

### **Bushfire Protection Assessment**

Newcastle East Public School – Alterations / Additions

Prepared for **EJE Architecture** 

27 September 2017





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## 1 Property and proposal

Street / property name:	48 Brown Street, The Hill		
Suburb / town:	Newcastle East	Postcode:	2260
Lot/DP no:	Lots 1-3 DP 794850		
Local Government Area:	Newcastle City Council		
Type of area:	Residential		
Type of development:	SFPP Infill (alterations/additions)		

### 1.1 Introduction

EJE Architecture commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) on behalf of Newcastle East Public School for proposed alterations/additions to the existing school facility and hereafter referred to as the 'subject land'.

This assessment has been prepared by ELA Senior Bushfire Consultant, Mark Hawkins (FPAA BPAD Level 3 Certified Practitioner No. BPD-L3-37742). Mark is recognised by the NSW Rural Fire Service as a qualified bushfire consultant in bushfire risk assessment.

### 1.2 Location and description of proposal

The subject land is located on the intersections of Brown and Tyrell Streets and Kitchener Parade within the suburb of Newcastle East. The school is located on the southern periphery of the Newcastle CBD and is surrounded by existing development except for an urban parkland called Arcadia Park to the south.

The school seeks to investigate the potential for future development on the site and identify any constraints which may affect further expansion. The subject land itself consists of managed gardens and established trees with mown grass however it is the remnant of Arcadia Park that has triggered Bush Fire Prone Land (BFPL) mapping for the subject site.

The grounds of Arcadia Park have a high degree of management with walking trails, mown lawns and defined garden beds. The site is managed by the Arcadia Park and Obelisk Hill Landcare group and is signposted as an active Landcare site. This existing management regime and the potential bushfire behaviour of the Park are discussed in **Section 3**. No actual development is proposed at this time however the maximum area available to provide compliant future construction has been determined as a result of this report.

Figure 1 shows the location of the subject land whilst Figure 2 shows the location of the proposed development in relation to the bushfire hazard.

## 2 Bushfire Protection Assessment Requirements

The subject land is identified as bush fire prone land by Newcastle City Council. Future development onsite will constitute infill Special Fire Protection Purpose (SFPP) development.

The following assessment is prepared in accordance with Section 100B of the *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2013*, and '*Planning for Bush Fire Protection* 2006' (RFS 2006) herein referred to as PBP.

SFPP developments are treated and assessed differently to other developments in that 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; and
- 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.

The key for a development of this nature (SFPP infill) is to achieve an <u>improved bushfire protection outcome</u> for the overall development than if proposed development did not proceed.

All new buildings however, can comply with the deemed-to-satisfy requirements appropriate for this type of development.



### Figure 1: Location



Figure 2: Bushfire hazard assessment and Asset Protection Zones



Figure 3: Arcadia Park vegetation assessment

## 3 Bushfire hazard

The vegetation and slope have been assessed in all directions from the school boundary. In accord with PBP, the predominant vegetation class has been assessed for a distance of at least 140 metres 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 metres in all directions. The predominant vegetation and effective slope assessments are shown in **Table 2** and **Figure 2**.

As shown in **Figure 2**, the predominant bush fire prone vegetation influencing the site is a pocket of remnant bushland within Arcadia Park which is mapped as bush fire prone land. This is the only bushfire prone vegetation impacting the site.

Figure 3 indicates the analysis of the vegetation in Arcadia Park and locations of managed areas.

### 3.1 Dispensations and assumptions for bushfire behaviour

The following dispensations have been afforded onsite:

- PBP provides a dispensation for remnant vegetation that is considered to be a low hazard if it meets the criteria of either less than 1 hectare in size or a potential fire run directly towards the site that does not exceed 50 m. Low hazard vegetation uses 'rainforest' setbacks and construction levels as a surrogate for the reduced fire behaviour expected from small and/or narrow areas of vegetation.
- The total area of the vegetation within the Park detailed in **Table 1** measures approximately 14,780.60 m<sup>2</sup> (1.48 ha) and consists of areas currently under revegetation, some garden areas defined by borders and managed areas (paths and mown grass). Other than the areas to be assessed as unmanaged Littoral rainforest, removing the managed areas and garden beds from the overall size calculation achieves the PBP remnant dispensation with a total area of 9,273.13 m<sup>2</sup> (0.93 ha). The measurement of the site was done in the field using GPS and mapped in Figure 2.
- The vegetation within Arcadia Park is currently being restored by the Arcadia Park and Obelisk Hill Landcare group to Littoral Rainforest and Coastal Shrubland. On ground evidence (**Figure 4**) indicates active removal of exotic plants and selected planting to ensure the Rainforest/Shrubland structure dominates. Rainforest has the higher requirement than Shrubland (assessed under PBP as Short Heath) and is assumed as the dominate vegetation for bushfire.
- The portion of downslope is restricted to a small area adjoining Kitchener Parade which has a natural
  inclination to move upslope to the east and away from the subject site due to topography. Research
  from Dr Jason Sharples (University of NSW, Canberra) presented to ELA indicates strong evidence
  that fires travel upslope even against prevailing winds. Accordingly, any fire originating from the lowest
  point below Kitchener Parade would travel upslope to the east before impacting the site from Pitt Street,
  at which point, a 0-5<sup>0</sup> downslope is assumed as an appropriate slope assessment.
- The threat originating from the south is not associated with dominant bushfire weather which is reinforced by findings of weather assessments conducted by ELA.
- Any radiant heat produced by vegetation within Arcadia Park will be blocked to a significant extent by existing, high-set two storey masonry school building located on the junction of Pitt Street and Kitchener Parade.



### Figure 4: Arcadia Park Landcare sign posting.

**Figure 2** identifies the required APZs, based on the 'low hazard' vegetation classification, which is provided mostly by Pitt Street and Kitchener Parade between the school and the hazard. All other areas, both within the school grounds and on adjoining residential properties are considered to constitute managed lands.

### Table 1: Analysis of Arcadia Park vegetation communities

Vegetation Community	Area (m2)	
Garden bed with litter	9,273.13	
Path	963.44	
Scrubby garden	2,324.10	
Visible Grass Areas	2,219.93	
Total	1,4780.60	

# Asset Protection Zone

### 4.1 APZ Compliance

Table A2.6 of PBP has been used to determine the acceptable solutions width of Asset Protection Zones (APZ) for the proposed Infill Special Fire Protection Purpose (SFPP) development based on the vegetation and slope data identified in **Section 3**.

The results of the APZ analysis are shown in Table 2 below.

Direction from envelope	Slope <sup>1</sup>	Vegetation <sup>2</sup>	PBP required APZ <sup>3</sup>	Available APZ	AS 3959-2009 Construction Level <sup>4</sup>	Comments
South	0-5 <sup>0</sup> downslope	Littoral Rainforest (Low Hazard)	40 m	40 m	BAL-12.5	Minimum APZ achieved onsite and Ivanhoe Street
All other directions			Ν	lanaged land		

Table 2: Determination of APZ and construction standards

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

<sup>2</sup> 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".* 

<sup>3</sup> Assessment according to Table A2.6 of PBP.

4 Assessment according to Table 2.4.2 of AS 3959-2009.

### 4.2 APZ maintenance plan

The following fuel management specifications can be used as a guide to achieve the PBP IPA performance requirements for any future maintenance and landscaping within the subject land:

- No tree or tree canopy is to occur within 2 metres of the building;
- The presence of a few shrubs or trees is acceptable provided that they are well spread out and do not form a continuous canopy between the hazard and the proposed development, and are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission;
- Ground covers within defined and well-managed garden beds with mulch are acceptable in this case.
- Established trees are appropriate within the APZ provided they are managed and do not provide a continuous canopy.

## 5 Construction Standard

The building construction standard is based on the determination of the Bushfire Attack Level (BAL) in accordance with Method 1 of *Australian Standard AS 3959-2009 'Construction of buildings in bushfire-prone areas'* (Standards Australia 2009). The BAL is based on known vegetation type, effective slope and managed separation distance between the development and the bushfire hazard.

As demonstrated in **Table 2**, future development requires a minimum of **BAL-12.5** construction standard for approval. It is important that the most current version of AS 3959-2009 is consulted in the design of this construction. Additionally, the ember proofing measures as outlined in PBP (within the 2010 Appendix 3 Addendum) are to be implemented as applicable to any proposed future development.

No development is proposed at this stage, however, provided any future additions are positioned outside of the minimum required APZ and are built to a minimum BAL-12.5 (to a maximum extent of 100 m from the hazard), the structures will comply with PBP.

### 6 Access

The existing access design for the school with access from Brown and Tyrell Streets will remain unaffected. Emergency pedestrian activities will be directed away from the hazard in emergency plans prepared for the development. Emergency evacuation plans in accordance with RFS guidelines will be required as part of conditions of consent. As such, the requirements in relation to the provision of compliant access arrangements is satisfied for SFPP development.

## 7 Water supply

The development will require fire hydrants to be installed to comply with AS 2419.1-2005 Fire hydrant *installations* – System design, installation and commissioning to provide coverage to any new buildings. The requirements in relation to the provision of compliant water supplies for future development are considered to be satisfied for SFPP Infill development.

Any further extension to 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; and
- 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.

## 8 Gas and electrical supplies

Electricity supply to / within the subject land is located aboveground. The proposed overhead electrical transmission lines are compliant with Section 4.2.7 of PBP, subject to the following specifications:

- Lines with short pole spacing (30 metres) are required, unless crossing gullies, gorges or riparian areas; and
- No part of a tree is closer to a power line than the distance set out in accordance with the specifications in *'Guide for the Management of Vegetation in the Vicinity of Electricity Supply Infrastructure'* issued by the Industry Safety Steering Committee 3 (ISSC3 2016).

Any gas services are to be installed and maintained in accordance with AS/NZS 1596:2014 The storage and handling of LP Gas (Standards Australia 2014).

### Assessment of environmental issues

An assessment of 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 has not been undertaken as it will be covered for future development by other parts of the DA process. However, site impacts have been minimised by carefully selected bushfire protection measures. The impact footprint of these measures e.g. APZ is clearly identified within this report and therefore capable of being clearly assessed by suitably qualified persons as required.

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

### 10 Evacuation and emergency response

The preparation of bushfire emergency procedures for the existing and future development is the responsibility of Newcastle East Public School. As such an emergency/evacuation plan is required consistent with the NSW Rural Fire Service *Guide to developing a Bush Fire Emergency Management and Evacuation Plan*. If there is already a plan in place it is to be updated if necessary.

## 11 Recommendations and conclusion

In the author's professional opinion, the bushfire protection measures discussed and recommended in this assessment provide a standard that is consistent with PBP requirements for infill Special Fire Protection Purpose development.

The following recommendations have been made within this report:

- 1. The site is to be managed to comply with the APZ requirements from **Section 4** of this report;
- 2. All new development needs to meet BAL-12.5 construction standards and the 2010 Appendix 3 addendum of PBP (**Section 5** of this report);
- 3. Access is to be provided in accordance with Section 6 of this report;
- 4. Water supplies are to be provided in accordance with Section 7 of this report;
- 5. Electrical and gas supplies are to be provided in accordance with Section 8 of this report; and
- 6. An Evacuation and Emergency Response Plan compliant with the requirements of the NSW RFS guidelines is required prior to occupation of the new buildings (**Section 10**).

Mark Hawkins Senior Bushfire Consultant FPAA BPAD Certified Practitioner No. BPAD30419-L3



## 12 References

Industry Safety Steering Committee 3 (ISSC3). 2016. ISSC3 Guide for the Management of Vegetation in the Vicinity of Electricity Supply Infrastructure. November 2016. NSW.

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.

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