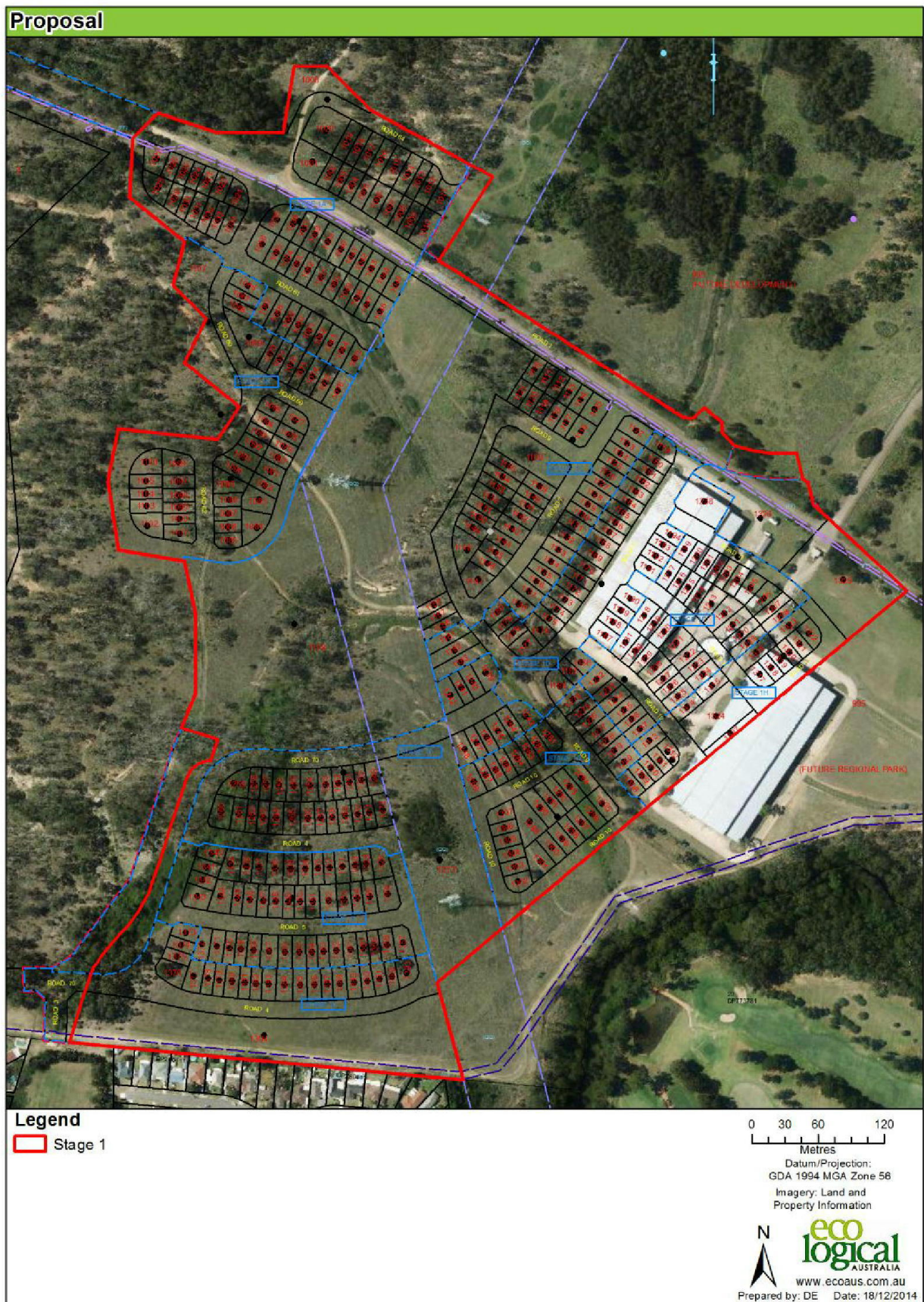


Figure 2: Stage 1 subdivision layout plan

## 2 Bushfire threat assessment

### 2.1 Assessment requirements

The subject land is identified as containing Bush Fire Prone Land by Penrith City Council. The following assessment is therefore 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.

The assessment also adopts the recommendations approved within the Precinct Plan relating to bushfire protection described within the report '*Bushfire Protection Assessment – St Marys Western and Central Precincts*' prepared by BES (2009). This assessment follows and builds upon the findings of the initial bushfire report.

### 2.2 Vegetation types and slopes

The vegetation and slope have been assessed outwards from the boundaries of the proposed subdivision in the direction of any bushfire hazards found. In accordance 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 was determined for a distance of at least 100 m. The predominant vegetation and effective slope assessments are shown in **Figure 3** and summarised in **Table 1** within the following Section 3 – Asset Protection Zones.

There are three types of bushfire hazard found within 140 m of the subdivision perimeter. There is bushland conserved within the Regional Park adjacent the western boundary of the subdivision consisting predominantly of Shale Plains Woodland with a smaller area of forest in the north. The bushland is on either a downslope in the PBP class of 0-5 degrees or upslope leading away from the subdivision boundary. The vegetation classifications are consistent with the bushfire assessment (BES 2009) approved as part of the Precinct Plan. Appendix 1 contains the vegetation mapping from the original assessment.

The third hazard type will be created within a riparian zone to run through the centre of the subdivision. Due to the width of the vegetated portion of the riparian zone being 50m or less, it can be categorised as 'low hazard'.

The bushland within future stages to the north of Stage 1 is to be managed for a distance of at least 100 m from the Stage 1 boundary in order to avoid unnecessary Asset Protection Zones or building construction standards for dwellings within Stage 1 at the northern interface. Managed lands in the form of Regional Open Space and existing residential development lies to the east and south of Stage 1 respectively. The Regional Open Space in this location is regularly slashed by Lend Lease as part of maintenance and fire mitigation across the St Marys site from Ropes Crossing in the east to Jordan Springs in the west, and will minimise potential for a grassland hazard to eventuate prior to construction of sporting fields and passive open space in the future.



### 3 Asset Protection Zones (APZ)

PBP has been used to determine the width of Asset Protection Zones (APZ) for the proposed subdivision. **Table 1** below shows the APZ calculation and the location of APZs is shown in **Figure 3**.

The proposed APZs exceed the PBP Acceptable Solutions for residential subdivision as they are based on BAL-29 of AS 3959-2009 *Construction of buildings in bushfire prone areas*.

**Table 1: Asset Protection Zone assessment**

| Location<br>(Refer to Figure 3) | Slope           | Vegetation                                 | PBP APZ   | Proposed APZ (AS 3959 BAL-29) |
|---------------------------------|-----------------|--|---|-------------------------------|
| Western boundary                | Upslope/Flat    | Woodland                                   | 10 m  | 16 m                          |
| Western boundary                | Downslope >0-5° | Woodland                                   | 15 m  | 21 m                          |
| Western boundary                | Upslope/Flat    | Forest                                     | 20 m  | 25 m                          |
| Western boundary                | Downslope >0-5° | Forest                                     | 25 m  | 32 m                          |
| Riparian Zone                   | Downslope >0-5° | Low Hazard                                 | 10 m  | 14 m                          |
| Northern boundary               | Varies          | Managed Precinct land (future subdivision) | The Precinct in this direction is to be managed as a 'Temporary APZ' to a distance of at least 100 m so that an APZ or construction standards are not required for new dwellings within Stage 1 adjacent this boundary. |                               |
| Eastern boundary                | Varies          | Managed Regional Open Space                | APZ not required as the adjoining land is managed as open space   |                               |
| Southern boundary               | Varies          | Managed residential properties             | APZ not required as the adjoining land is managed   |                               |

The proposed APZs will require vegetation maintenance to achieve the performance objectives of an Inner Protection Area (IPA) as described by PBP. The following fuel management guide should be used to satisfy the performance requirements:

- No tree or tree canopy is to occur within 2 m of future dwelling rooflines;
- The presence of a few trees in the APZ is acceptable provided that they are well spread out and do not form a continuous canopy whereby single trees, or clumps of trees forming one canopy are separated by 2 to 5 m depending on the canopy size;
- Shrubs are to be limited to select and well managed garden beds that are located far enough away from future buildings so that they will not ignite the buildings by direct flame contact or radiant heat emission;
- 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).



Figure 3: Stage 1 bushfire hazard analysis and Asset Protection Zones



## 4 Bushfire Attack Levels

Penrith City Council has requested that the Bushfire Attack Levels (BALs) under AS 3959-2009 *Construction of buildings in bushfire-prone areas* (AS 3959) be issued at time of subdivision application.

A BAL map has been prepared for Stage 1 and is provided as **Figure 4** on the following page. The BALs comply with the PBP Acceptable Solution (deemed-to-satisfy) method, which is to apply BALs based on the vegetation and slope assessment methodology within PBP and Table 2.4.2 of AS 3959-2009 (Method 1).

To prevent the need for unnecessary BALs for dwellings along the northern boundary of Stage 1, a temporary 100 m APZ is required within the adjacent future stage. Once the adjoining future stage is developed, maintenance of a temporary APZ would no longer be required.



Figure 4: Stage 1 Bushfire Attack Levels (BALs)

## 5 Access and egress

The subdivision will be accessed ultimately from four access points; from the south via Werrington County, the west via Jordan Springs, the east via Ropes Crossing and the north via future stages of the Central Precinct. The proposed public road layout within the subdivision and its linkages to existing and future surrounding roads complies with PBP (refer to **Figure 2**).

**Table 2** on the following page lists the PBP acceptable solutions and performance criteria for public roads in bushfire prone areas. The design and construction of the roads are to comply with the provisions listed within **Table 2**. The proposed layout shown in **Figure 2** can achieve these. A public perimeter road is proposed along the interface with the bushfire hazard.

## 6 Utilities

### 6.1 Water supply

The subdivision is to be serviced by reticulated water. 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;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The PBP provisions of parking on public roads are met.

### 6.2 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, and
- No part of a tree should be closer to a powerline than the distance specified in “*Guideline for managing vegetation near power lines*” issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2005).

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).



**Table 2: Performance criteria for proposed public roads**

| Performance Criteria  | Acceptable Solutions  |
|---|---|
| <b>The intent may be achieved where:</b>  |   |
| <ul style="list-style-type: none"> <li>firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)</li> </ul> | <ul style="list-style-type: none"> <li>public roads are two-wheel drive, all weather roads</li> </ul>   |
| <ul style="list-style-type: none"> <li>public road widths and design that allows safe access for firefighters while residents are evacuating an area</li> </ul>                     | <ul style="list-style-type: none"> <li>urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle) stating a minimum trafficable width of 6.5 m</li> <li>the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas</li> <li>traffic management devices are constructed to facilitate access by emergency services vehicles</li> <li>public roads have a cross fall not exceeding 3 degrees</li> <li>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</li> <li>curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number to allow for rapid access and egress</li> <li>the minimum distance between inner and outer curves is six metres</li> <li>maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient</li> <li>there is a minimum vertical clearance to a height of four metres above the road at all times</li> </ul> |
| <ul style="list-style-type: none"> <li>the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles</li> </ul>                               | <ul style="list-style-type: none"> <li>the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating</li> </ul>   |
| <ul style="list-style-type: none"> <li>roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered</li> </ul>         | <ul style="list-style-type: none"> <li>public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression</li> <li>public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression</li> </ul>  |
| <ul style="list-style-type: none"> <li>there is clear access to reticulated water supply</li> </ul>   | <ul style="list-style-type: none"> <li>public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> <li>one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> </ul>   |
| <ul style="list-style-type: none"> <li>parking does not obstruct the minimum paved width</li> </ul>   | <ul style="list-style-type: none"> <li>parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement. No services or hydrants are located within the parking bays</li> <li>public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road</li> </ul>   |

## 7 Recommendations and conclusion

### 7.1 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 as listed in **Table 1**;

Recommendation 2- Asset Protection Zone maintenance is to comply with the NSW Rural Fire Service document 'Planning for Bush Fire Protection 2006' Inner Protection Area (IPA) performance requirements as listed in Appendix 2 Section A2.2 of PBP and guided by the fuel management principles listed in **Section 3** of this report;

Recommendation 3- The design and construction of public roads is to comply with the acceptable solutions listed in **Table 2** of this report;

Recommendation 4 - A hydrant water supply is to be installed in accordance with Australian Standard AS 2419.1 and **Section 6.1** of this report;

Recommendation 5 - Electrical services should be underground and if overhead lines are used, overhanging branches should be trimmed according to "Guideline for managing vegetation near power lines" issued by Department of Energy, Utilities and Sustainability (ISSC 3, December 2005);

Recommendation 6 - Gas services are to be installed and maintained in accordance with AS/NZS 1596:2008 (Standards Australia 2008).

### 7.2 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 aim and objectives of 'Planning for Bush Fire Protection' (RFS 2006) and appropriate for the issue of a Bush Fire Safety Authority.



David Peterson

Principal Bushfire Consultant

**Eco Logical Australia Pty Ltd**

**FPAA BPAD Certified Practitioner No. BPD-PD-23276**



## References

Department of Energy, Utilities and Sustainability (ISSC 3, December 2005) *Guideline for managing vegetation near power line*

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.

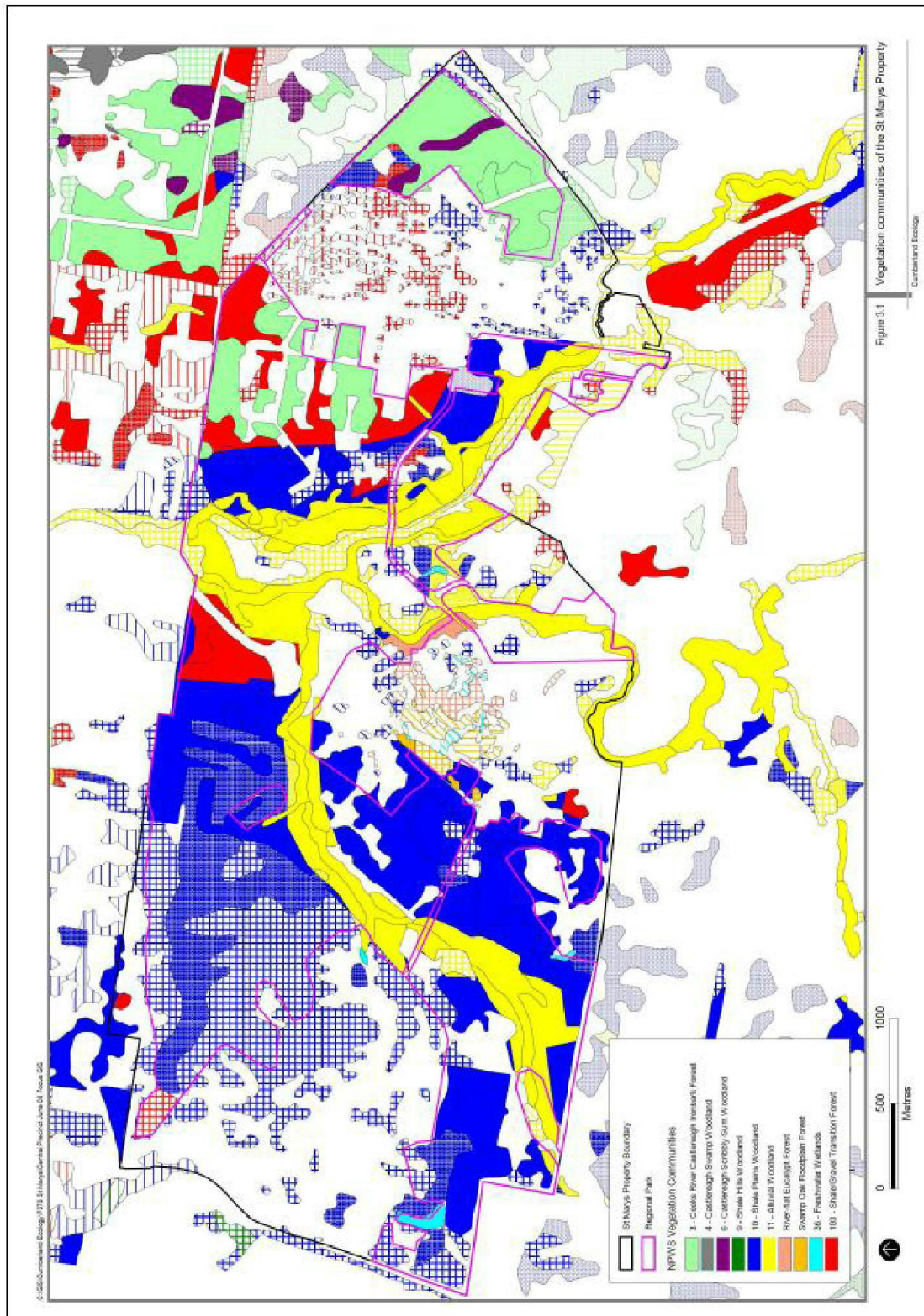
Standards Australia. 2005. *Fire hydrant installations - System design, installation and commissioning*, AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

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 3959-2009, Standards Australia International Ltd, Sydney



## Appendix 1 - Vegetation Mapping





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