

## **BUSHFIRE PRELIMINARY CONSTRAINTS ANALYSIS**

### **PROPOSED SPECIAL FIRE PROTECTION PURPOSE AND RESIDENTIAL DEVELOPMENT**

**LOT 1 DP 321353 &  
LOT 322 DP 1102537  
254-266 Longueville Road, Lane Cove**

Date: **22/12/2011**

Prepared for: **Lane Cove Council**

**DRAFT**

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  | <b>BUSHFIRE PLANNING AND DESIGN</b>                                                  |
|                                                                                     | <b>Certified Practitioner</b>                                                        |
| Certification No.                                                                   | <b>BPD-PA-16132</b>                                                                  |
| Signature                                                                           |  |

**NEWCASTLE BUSHFIRE CONSULTING**  
5 Chartley Street, Warners Bay NSW 2282  
(Ph) 02 40230149 (mob) 0423 923284  
Email: mail@newcastlebushfire.com.au

Couch Family Trust T/A  
Newcastle Bushfire Consulting Pty Ltd A.B.N. 96 831 374 298  
Bushfire and Building Sustainability Consultants

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Prepared By:



Phillip Couch GFireE  
Bach Info Science  
Grad Dip Design for Bushfire Prone Areas  
FPAA BPAD - A Certificate Number BPD-PA-16132  
Director Newcastle Bushfire Consulting



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## 1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

The report assesses potential Integrated Development opportunities against the requirements of s100B of the Rural Fires Act 1997, AS3959 (2009) Building in Bushfire Prone Areas and Planning for Bushfire Protection, 2006.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

|                                                 |                                                                           |                                 |                    |
|-------------------------------------------------|---------------------------------------------------------------------------|---------------------------------|--------------------|
| <b>Applicant Name</b>                           | Lane Cove Council                                                         |                                 |                    |
| <b>Site Address</b>                             | 254-266 Longueville Road,<br>Lane Cove                                    | <b>Lot/Sec/DP</b>               | Lot 322 DP 1102537 |
| <b>Local Government Area</b>                    | Lane Cove                                                                 | <b>FDI</b>                      | 100                |
| <b>Bushfire Prone Land</b>                      | Yes – within the 100 metre buffer of a Category 1 Vegetation              |                                 |                    |
| <b>Type of development</b>                      | Integrated Development<br>and Residential<br>Development<br>Opportunities | <b>Type of Area</b>             | Urban              |
| <b>Special Fire Protection Purpose</b>          | Yes                                                                       | <b>Flame Temperature</b>        | 1090K and 1200K    |
| <b>Application Complies with DTS Provisions</b> | Yes                                                                       | <b>Referral to RFS required</b> | Yes                |

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

|                                                    | North                     | East               | South and East                            | West             |
|----------------------------------------------------|---------------------------|--------------------|-------------------------------------------|------------------|
| <b>AS3959 (2009) Vegetation Structure</b>          | Forest                    | Forest             | Remnant Vegetation<br>< 1 hectare in size | Maintained Lands |
| <b>Asset Protection Zone</b>                       | 80 metres                 | 44 metres          | 20 metres                                 | 140 metres       |
| <b>Accurate Slope Measure</b>                      | 8 degrees downslope       | 11 degrees upslope | 14 degrees downslope                      | N/A              |
| <b>Slope Range</b>                                 | 6 to 10 degrees downslope | Level/Upslope      | 11 to 15 degrees downslope                | N/A              |
| <b>AS3959 (2009) Bushfire Attack Level (BAL)</b>   | BAL-12.5                  | BAL-19             | BAL-40                                    | N/A              |
| <b>PBP (2006) Table A2.6 Safe Defendable Space</b> | 85 metres                 | 60 metres          | 60 metres                                 | N/A              |
| <b>Alternate Solution Safe Defendable Space</b>    | As above                  | As above           | Detaield Fire Model<br>47 metres          | N/A              |

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.1.3 COMPLIANCE

| Performance Criteria                     | Proposed Development Determinations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Method of Assessment      |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Asset Protection Zone</b>             | <p>Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 2 Detailed Procedure and Planning for Bushfire Protection (2006) using 1200 Kelvin Flame and Planning for Bushfire Protection (2006) rainforest fuel loads to determine safe defensible space of &lt; 10kw/m2 at the building exit.</p> <p>Asset Protection Zones can be offset onto the golf course land if a Plan of Management is developed or section 88B easement is prepared.</p> <p>Significant site preparation will need to be done in managing asset protection zones on the site where the slope exceeds 20 degrees downslope due to soil slip and erosion. This is identified as the area immediately east of the grassed platform furthest from the Longueville Road.</p> | <u>Alternate Solution</u> |
| <b>Access – Internal Roads</b>           | Property access to comply with Planning for Bushfire Protection (2006) S4.1.3 and S4.2.7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Acceptable Solution       |
| <b>Water Supply</b>                      | <p>Access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads.</p> <p>Fire Hydrant spacing, sizing and pressures should comply with AS 2419.1 – 2005.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Acceptable Solution       |
| <b>Electrical Supply</b>                 | <p>The existing electrical supply to the local area is via overhead electrical transmission lines.</p> <p>All proposed onsite power supply is to be located underground.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Acceptable Solution       |
| <b>Gas Supply</b>                        | Any proposed gas supply will be located underground.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Acceptable Solution       |
| <b>Emergency and Evacuation Planning</b> | An emergency management plan developed in accordance with AS 3745, should be prepared and consider bushfire risk to the residential accommodation and other onsite development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Acceptable Solution       |

## **2.0 INTRODUCTION**

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### **2.1 PURPOSE OF REPORT**

The purpose of this report is to establish suitable bushfire mitigation measures for proposed Integrated Development Opportunities to be constructed at Lot 322 DP 1102537, 254-266 Longueville Road, Lane Cove.

The assessment acknowledges the requirements of s100B of the Rural Fires Act 1997 and Planning for Bushfire Protection 2006 to protect persons, property and the environment from danger that may arise from a bushfire.

Under the provisions of section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aim and objectives of Planning for Bushfire Protection 2006 to reduce the risk of ignition of the Integrated Development in a bushfire event.

### **2.2 PROPOSED DEVELOPMENT**

This report examines integrated development opportunities on council lands.

### **2.3 SIGNIFICANT ENVIRONMENTAL FEATURES**

The only known significant environmental features on the subject site are slopes exceeding 18 degrees. The site has been cleared previously due to the previous uses as a bowling green. The site is part zoned Environmental Conservation Zone.

### **2.4 ENVIRONMENTAL ASSETS**

A flora, fauna and fungi impact assessment has been prepared for the site.

### **2.5 ABORIGINAL HERITAGE**

Searches of National Parks and Wildlife database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site.



PHOTOGRAPH 1 – SITE PHOTO

View of the proposed development site. There has been terracing in the past with forest remnant and exotic weeds located between the building pad and the adjacent golf course.

### **3.0 BUSHFIRE ATTACK ASSESSMENT**

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#### **3.1 VEGETATION CLASSIFICATION**

Potential bushfire hazards were identified from Lane Cove Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bushfire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

The forest remnant to the south of the site will be less than a hectare in size following management of vegetation on the subject site and has been assessed with rainforest fuel loadings.

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.





FIGURE 1 – VEGETATIVE THREATS MAP





PHOTOGRAPH 2 – VEGETATIVE THREAT

View of forest remnant adjacent the golf course. The vegetation is dominated by eucalypts in the upper stratum with native shrubs and exotic species in the understorey. With vegetation managed on the subject site the bushland vegetation to the south will be less than 1 hectare in size and will burn in the manner of an evolving spot fire, not a full intensity forest fire.

### 3.2 EFFECTIVE SLOPE

#### Methodology

Effective slope was measured using 2 metre contour data obtained from Lane Cove Council and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction and along the length of the remnant.

Effective Slopes have been identified in Figure 4 – Slope Measure and shown in Table 2 – Bushfire Threat Assessment.



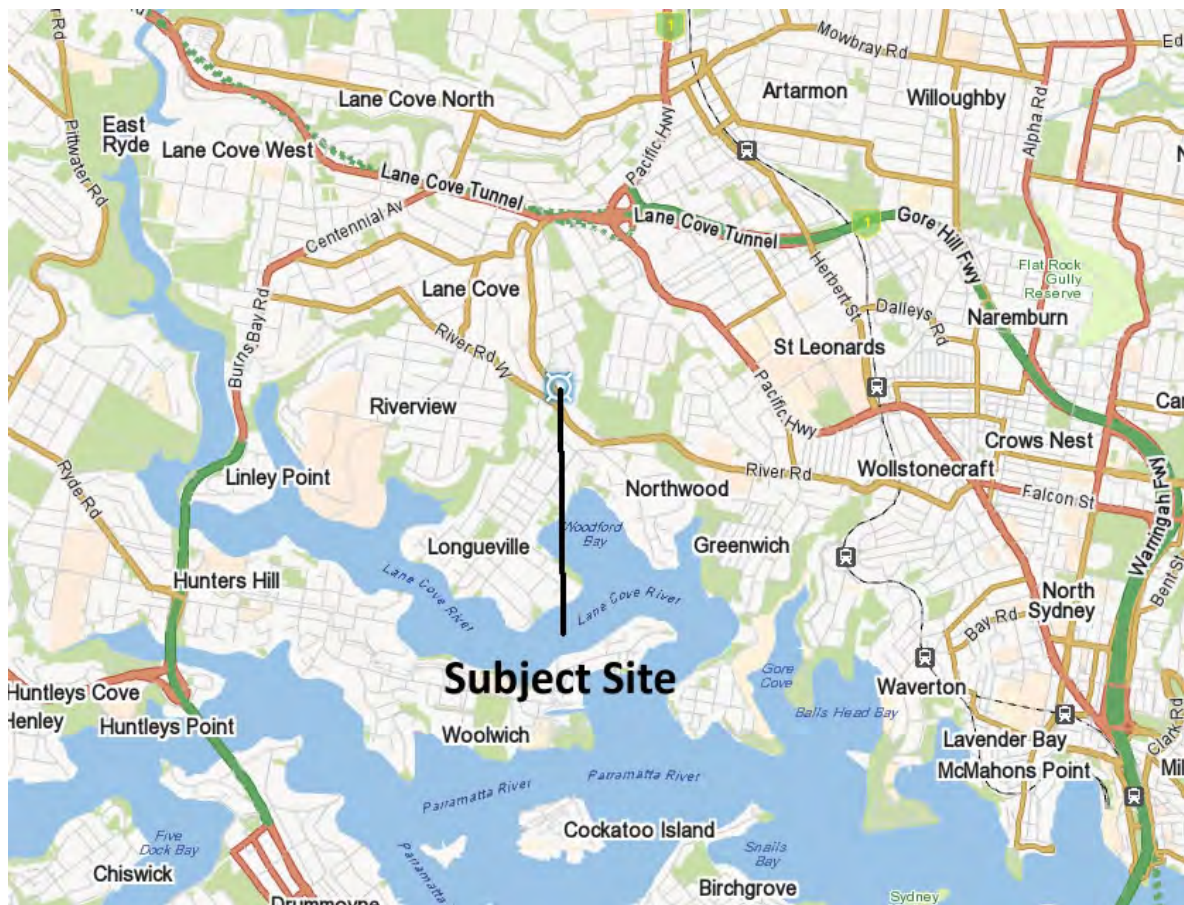


FIGURE 2 – LOCALITY MAP

[www.whereis.com](http://www.whereis.com) © Telstra Corporation Limited

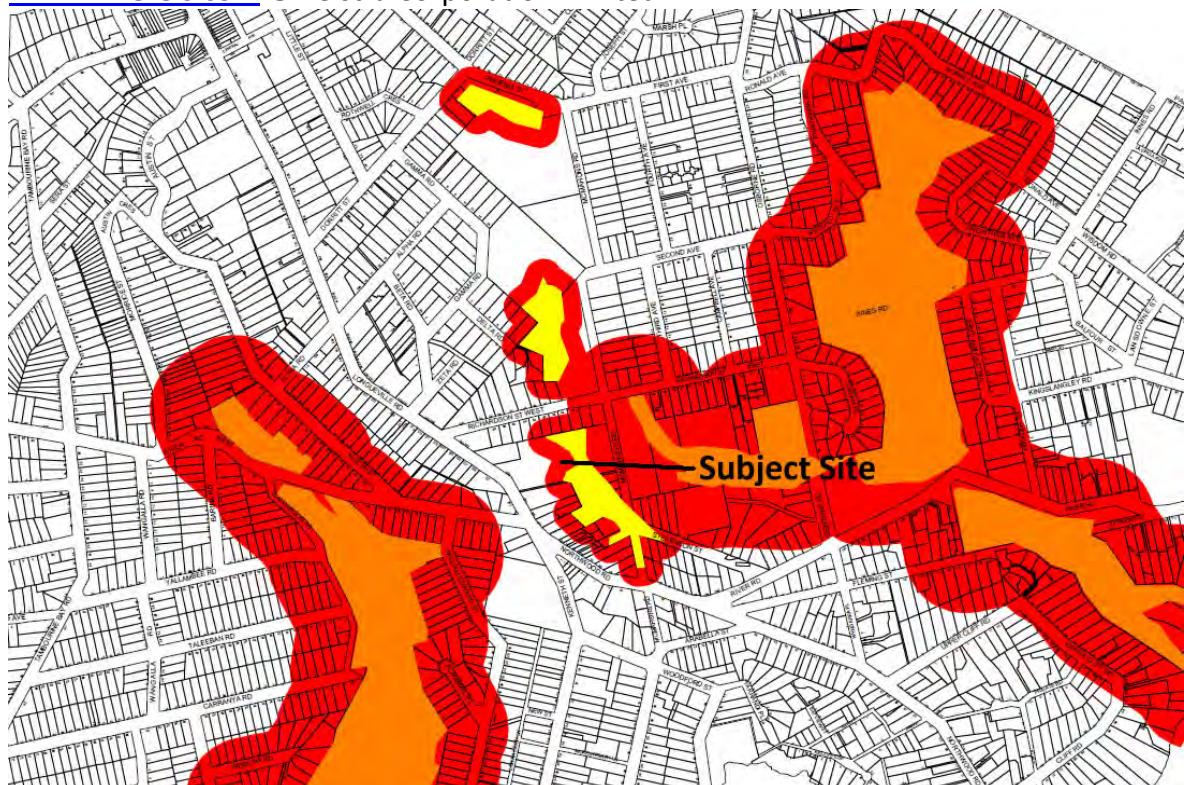


FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP



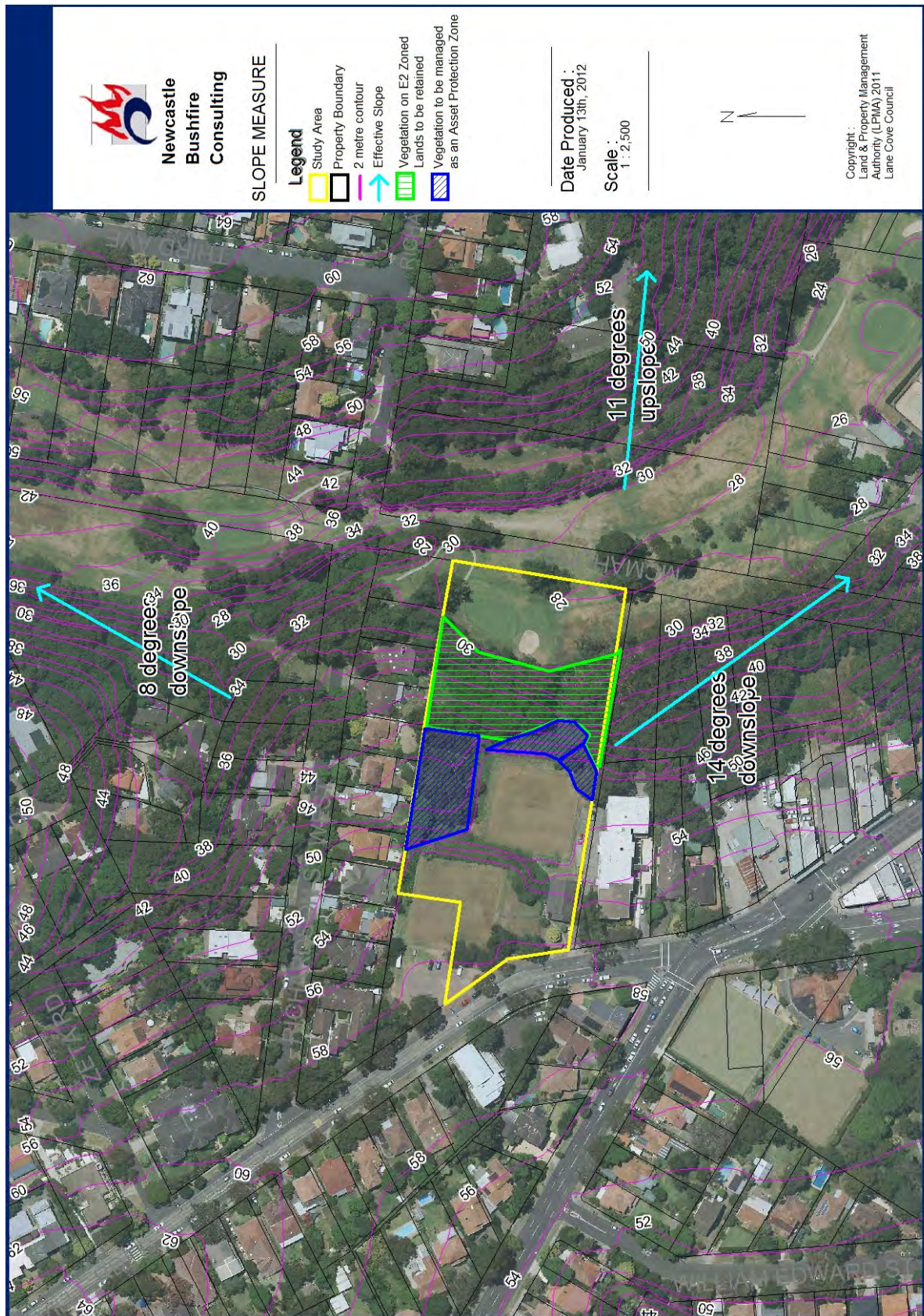


FIGURE 4 – SLOPE MEASUREMENTS MAP

### **3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES – ALTERNATE SOLUTION**

Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 2 Detailed Procedure and Planning for Bushfire Protection (2006), using 1200 Kelvin Flame and Planning for Bushfire Protection (2006) forest fuel loads to determine safe defensible space of < 10kW/m<sup>2</sup> to any face of the building.

The performance criteria of “radiant heat levels of greater than 10kW/m<sup>2</sup> will not be experienced by occupants or emergency services workers entering or exiting a building.” will be achieved with a **47 metre Asset Protection Zone**.

A non-performance based assessment using Planning for Bushfire Protection (2006) risk assessment tables considering vegetation with a 100 metre wide flame width will require a **60 metre Asset Protection Zone**.

These distances are plotted in Figure 5 Safe Defendable Space map.

### **3.4 BUSHFIRE ATTACK LEVELS**

#### **Seniors Living/Integrated Development**

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment. The building will be subject to reduced levels of radiant heat and should offer ember protection via BAL-12.5 construction.

#### **Standard Residential Development Multi-unit and freestanding dwelling**

AS3959 (2009) construction levels are designed for residential development with varying construction levels for units/standard dwellings illustrated in Figure 6 Asset Protection Zones Map.

#### **Other Class of building Non Residential BCA Class 5 to 8**

AS3959 (2009) construction levels are designed for residential development and if the proposed development is identified as “other development” under Planning for Bushfire Protection (2006) these conditions do not apply. The provisions of the BCA 2011 for fire safety are accepted for bushfire purposes where the aims and objectives of Planning for Bushfire Protection are met. Construction of the building is to comply with BCA 2011 fire safety provisions.



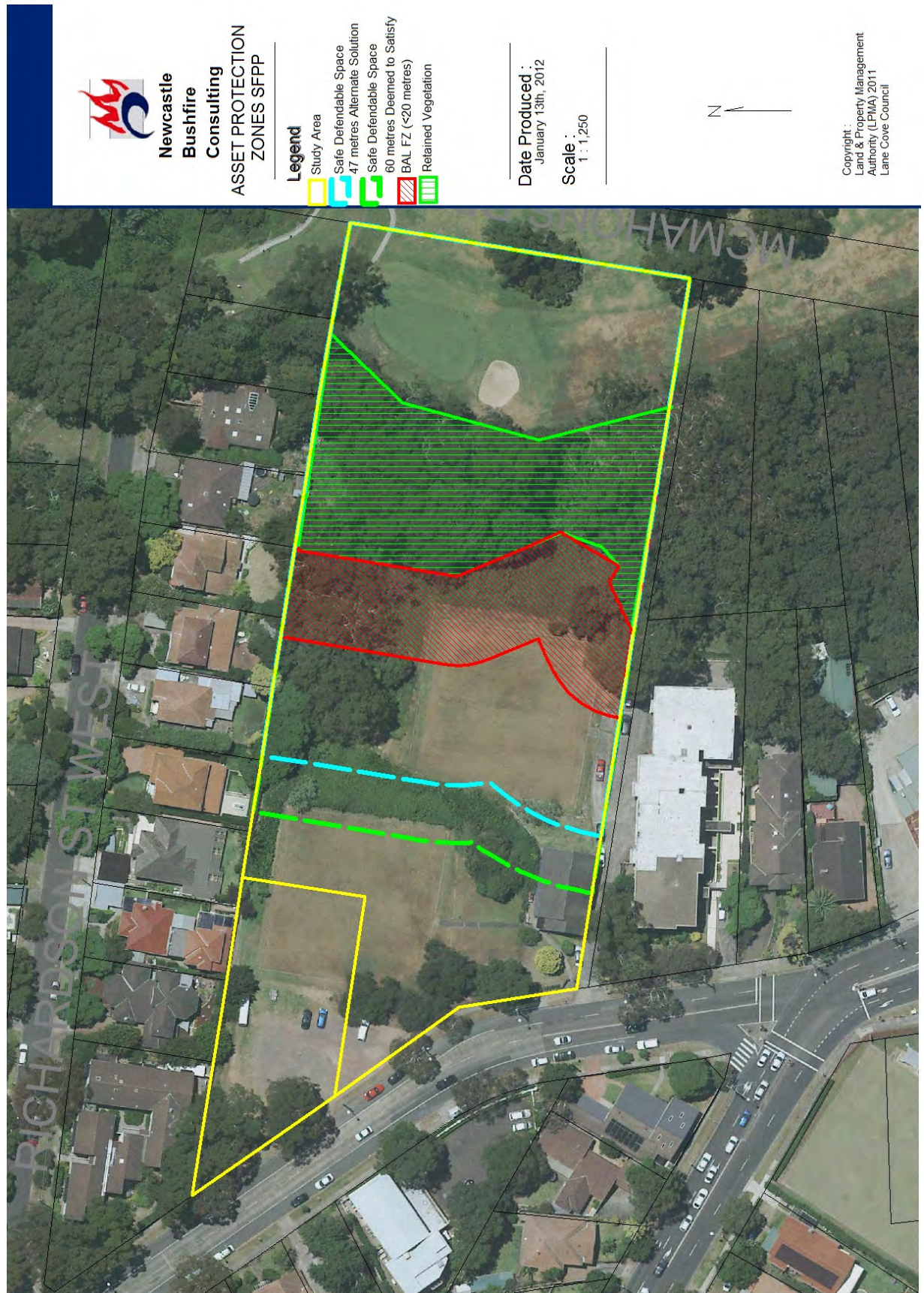


FIGURE 5 – SAFE DEFENDABLE SPACE MAP



## **4.0 UTILITY SERVICES AND INFRASTRUCTURE**

### **4.1 WATER SERVICES**

A reticulated water supply and street hydrant access is available from Longueville Road. Additional hydrants will need to be installed in accordance with AS 2419.1 – 2005 and should incorporate a ring main system. It is noted that hydrant pressures have not been tested as part of this report.

### **4.2 ELECTRICITY SERVICES**

The onsite electrical transmission lines are recommended to be located underground and will require no additional protection measures.

### **4.3 GAS SERVICES**

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 -2002 and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the buildings are not to be used.



**PHOTOGRAPH 3 – SITE ACCESS**

Road access is via dual carriageway fully sealed bitumen road.

## **5.0 PROPERTY ACCESS AND PUBLIC ROAD SYSTEM CAPACITY**

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### Public Road Access

The subject site is located on Longueville Road being a major arterial road through Lane Cove. All of the local roads interconnect into the local road network excepting Harrison Street West which terminates adjacent the golf course. Emergency Services are expected to have good access to the area at most times however local population densities may lead to significant traffic.

The public road network allows vehicle access onto the adjacent golf course and residential streets providing good access for parallel attack by firefighting vehicles and pre-established control lines.

There are no known fire trails through the local area due to the small areas of vegetation.

### Property Access

Property access roads shall comply with sections 4.1.3 and 4.2.7 of Planning for Bush Fire Protection 2006 as detailed below.

- internal roads are two-wheel drive, sealed, all-weather roads;
- 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;
- 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;
- traffic management devices are constructed to facilitate access by emergency services vehicles.
- 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.
- maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.
- crossfall of the pavement is not more than 10 degrees.
- roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).
- roads are clearly sign-posted and bridges clearly indicate load ratings.
- the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).



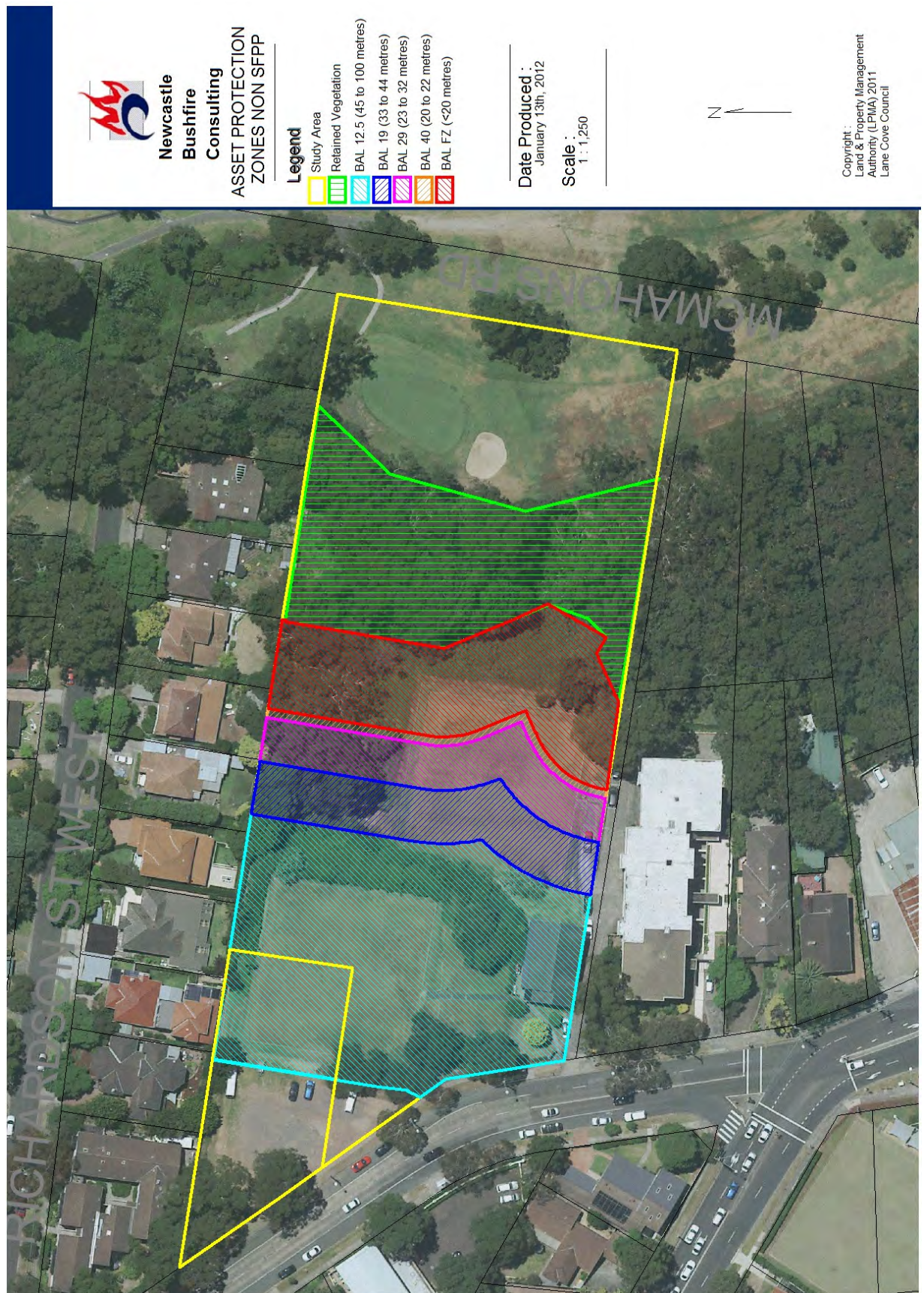


FIGURE 6 – STANDARD RESIDENTIAL DEVELOPMENT CONSTRUCTION LEVELS

## **6.0 LANDSCAPING MAINTENANCE**

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It is recommended that landscaping is undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

## **7.0 EMERGENCY AND MAINTENANCE PLANS**

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### **7.1 BUSHFIRE MAINTENANCE PLANS**

A monitoring and fuel management plan shall be prepared for the site maintaining onsite landscaping as an Inner Protection Area which should be monitored by the facility manager.

### **7.2 FIRE EMERGENCY PROCEDURES**

The new facility should have an emergency management plan developed in accordance with AS 3745 and consider bushfire risk for the entire development. The facility manager should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of the building.

## **8.0 FORMS OF DEVELOPMENT**

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Figure 5.0 and Figure 6.0 has indicated two development areas being Special Fire Protection Purpose Development Zone and Non-Special Fire Protection Purpose Zone. A description of development allowable in each zone is listed below.

### Special Fire Protection Purpose Developments

- (a) a school,
- (b) a child care centre,
- (c) a hospital (including a hospital for the mentally ill or mentally disordered),
- (d) a hotel, motel or other tourist accommodation,
- (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons,
- (f) housing for older people or people with disabilities within the meaning of State Environmental Planning Policy No 5— Housing for Older People or People with a Disability (now SEPP (Seniors Living))
- (g) a group home within the meaning of State Environmental Planning Policy No 9—Group Homes,
- (h) a retirement village,
- (i) manufactured home estates (within the meaning of State Environmental Planning Policy No 36—Manufactured Home Estates), comprising two or more caravans or manufactured homes, used for the purpose of casual or permanent accommodation (but not tourist accommodation),
- (j) sheltered workshops, or other workplaces, established solely for the purpose of employing persons with disabilities,
- (k) respite care centres, or similar centres, that accommodate persons with a physical or mental disability or provide respite for carers of such persons,
- (l) student or staff accommodation associated with a school, university or other educational establishment.

The above development type should not be located within 47 metres of the southern boundary based upon an alternate solution of fire modelling or within 60 metres of the western boundary based upon deemed to satisfy fire modelling tables.



Non-Special Fire Protection Purpose Development allowable directly adjacent the western boundary – subject to minimum planning setbacks.

Any standard residential, commercial building, manufacturing building not identified as a Special Fire Protection Purpose above or as a Controlled Development Type below that is allowed by the LEP can be built 20 metres from the southern boundary.

Any development in this zone will need to have structural fire separation from the Special Fire Protection Purpose development or be designed in a manner that the access and exit to the Special Fire Protection Purpose is within the Special Fire Protection Purpose Zone. Construction and design of a building in this zone should be in a manner that prevents the spread of structural fire to the Special Fire Protection Purpose.

Controlled Development Not Permitted on the Site

- Power generating works
- Sawmills
- Junk yards
- Liquid fuel depots
- Offensive and hazardous industries
- Chemical industries
- Service stations
- Ammunition storage/manufacture
- Fire works manufacture/storage

## 9.0 PRELIMINARY RECOMMENDATIONS

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Based upon an assessment of information received for the proposal, the following conditions are identified.

1. Special Fire Protection Purpose building works shall comply with BAL-12.5 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection 2006 Appendix 3 (amended May 2010).
2. Special Fire Protection Purpose shall not be constructed within (47 metres or 60 metres) of the retained forest remnant vegetation onsite.
3. Non-Special Fire Protection Purpose development may be constructed to minimum 20 metres from the retained forest remnant vegetation onsite. The development should be designed to have structural fire separation from the Special Fire Protection Purpose.
4. Non-Special Fire Protection Purpose developments Class 5 to 8 buildings shall be constructed in accordance to BCA Structural Provisions.
5. Specific consideration will need to be given to maintaining lands on the subject site as an asset protection zone where they exceed 20 degrees downslope. This could involve terracing or planting out the areas with fire-resistant ground covers that will prevent soil slip or erosion.
6. Non-Special Fire Protection Purpose residential dwellings located 20 metres off the southern boundary shall be constructed to BAL-40 in accordance with AS 3959-2009 Building in Bushfire Prone Areas and the construction requirements of Planning for Bushfire Protection 2006 Appendix 3 (amended May 2010).
7. Any non E2 zoned lands onsite are recommended to be maintained as an Inner Protection Area (IPA) as outlined within section 4.1.3 and Appendix 5 of *Planning for Bush Fire Protection 2006* and the NSW Rural Fire Service's document *Standards for asset protection zones*.
8. Any gas services should be installed with Section 4.3 of this document.
9. Landscaping is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
10. An emergency management plan should be developed for the site in accordance with AS3745 and consider bushfire risk.
11. Fire Hydrant services should be designed in accordance with AS2419.1 -2005.

## **10.0 CONCLUSION**

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This report has been prepared as a preliminary constraints analysis to identify potential building zones and types of development available to the site. There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.



## 11.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bushfire Protection (2006) and the NSW Rural Fire Services “Standards for Asset Protection Zones”. The property owner should obtain these two documents and familiarise themselves with their content.

### Generally

Asset Protection Zones (APZ) refers to the area between the bushfire threat and the asset (ie building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

### Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel free zone.

#### A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a buildings glazing and vent openings.
2. Avoid planting around entry ways if the vegetation is flammable.
3. A maximum 30% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

#### B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3m of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

### Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining vegetation threat. The OPA should be maintained as a fuel reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

#### A. Shrubs:

1. Reduce or trim large stands of shrubs

#### B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

## **12.0 REFERENCES AND DISCLAIMER**

### **References**

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

Keith D. (2004) "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney.

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bushfire Protection

New South Wales Rural Fire Service (2010) Planning for Bushfire Protection Appendix 3 Amendment

### **Disclaimer**

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and fire fighters.

Planning for Bushfire Protection (2006) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains.

AS3959 (2009) Building in Bushfire Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.