



Travers

bushfire & ecology

bushfire protection assessment

Proposed Cemetery
Lot 2 DP 1108408
13 Park Road, Wallacia

Under Section 79BA of the EP&A Act 1979

October 2017
(REF: A17162B)



Traversers
bushfire & ecology

Bushfire Protection Assessment

**Proposed Cemetery
Lot 2 DP 1108408
13 Park Road, Wallacia**

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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

EXECUTIVE SUMMARY

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed staged construction of cemetery at No. 13 Park Road, Wallacia.

The proposal includes the construction of two (2) new buildings as well as retention and repurposing of two (2) existing buildings along with an integrated road network. The proposed new multipurpose chapel is (in part) a Class 9b building under the Building Code of Australia and is considered an 'assembly' building. The north eastern portion of this building (basement level) will be utilised as a cremator and is therefore considered a Class 8 laboratory' (furnace room). The proposed new administration building, existing maintenance building and function centre are Class 5, 6 & 8 buildings.

The proposed development is categorised by the NSW Rural Fire Service (RFS) as infill development and must be assessed in accordance with *Planning for Bush Fire Protection 2006 (PBP)* under Section 79BA of the *Environmental Planning & Assessment Act (EP&A Act)*. Consideration of the specific objectives listed in Section 4.2.3 for special fire protection purpose developments (SFPP) are to be considered for the Class 9b buildings to ensure they comply with the aims and objectives of PBP.

As this assessment has used a performance based approach, this report must be submitted to the NSW RFS for assessment.

Our assessment found that bushfire can potentially affect the existing maintenance building and proposed chapel from the forest / woodland vegetation proposed to be retained and rehabilitated on site, resulting in possible ember and radiant heat attack.

However, the bushfire risk posed to the buildings will be reduced to an acceptable level of risk as an appropriate combination of bushfire protection measures can be applied to the development in accordance with *PBP*.

The assessment has concluded that the proposed development will provide compliance with *Planning for Bushfire Protection (PBP) 2006* with the following proposed alternative solutions:

- Road carriageway widths of 6.5m (two-way) and 3.5m (one-way) for all roads regardless of curve radius as well as 2.1m wide grassed parking bays in accordance and in compliance with the pre-DA advice received from the NSW RFS for a similar project involving a proposed cemetery at Macarthur Memoria Park (RFS ref; DOC17/38466).
- The proposed buildings will be provided with hydrants in accordance with the relevant Australian Standard. Hydrants are not proposed to be installed within the remainder of the road system.

The bushfire attack assessment has been undertaken and will be applied in accordance with;

- Table 2.4.3 (simplified procedure – Method 1) of *AS3959 Construction of buildings in bushfire prone areas* (2009) for the multipurpose chapel and maintenance building.

Building construction standards have not been recommended for the administration building and function centre due to the surrounding managed land (>100m from bushfire prone land).

GLOSSARY OF TERMS

APZ	Asset protection zone
AS1596	<i>Australian Standard – The storage and handling of LP Gas</i>
AS2419	<i>Australian Standard – Fire hydrant installations</i>
AS3745	<i>Australian Standard – Planning for emergencies in facilities</i>
AS3959	<i>Australian Standard – Construction of buildings in bushfire-prone areas 2009</i>
BAL	<i>Bushfire attack level</i>
BCA	<i>Building Code of Australia</i>
BSA	Bushfire safety authority
EEC	Endangered ecological community
<i>EP&A Act</i>	<i>Environmental Planning & Assessment Act 1979</i>
FDI	Fire danger index
IPA	Inner protection area
LGA	Local government area
m	Metres
OPA	Outer protection area
<i>PBP</i>	<i>Planning for Bush Fire Protection 2006</i>
RFS	NSW Rural Fire Service
SFPP	Special fire protection purpose

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Introduction

1

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed construction of cemetery at No. 13 Park Road, Wallacia.

The property is located on land that is mapped by Penrith City Council as being bushfire prone. This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection 2006 (PBP)*.

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape
- undertake a bushfire attack assessment in accordance with *PBP*
- provide advice on mitigation measures, including the provision of asset protection zones (APZs), construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape.

1.2 Project synopsis

The proposed development involves the construction of the following built facilities on site:

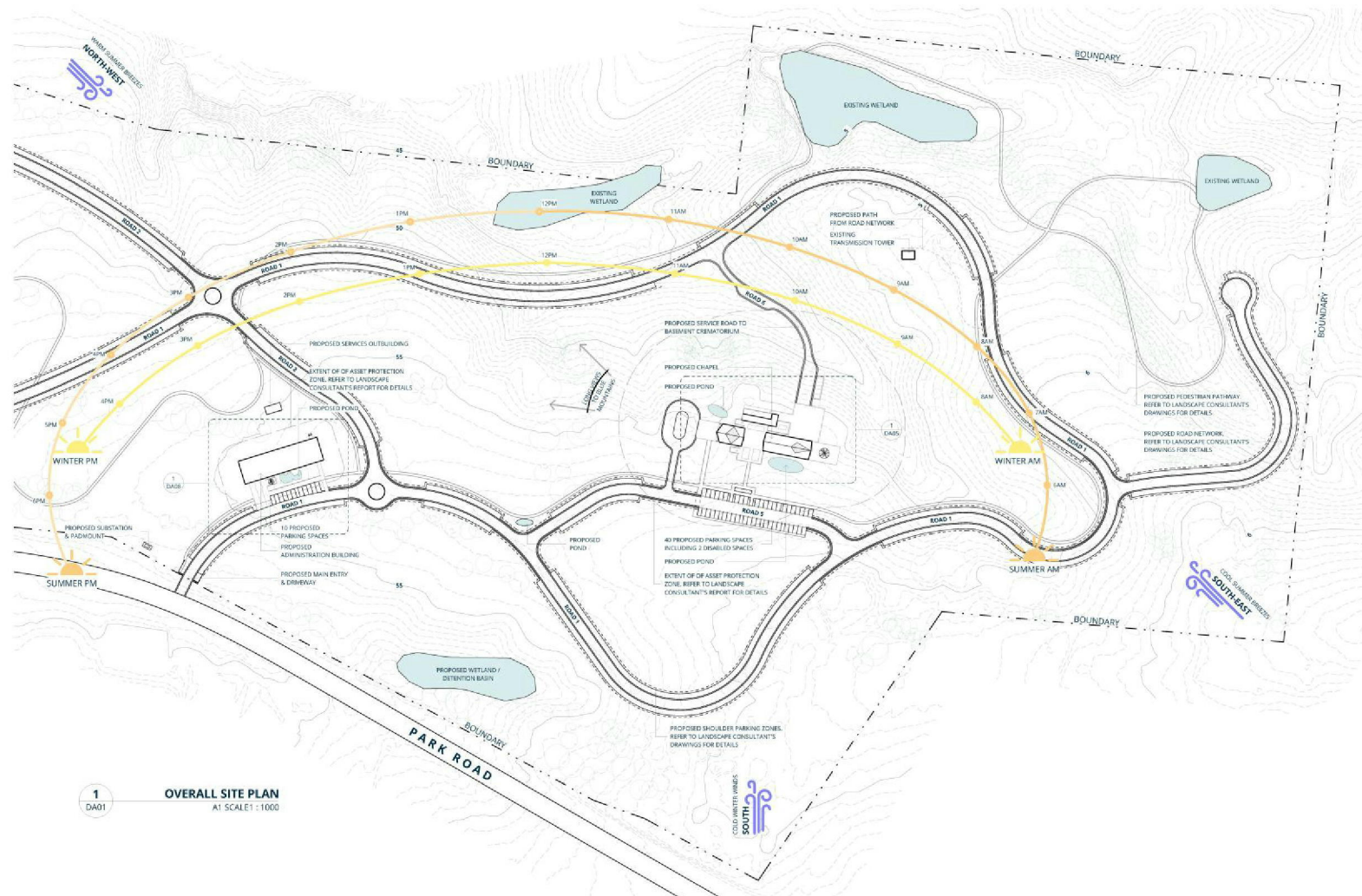
- A multipurpose chapel (with cremator below);
- A administration office;
- Reuse of existing building as function room; and
- Reuse of existing workshop building.

A road network has been designed to allow access to each of these facilities and access to the various burial and memorial sites throughout the development. Please refer to Figure 1.1 & 1.2 for an illustration of the proposed road network and built facilities.

Schedule 1 attached depicts the bushfire constraints and minimum APZs required for the proposed built assets on site.



Figure 1.1 – Site plan



1 OVERALL SITE PLAN
DA01 AT SCALE 1:1000



WALLACIA GOLF COURSE REDEVELOPMENT
13 PARK RD, WALLACIA SYDNEY NSW 2745

A FOR INFORMATION 13.10.17
B DEVELOPMENT 16/11/17
APPLICATION SUBMISSION 17.10.17



CATHOLIC CEMETERIES
BOARD



SITE PLAN - OVERALL

A138-016 DA02
A1 1:1000
DA SUBMISSION B

Figure 1.2 – Site plan (new chapel and administration building)

1.3 Information collation

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- General Arrangement Plan prepared by *Warren Smith & Partners* (Job no. 5936000) dated September 2017
- Site plans and elevations prepared by *Ignite* (A138-016) dated 17/10/17.
- Flora and Fauna Report prepared by *Travers bushfire & ecology*
- Local Environmental Plans
- *Nearmap* aerial photography
- topographical maps DLPI of NSW 1:25,000
- Australian Standard 3959 *Construction of buildings in bushfire-prone areas*
- *Planning for Bush Fire Protection 2006 (NSW RFS) (PBP)*

An assessment of the proposed development site and surrounds was undertaken by Nicole van Dorst on 4 September 2017 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The property is approximately 44 ha in size and is located north of Park Road and west of Mulgoa Road, within the local government area of Penrith. The property currently accommodates 'Panthers Wallacia Golf Course' which includes golf course greens, a clubhouse building, maintenance shed and car parking (refer Figure 1.3).

Bushland vegetation is restricted to the northern boundary of the site and within the riparian corridors. The bushfire risk is further mitigated by the proposed establishment of approximately 40,000 burial spaces which will ensure that the majority of this land (outside of the proposed conservations areas) and surrounding the road network will consist of mown / landscaped / managed land.



Figure 1.3 – Aerial appraisal

1.5 Legislation and planning instruments

1.5.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *Building Code of Australia (BCA)*. The identification of bushfire prone land is required under Section 146 of the *EP&A Act*.

Section 79BA of the *EP&A Act* states that development consent cannot be granted for the carrying out of development for any purpose on bushfire prone land unless the consent authority:

- is satisfied that the development conforms to the specifications and requirements of *PBP*
- has consulted with the Commissioner of the NSW RFS concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bushfire.

1.5.2 Bushfire prone land

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed development is located on land that is mapped by Penrith City Council as being bushfire prone (refer Figure 1.4).

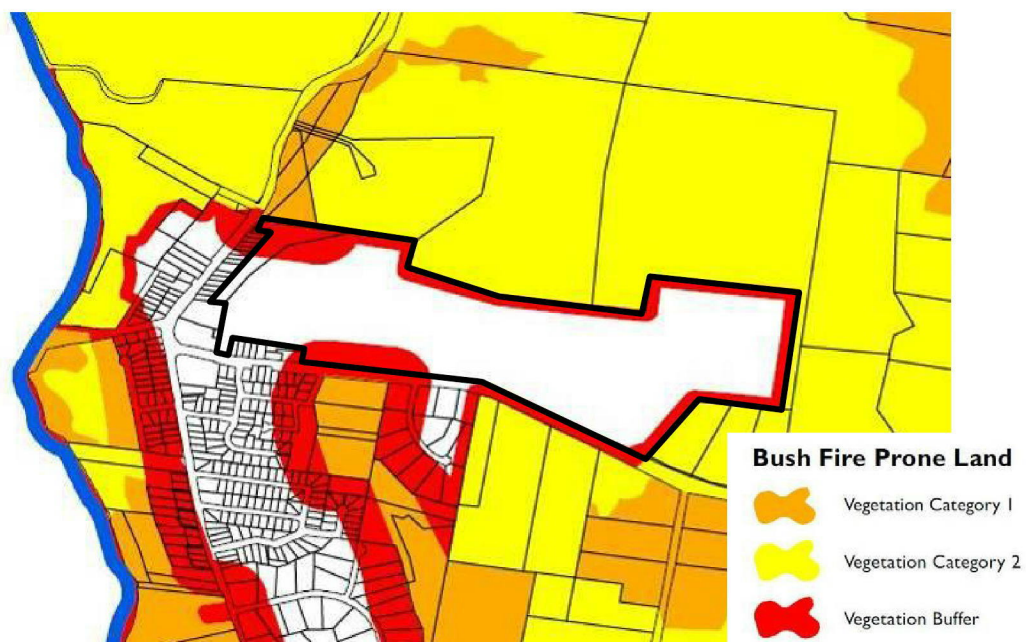


Figure 1.4 – Bushfire prone land map

1.5.3 Local Environmental Plan (LEP)

An LEP provides for a range of zonings and lists development that is permissible, or not permissible, as well as the objectives for development within a zone.

The majority of the site is zoned under the Penrith LEP 2010 as E3 Environmental Management with a small portion of RU5 Village and SP2 – Infrastructure. The proposal, including the provision of APZs, is consistent with the objectives of the zoning.

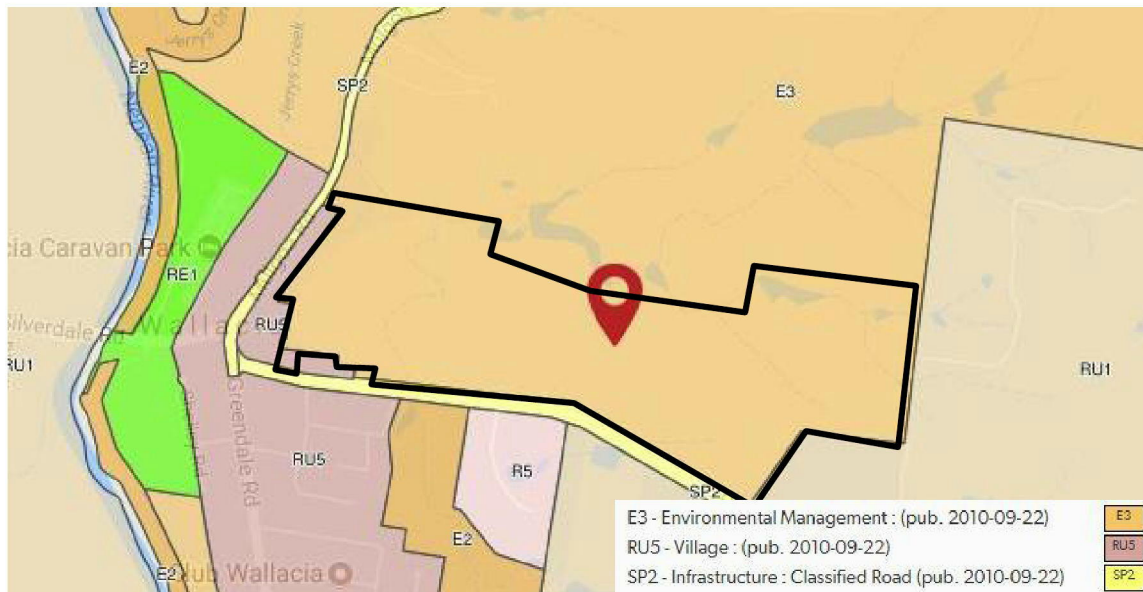


Figure 1.5 – Zoning Map

1.5.4 Planning for Bush Fire Protection 2006 (PBP)

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP* published in 2006. *PBP* provides planning controls for building in bushfire prone areas as well as guidance on effective bushfire protection measures. The policy aims to provide for the protection of human life (including fire fighters) and to minimise impacts on property and the environment from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment. *PBP* outlines the following specific objectives for infill development.

1. Ensure that the bushfire risk to adjoining properties is not increased.
2. Provide a minimum defendable space.
3. Provide better bushfire protection on a redevelopment site than the existing situation. This should not result in new works being exposed to a greater risk than the existing building.
4. Ensure that the footprint of the proposed building does not extend towards the hazard beyond existing buildings lines on neighbouring land.
5. Not result in an increased bushfire management and maintenance responsibility on adjoining lands, unless the owner has agreed to the development.
6. Ensure that building design and construction enhance the chances of occupant and building survival.

Although the multipurpose chapel is not classified as a *Special Fire Protection Purpose Development* the following objectives are required to be considered;

7. Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and fire fighters 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.
8. Provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats. During emergencies, the risk to fire fighters and other emergency services personnel can be high through prolonged exposure, where door-to-door warnings are being given and exposure to the bush fire is imminent.

PBP outlines the bushfire protection measures required to be assessed for new development in bushfire prone areas. The proposal has been assessed in compliance with the following measures:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities
- landscaping, and
- emergency management arrangements.

1.5.6 Building Code of Australia and the Australian Standard AS3959 – 2009

The *BCA* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls. The *BCA* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions.

In NSW, the construction of buildings in bushfire prone areas relates to Classes 1, 2, 3, 4 and Class 9 buildings that are a special fire protection purpose (*SFPP*) or a Class 10a building or deck associated with the aforementioned building classes. The design and construction manual for the deemed to satisfy requirements is the Australian Standard AS3959 *Construction of buildings in bushfire-prone areas 2009 (AS3959)*. These classes of buildings must therefore be constructed in accordance with AS3959.

The *BCA* does not provide for any bushfire specific performance requirements for commercial and industrial buildings (Classes 5–8) and, as such, AS3959 does not apply as a set of deemed to satisfy provisions. The general fire safety construction provisions are taken as acceptable solutions.

Section 2.3 provides an assessment for each of these building classes. The proposed multi-purpose chapel is in part a Class 9b building and is required to comply with AS3959.

Although the maintenance building and the northern portion of the Chapel building is a Class 8 building, the proposed use may involve the storage of flammable material. As a result *TBE* have undertaken a conservative approach and recommends upgrade of the maintenance building for ember protection in order to comply with the aims and objectives of *PBP*.

1.6 Environmental constraints

Travers bushfire & ecology have prepared a Flora and Fauna Assessment for the property.

The report has recommended the following measure to mitigate adverse ecological impacts:

- A Vegetation Management Plan is to be prepared to outline the vegetation restoration areas. The vegetation management plan should aim to restore to at least the core riparian zone as determined by the 50% offset line from top of bank using locally occurrence native vegetation species from the communities. It is to incorporate any equivalent area riparian offsets for the removal of the central watercourse adjacent to the proposed chapel.

The APZ's recommended in the report take into account the vegetation management strategy.



Bushfire Threat Assessment

2

To assess the bushfire threat and to determine the required width of an APZ for a development, a review of the elements that comprise the overall threat needs to be completed.

PBP provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) to determine APZ distances. The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

Hazardous fuels surrounding the buildings include;

- Forest vegetation located over 60m north of the proposed multi-purpose chapel and to the north of the drainage line. This community is a Cumberland Plain Woodland community supporting a mid-storey of shrubs.
- Forest vegetation to the south (beyond Park Road) and west of the existing maintenance building. The community to the west is a River-flat Eucalypt Forest on coastal flood-plains.
- Forest vegetation to the north & west of the existing communications tower.

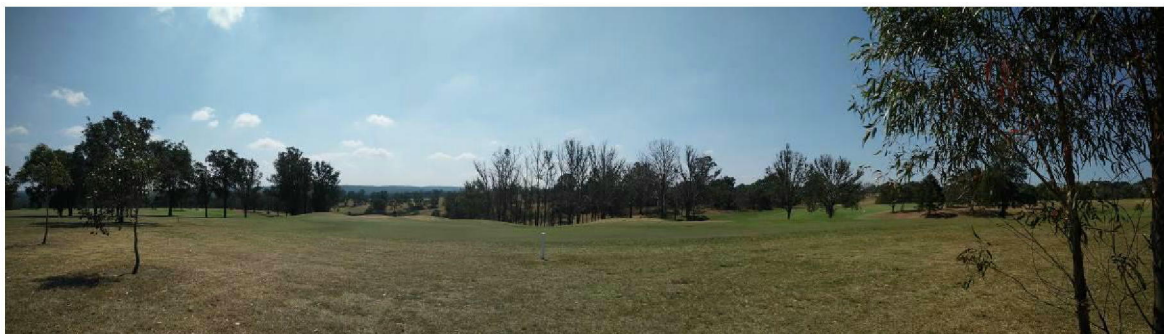


Photo 1 – View north of proposed Chapel

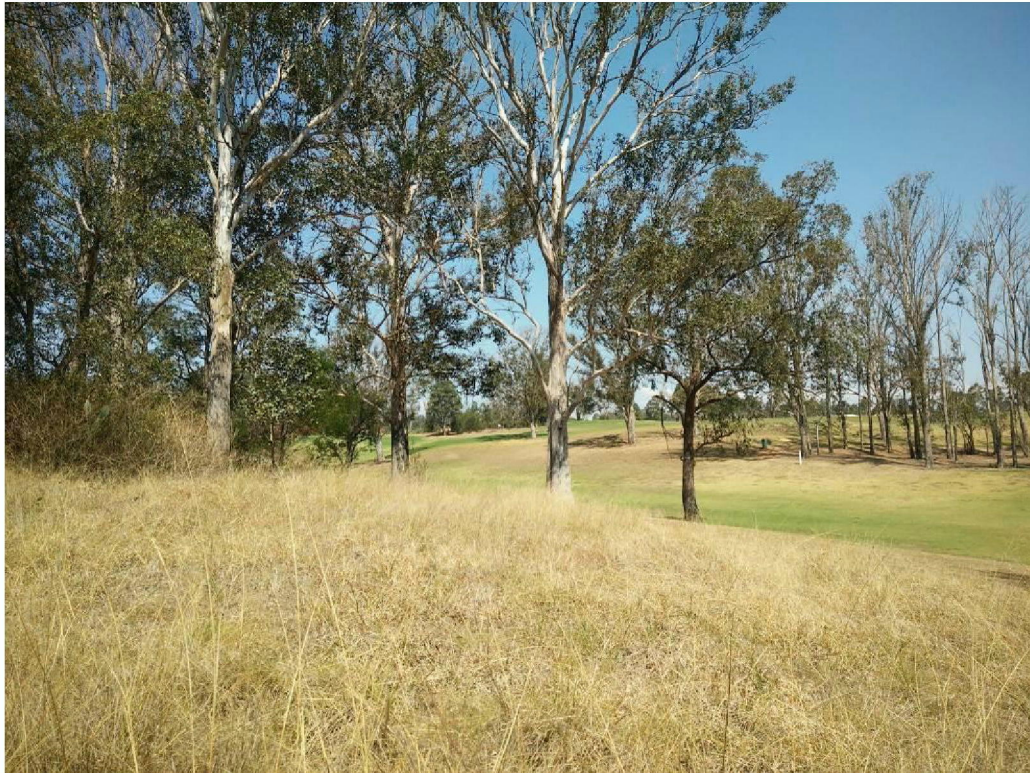


Photo 2 – Vegetation to the north of the Chapel / upslope from creek line.

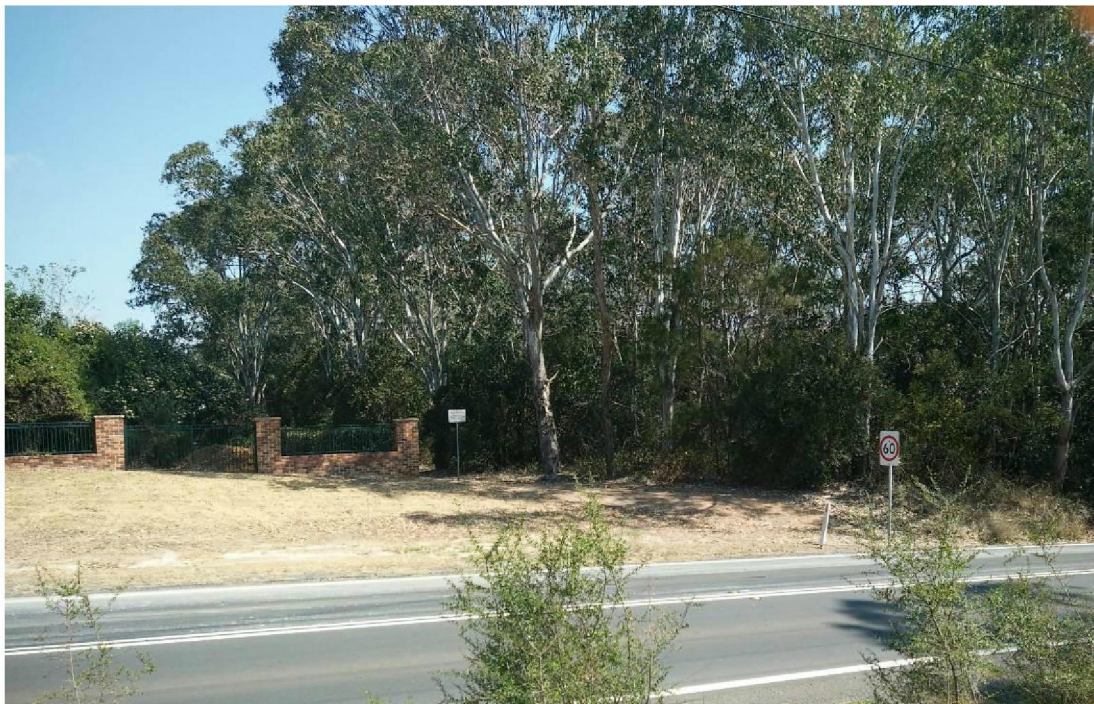


Photo 3 – Vegetation beyond Park Road, to the south of the maintenance building.



Photo 4 & 5 – Vegetation to the west of the maintenance building.

In addition to the above there are a number of remnant patches (managed understorey) of planted vegetation located within the site and adjacent to the function centre and proposed administration building.



Photo 6 – Planted vegetation to the north of the administration building



Photo 7 – Planted vegetation to the north of the function centre (existing building)



Photo 8 – Planted vegetation adjoining the communications tower.

2.2 Effective slope

The effective slope is assessed for a distance of up to 100m. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous vegetation is:

- Level to upslope within the forest vegetation to the north of the Chapel (on the northern side of the creek line).
- Level within the forest vegetation to the south and west of the workshop

2.3 Bushfire attack assessment

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site using forest vegetation located within the Greater Sydney region. Table 2.1 provides a summary of the bushfire attack assessment for the multipurpose chapel and have been assessed as a SFPP development.

Table 2.1 – Bushfire attack assessment (Class 9b buildings)

Aspect	Vegetation formation within 140m of development	Effective slope of land	Minimum APZ required equivalent to 10kw/m ² (metres)	APZ provided (metres)	BAL construction standard
Chapel (Class 9b building)					
North	Forest	Level to up slope	60	60	BAL 12.5
South and east	Remnant patches of planted vegetation (refer Note 1)	0-5 ^{0D}	40	40	
Cremator (Class 8 building) – Refer Note 2					
North	Forest	Level to up slope	N/A	50	BAL 12.5
East	Remnant patches of planted vegetation (refer Note 1)	0-5 ^{0D}	N/A	33	
Function centre (Class 6 - refer Note 3)					
North, south, east & west	The land surrounding the proposed function centre (existing building) will be maintained as lawns and landscaped gardens. There is no bushfire prone vegetation within 100m of the buildings and therefore BAL standards do not apply. However an APZ of 40m has been applied to guide landscaping design.				

Notes: * Slope is either 'u' meaning upslope or 'c' meaning cross slope or 'd' meaning downslope

Note 1: *PBP* describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a shape that provides a potential fire run directly towards a building not exceeding 50m. The vegetation to these aspects exhibits these qualities and therefore the threat posed is considered low and APZ setbacks for this aspect are the same as for the rainforest category outlined in *PBP*.

Note 2: The cremator is located on the ground floor of the chapel. The majority of the cremator will be utilised by staff only. This area consists of a control room, storage, workroom, staff room, lockers as well as the cremator and associated facilities. Although the 'viewing room' will be accessed by visitors it is located over 60m from the bushfire hazard with the visitor entry point located on the upper floor of the Chapel. As a result radiant heat levels of greater than 10kW/m² will not be experienced by visitors or emergency services workers entering or exiting a Class 9b portion of the building.

Note 3: Although the function centre is considered a Class 6 building, its proposed use will involve gatherings to hold wakes and memorials following funerals held at the cemetery. As a result TBE have undertaken a conservative approach to apply asset protection zones to guide future landscaping.

There are no predetermined minimum APZ requirements for Class 5 – 8 buildings under PBP, however all development must meet the aims and objectives of PBP which includes preventing direct flame contact and material ignition. In addition the BCA does not provide for any bushfire specific performance requirements for Class 5 – 8 buildings and as a result AS3959 does not apply as a set of deemed to satisfy provisions.

The following assessment for the Class 5 – 8 buildings seeks to comply with the aims and objectives of PBP and to provide appropriate defendable space for the buildings. BAL levels have been applied to the workshop due to its proposed use and storage of flammable material.

Table 2.2 – Bushfire attack assessment (Class 5-8 buildings)

Aspect	Vegetation formation within 140m of development	Effective slope of land	Minimum APZ required (29kW/m ²)	APZ provided (metres)	BAL construction standard recommended
Administration building (Class 5)					
North, south, east & west	The land surrounding the proposed administration building will be maintained as lawns and landscaped gardens. There is no bushfire prone vegetation within 100m of the buildings and therefore BAL standards do not apply. However an APZ of 15m has been applied to guide landscaping design.				
Workshop (Class 8)					
North & east	Remnant patches of planted vegetation (refer Note 1)	0-5 ^{0D}	15	15	The existing building is to be upgraded for ember protection (refer Section 3.2)
South	Forest	Level to upslope	25	45 (including Park Road)	
West	Forest	0-5 ^{0D}	32	32	
Communications Tower (existing)					
In accordance with the <i>NSW RFS Community Resilience Practice Notes 1/11 – Telecommunication Towers in Bush Fire Prone Areas</i> the existing tower on site is to be provided with an APZ of 10m. This APZ is to be free of surface fuel and elevated fuel and should have a minimum canopy.					

Note 1: PBP describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a shape that provides a potential fire run directly towards a building not exceeding 50m. The vegetation to these aspects exhibits these qualities and therefore the threat posed is considered low and APZ setbacks for this aspect is the same as for the rainforest category outlined in PBP.

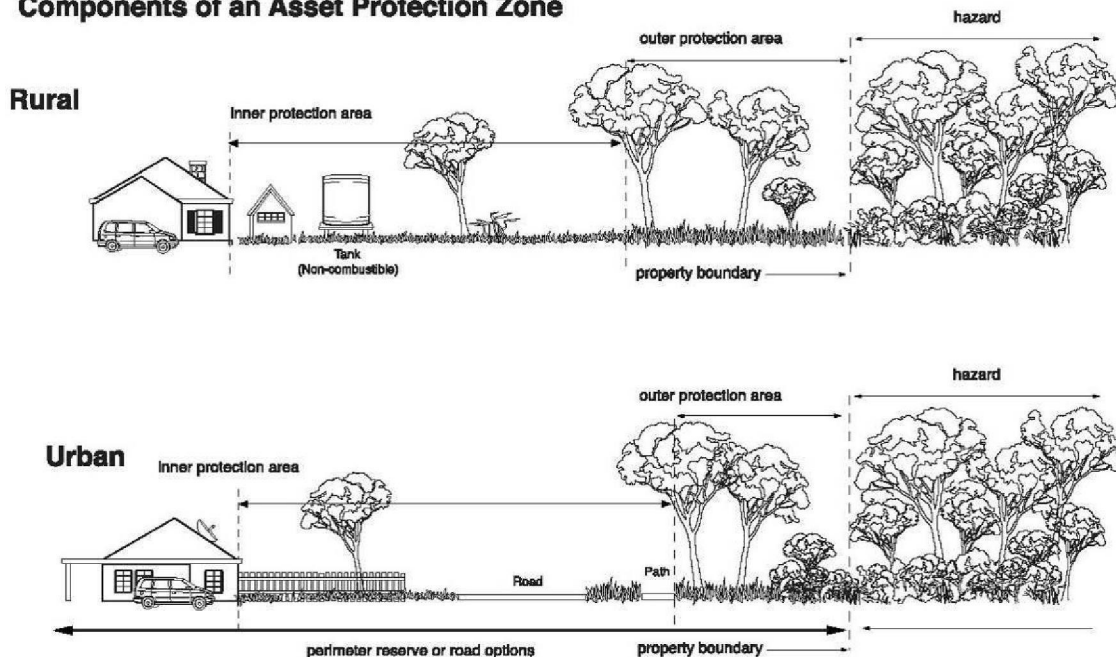
Specific Protection Issues

3

3.1 Asset protection zones

APZs are areas of defensible space separating hazardous vegetation from buildings. The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The IPA cannot be used for habitable dwellings but can be used for all external non-habitable structures such as pools, sheds, non-attached garages, cabanas, etc. A typical APZ and therefore defensible space is graphically represented below:

Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

Although the multipurpose chapel and function room are not considered a SFPP building it should consider the aims and objectives of PBP with the provision of sufficient APZ's to reduce radiant heat exposure to $<10\text{kWm}^2$. In addition the Class 5 – 8 buildings have been provided with adequate asset protection zones to fulfil the aims and objectives of PBP which includes the provision of defensible space and prevention of flame contact and material ignition.

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3.1 – Performance criteria for asset protection zones (PBP guidelines pg. 19)

Performance criteria	Acceptable solutions	Complies
Radiant heat levels of greater than 10kW/m ² will not be experienced by occupants or emergency services workers entering or exiting a building.	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of <i>PBP</i> . Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development.	Complies. The Class 9b portion of the multipurpose chapel and function room are not exposed to a radiant heat thresholds >10kWm ² .
Applicant demonstrates that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fire is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on land with a slope exceeding 18°.	Complies. The APZ's will be maintained by grounds staff.
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of <i>Standards for Asset Protection Zones (RFS 2005)</i> .	Complies - to be made a condition of consent.

3.2 Building protection

The BCA does not provide any bushfire specific requirements for Classes 5-8 industrial / commercial buildings. The general fire safety construction provisions are taken as acceptable solutions.

PBP recommends that bushfire construction standards for Classes 5-8 buildings should be considered on a case by case basis. Bushfire construction recommendations are dependent on the level of bushfire risk and the provision of adequate access opportunities.

Based on the proposed use, sufficient APZ and adequate access to the function centre and administration building will not require compliance with AS3959.

As outlined in Tables 2.1 & 2.2 the Multipurpose Chapel is to be constructed in accordance with BAL 12.5.

The existing workshop building is to be upgraded to improve ember protection via the following measures:

- Openable windows, vents and weepholes shall be externally screened with corrosion resistant steel, bronze or aluminium mesh screens having a maximum aperture size of 2mm.
- The base of external side hung doors are fitted with weather strips, drought excluders or drought seals where the doors do not close on a rebated edge.

3.3 Hazard management

Should the development be approved, the owner of the property (or grounds maintenance staff) will be required to manage the APZ in accordance with RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005) with landscaping to comply with Appendix 5 of *PBP*. In terms of implementing and / or maintaining APZs, there is no physical reason that would constrain hazard management from being successfully carried out by normal means (e.g. mowing / slashing / grazing). A summary of the guidelines for managing APZs is attached as Appendix 1 to this report.

It is recommended that a plan of management is prepared for the site which identifies the staging of the development, areas where vegetation is to be retained / rehabilitated as well as the implementation and ongoing maintenance requirements of the asset protection zones.

3.4 Access for fire fighting operations

The intent of measures required by the RFS for internal roads is *“to provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area”*.

The proposed road network has been designed to allow access to each of the built facilities and various burial and memorial sites throughout the development. All two-way roads are proposed to have parallel parking on both sides and one-way roads to have parallel parking on one side. Access points to the development are provided in three locations on the southern boundary (Park Road) with a fourth (4th) access also provided onto Mulgoa Road in the west.

Table 3.2 below outlines the proposal’s compliance with the performance criteria for public roads.

Table 3.2 – Performance criteria for internal roads (PBP guidelines pg. 35)

Performance criteria	Acceptable solutions	Complies
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.	Yes
	Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8m minimum curb to curb) and shoulders on each side, allowing traffic to pass in opposite directions.	Yes. An alternative solution has been proposed as detailed below.
	Roads are through roads. Dead end roads are not more than 100m in length from a through road, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead end.	A 200m long dead end road is proposed at the north-eastern corner of the site. This road will access burial sites only (i.e. no buildings). Given the expected low usage rates the 200m long road will provide safe access for fire fighters.
	Traffic management devices are constructed to facilitate access by emergency services vehicles.	Yes. Can be a condition of consent
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	Yes
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.	Yes
	The minimum distance between inner and outer curves is 6m.	Yes
	Maximum grades do not exceed 15° and average grades are not more than 10°.	Yes
	Cross fall of the pavement is not more than 10°.	Yes
	Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than storm surge).	Yes
	Roads are clearly sign-posted and bridges clearly indicate load ratings.	Yes
	The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).	Yes

Warren Smith & Partners, consulting engineers have prepared a swept path analysis to determine whether the proposed road widths and curve radii will allow unrestricted firetruck access throughout the site. This information has confirmed the proposed road 'public' carriageway widths of 6.5m (two-way) and 3.5m (one-way) for all roads regardless of curve radius as well as the 3.1m wide grassed parking bays satisfy the performance criteria which is to enable safe access for emergency services and allow crews to work with equipment about the vehicle. The proposed service road (road 6) to the north of the chapel will have a width of 4m, with a passing bay and will be provided with a turning head to allow for a fire truck to undertake a three point turn in compliance with the requirements for a 'fire trail'.

The proposed access is in compliance with the pre-DA advice received from the NSW RFS for a similar project involving a proposed cemetery at Macarthur Memoria Park ((RFS ref; DOC17/38466).

3.5 Water supplies

Table 3.3 outlines the proposals compliance with the performance criteria for reticulated water supply.

Table 3.3 – Performance criteria for reticulated water supplies (PBP guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
Water supplies are easily accessible and located at regular intervals.	<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 comply with AS2419.1. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.</p> <p>The provisions of public roads in Section 4.1.3 of PBP in relation to parking are met.</p>	Yes – refer below

The proposed buildings (chapel, function room, administration office and workshop) will be provided with hydrants in accordance with the requirements of the relevant Australian Standard. Hydrants will be located to ensure a 70m unobstructed path can be provided between the hydrant and all aspects of the buildings.

However hydrants are not proposed to be installed within the remainder of the road system. Given the extent of managed land surrounding the internal road network, the proposed use and limited built assets additional hydrants are not considered necessary.

3.6 Gas

Table 3.4 outlines the required performance criteria for the proposals gas supply.

Table 3.4 – Performance criteria for gas supplies

Performance criteria	Acceptable solutions	Complies
Location of gas services will not lead to the ignition of surrounding bushland land or the fabric of buildings.	<p>Reticulated or bottled gas bottles are to be installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Metal piping is to be used.</p> <p>All fixed gas cylinders are to be kept clear of flammable materials and located on the non-hazard side of the development.</p> <p>If gas cylinders are to be kept close to the building the release valves must be directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion.</p> <p>Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.</p>	Complies – The LPG gas tanks located to the north of the cremator are to comply with this condition. The tanks are located 40m from the bushfire hazard.

3.7 Emergency and evacuation planning

Table 3.5 outlines the required performance criteria for the proposal's emergency procedures

Table 3.5 – Performance criteria for emergency and evacuation planning (PBP guidelines pg.39)

Performance criteria	Acceptable solutions	Complies
An emergency and evacuation management plan is approved by the relevant fire authority for the area.	<p>An emergency / evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency / Evacuation Plan.</p> <p><i>Note: The applicant should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a SFPP.</i></p>	Complies - can be made a condition of consent.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	<p>An emergency planning committee is established to consult with staff in developing and implementing and emergency procedures manual.</p> <p>Detailed plans of all emergency assembly areas including onsite and offsite arrangements as stated within AS3745 are clearly displayed, and an annual trial emergency evacuation is conducted.</p>	Complies - can be made a condition of consent.



Conclusion & Recommendations

4

4.1 Conclusion

Travers bushfire & ecology has been requested to undertake a bushfire protection assessment for the proposed staged construction of cemetery at No. 13 Park Road, Wallacia.

Our assessment found that bushfire can potentially affect the existing maintenance building and proposed chapel from the forest / woodland vegetation proposed to be retained and rehabilitated on site, resulting in possible ember and radiant heat attack.

However, the bushfire risk posed to the buildings will be reduced to an acceptable level of risk as an appropriate combination of bushfire protection measures can be applied to the development in accordance with *PBP*.

The assessment has concluded that the proposed development will provide compliance with *Planning for Bushfire Protection (PBP) 2006* with the following proposed alternative solutions:

- Road carriageway widths of 6.5m (two-way) and 3.5m (one-way) for all roads regardless of curve radius as well as 2.1m wide grassed parking bays in accordance and in compliance with the pre-DA advice received from the NSW RFS for a similar project involving a proposed cemetery at Macarthur Memoria Park (refer Appendix 3).
- The proposed buildings will be provided with hydrants in accordance with the relevant Australian Standard. Hydrants are not proposed to be installed within the remainder of the road system, given the low bushfire risk and reduced number of built assets.

4.2 Recommendations

Recommendation 1 - APZs are to be provided to the proposed development as outlined in Table 2.1 & 2.2 and depicted in Schedule 1.

Recommendation 2 - Fuel management within the APZs is to be maintained by regular maintenance of the landscaped areas, mowing of lawns in accordance with the guidelines provided in Appendix 1, and / or as generally advised by the RFS in their publications.

It is recommended that a plan of management is prepared for the site which identifies the staging of the development, areas where vegetation is to be retained / rehabilitated as well as the implementation and ongoing maintenance requirements of the asset protection zones.

Recommendation 3 – Building construction standards are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2009)* with additional construction requirements as listed within Section A3.7 of Addendum Appendix 3 *PBP*.

Based on the proposed use, sufficient APZ and adequate access the administration building and function centre will not require compliance with AS3959.

The Multipurpose Chapel is to be constructed in accordance with BAL 12.5.

The existing workshop building is to be upgraded to improve ember protection via the following measures:

- Openable windows, vents and weepholes shall be externally screened with corrosion resistant steel, bronze or aluminium mesh screens having a maximum aperture size of 2mm.
- The base of external side hung doors are fitted with weather strips, drought excluders or drought seals where the doors do not close on a rebated edge.

Recommendation 4 – Water supply is to comply with the performance criteria outlined Section 4.2.7 of *PBP*.

The proposed and existing buildings are to be provided with hydrants to ensure a 70m unobstructed path can be provided between the hydrant and all aspects of the buildings.

The proposed and existing buildings are to be provided with hydrants to ensure a 70m unobstructed path can be provided between the hydrant and all aspects of the buildings.

Recommendation 5 – Access is to comply with the performance criteria outlined Section 4.2.7 of *PBP*. The public road carriageway widths are 6.5m (two-way) and 3.5m (one-way) regardless of curve radius. Parking bays are 2.1m wide. The service road (Chapel) has a carriageway width of 4m.

Recommendation 6 – Electricity and gas supply is to comply with the acceptable solutions as provided within Section 4.2.7 of *PBP*.

Recommendation 7 – An emergency / evacuation plan will need to be prepared consistent with the *RFS Guidelines for the Preparation of Emergency / Evacuation Plan* prior to building occupation.

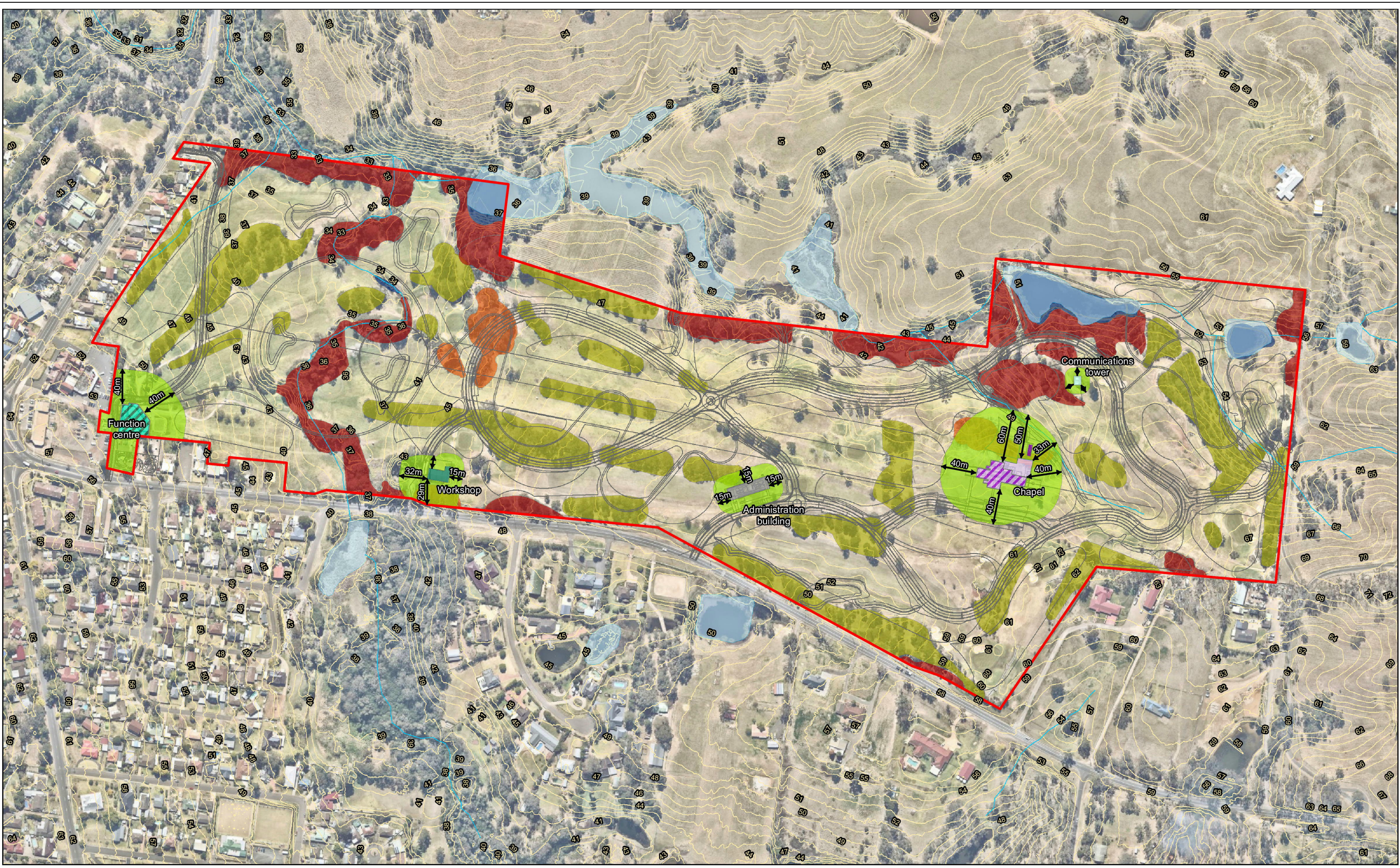
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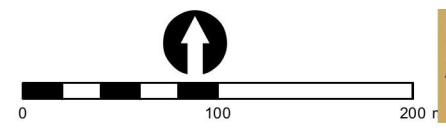


Plan of Bushfire Protection Measures

S1



Legend			
Site boundary	Existing buildings	Proposed buildings	Open waterbodies
Creek (source : LPI)	Communications tower	Administration building	Planted vegetation
Contours 1m (source : LiDAR)	Function centre	Chapel	Vegetation Formation
Asset protection zone	Workshop	Crematorium	Forest
		LPG gas storage	Woodland



Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE
13 Park Rd Wallacia
A17162_BF001

DATE & ISSUE NUMBER
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Issue 1

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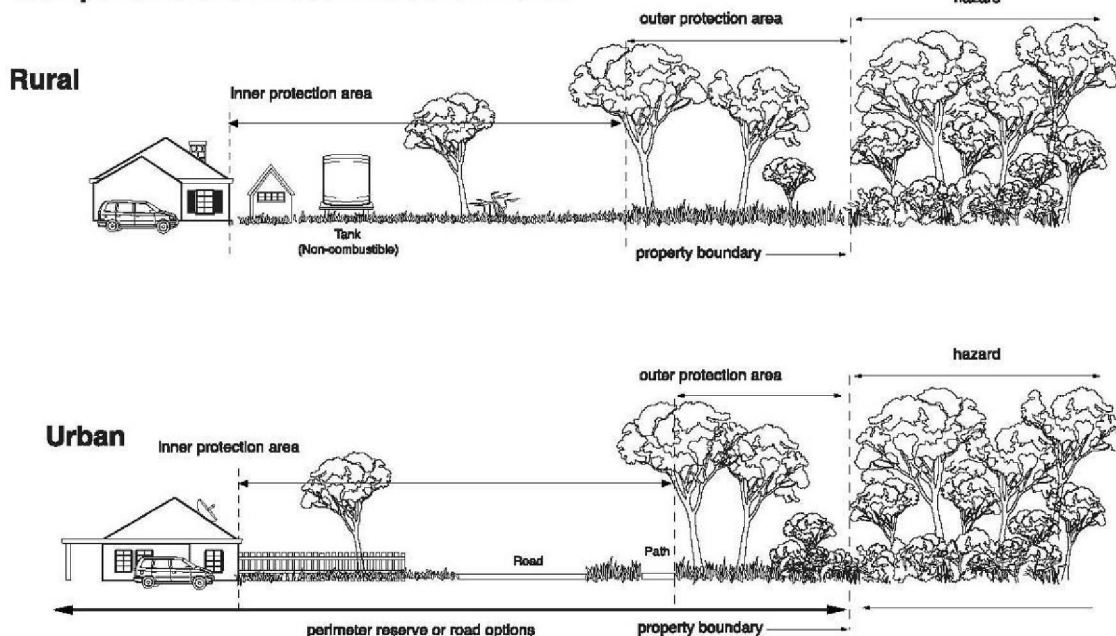
Management of Asset Protection Zones

A1

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. A typical APZ is graphically represented below:

Components of an Asset Protection Zone



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The APZ's are to be maintained as an inner protection area. The following provides maintenance advice for vegetation within the inner protection areas.

Inner Protection Area (IPA)

Fuel loads within the IPA are to be maintained so it does not exceed 4t/ha.

Trees are to be maintained to ensure;

- Canopy cover does not exceed 15% (at maturity)
- Trees (at maturity) should not touch or overhang the building
- Lower limbs should be removed up to a height of 2m above ground

- Preference should be given to smooth barked and evergreen trees

Shrubs are to be maintained to ensure;

- Create large discontinuities or gaps in vegetation to slow down or break the progress of fire towards buildings
- Shrubs should not be located under trees
- Shrubs should not form more than 10% of ground cover in the APZ area
- Shrubs should be in clumps no greater than 5m²
- Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of vegetation

Grass is to be maintained to ensure:

- Should be kept mown (as a guide grass should be kept to no more than 100mm in height.
- Leaves and vegetation debris is removed.

Landscaping to the site is to comply with the principles of Appendix 5 of PBP. In this regard the following landscaping principles are to be incorporated into the development:

- Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;
- Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building;
- When considering landscape species consideration needs to be given to estimated size of the plant at maturity;
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e. leaf litter);
- Avoid climbing species to walls and pergolas;
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building;
- Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and
- Use of low flammability vegetation species.