Bushfire Protection Assessment

Proposed Assembly Building – 1 Water Street, Werrington

Prepared for
Hills Christian Life Centre Ltd

21 November 2017

DOCUMENT TRACKING

Item	Detail
Project Name	Bushfire Protection Assessment: Proposed assembly building - 1 Water Street, Werrington.
Project Number	16SYD_5713
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Status	Final
Version Number	3
Last saved on	21 November 2017

This report should be cited as 'Eco Logical Australia November 2017. Proposed assembly building - 1 Water Street, Werrington. Prepared for Hills Christian Life Centre Ltd.'

Contents

1 Property and proposal 1
1.1 Description of proposal 1
1.2 Location and description of subject land 1
1.3 Development pathway 1

2 Bushfire threat assessment 7
2.1 Vegetation types 7
2.2 Effective slope 7

3 Asset protection zones 8
3.1 APZ considerations 8
3.2 APZ maintenance plan 9
3.3 Construction standard 9

4 Utilities and access 10
4.1 Water supply 10
4.2 Gas and electrical supplies 10
4.3 Access and egress 10

5 Assessment of environmental issues 12

6 Emergency management procedures 13

7 Compliance with Fact Sheet 4/12 15

8 Recommendations and conclusion 17

References 18

List of figures

Figure 1: Location 3

Figure 2: Bushfire hazard assessment 4

Figure 3: Plan of development 5

Figure 4: Penrith City Council Bush Fire Prone Land Map (Source: NSW Government Planning Portal) 6

List of tables

Table 1: Threat assessment, APZ and category of bushfire attack 8

Table 2: Performance criteria for proposed public roads 11

1 Property and proposal

Name:	Church auditorium		
Street or property name:	1 Water Street		
Suburb, town or locality:	Werrington	**Postcode:**	2747
Lot and DP:	Lot 1 DP 1176624		
Local Government Area:	Penrith City Council		
Type of area:	Employment		
Type of development:	Assembly building (Class 9b)		

1.1 Description of proposal

Hills Christian Life Centre Ltd commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed church auditorium at 1 Water Street, Werrington (hereafter referred to as the subject land).

The proposal involves the construction of a new auditorium (assembly building) and associated works on a large vacant block of land.

1.2 Location and description of subject land

The subject land is located within the Western Sydney suburb of Werrington in the Penrith City Council Local Government Area as shown in **Figure 1**. It is zoned IN2 (Light Industrial) under the *Penrith Local Environmental Plan 2010*.

Figure 2 shows the subject land and the location of the proposed church auditorium in relation to the nearest bush fire prone vegetation.

Figure 3 shows a plan of the development.

1.3 Development pathway

As the proposal does not include residential subdivision or any special fire protection purpose (SFPP) developments, Section 100B of the *Rural Fires Act 1997* does not apply. The development will be instead be assessed by Penrith City Council under Section 79BA of the *Environmental Planning and Assessment Act 1979.*

In 2014 the NSW Rural Fire Service (RFS) introduced *Fact Sheet 2/14 Places of Public Worship and Other Public Assembly Buildings on Bush Fire Prone Land*. Fact Sheet 2/14 applies to any building considered as a Class 9b assembly building under the National Construction Code (NCC). The NCC defines an assembly building as a building where people may assemble for—

a) civic, theatrical, social, political or religious purposes including a library, theatre, public hall or place of worship; or
b) educational purposes in a school, early childhood centre, preschool, or the like; or
c) entertainment, recreational or sporting purposes including—

i. a discotheque, nightclub or a bar area of a hotel or motel providing live entertainment or containing a dance floor; or
ii. a cinema; or
iii. a sports stadium, sporting or other club; or

d) transit purposes including a bus station, railway station, airport or ferry terminal.

As the proposed auditorium will be used as a place of public worship it is captured as a Class 9b assembly building. In accordance with Fact Sheet 2/14 the development is to be considered as if it were an SFPP development and be assessed against the SFPP objectives outlined in *Planning for Bush Fire Protection 2006* (RFS 2006). In particular the following matters are to be addressed:

- The aims and objectives of PBP;
- The specific objectives for SFPP Developments as set out under clause 4.2.3 of PBP;
- The capacity and training of staff and occupants to participate in a firefighting response;
- The performance criteria for asset protection zones for SFPP developments (table A2.6 of PBP);
- The capacity of the existing and proposed road network to facilitate emergency evacuation;
- Depending on the scale of the development, this may include consideration of the traffic impacts of emergency evacuation of the development in relation to:
    - the broader road network that may be affected;
    - the impact on the road system during the evacuation of the facility;
    - the traffic level likely to be generated during an emergency evacuation;
    - impacts of evacuation on approach and departure direction;
    - review of intersection performance;
    - review of limitations/constraints of affected area/road network system;
    - road access management during an evacuation;
    - management of potential traffic conflicts (i.e. emergency vehicles versus evacuating members of the public);
    - provision for non occupation on days of Extreme or Catastrophic Fire Danger, or other such conditions;
    - emergency management planning commensurate with the risk; and
    - child care facilities within a place of public worship.

Figure 1: Location

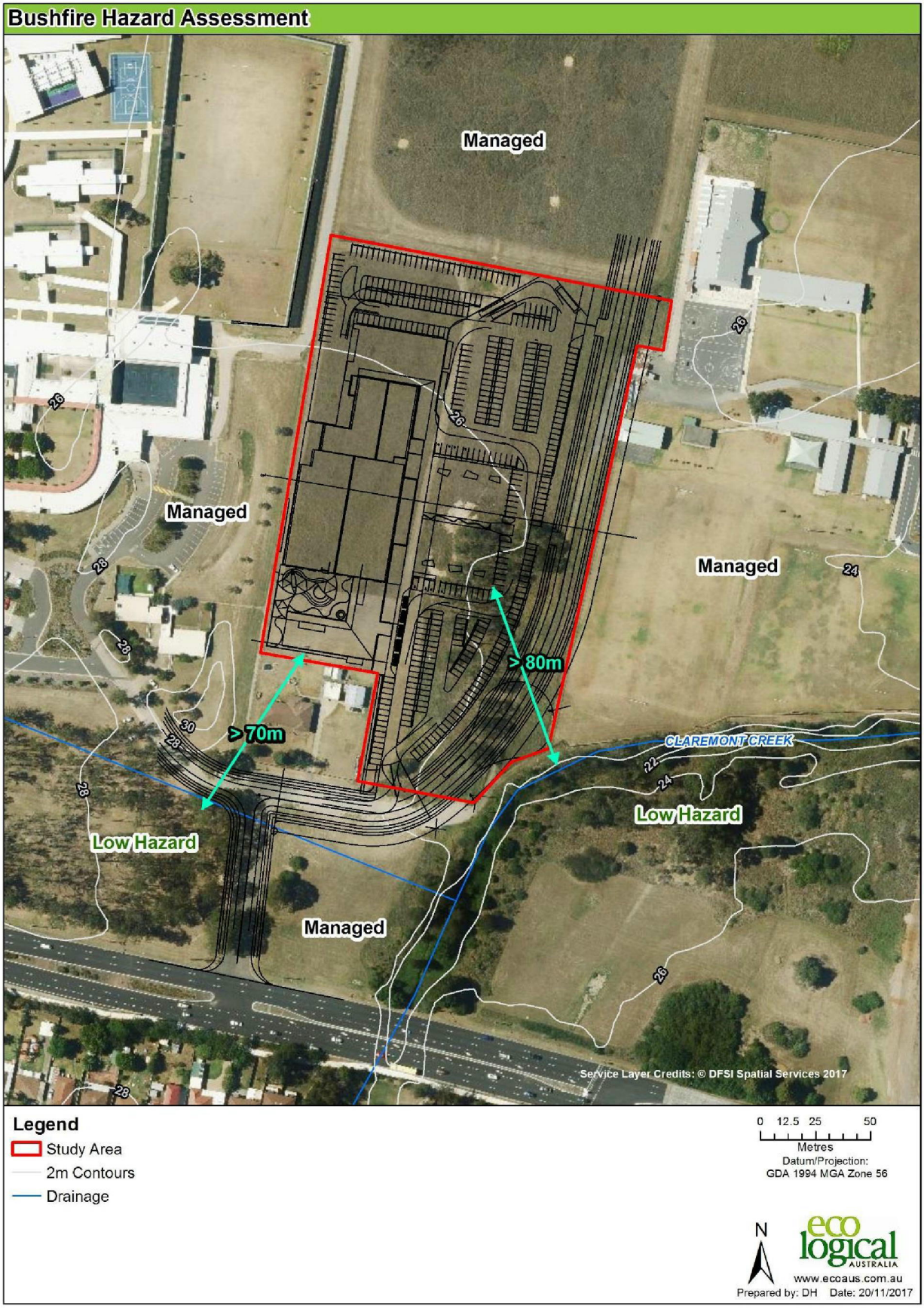

Figure 2: Bushfire hazard assessment

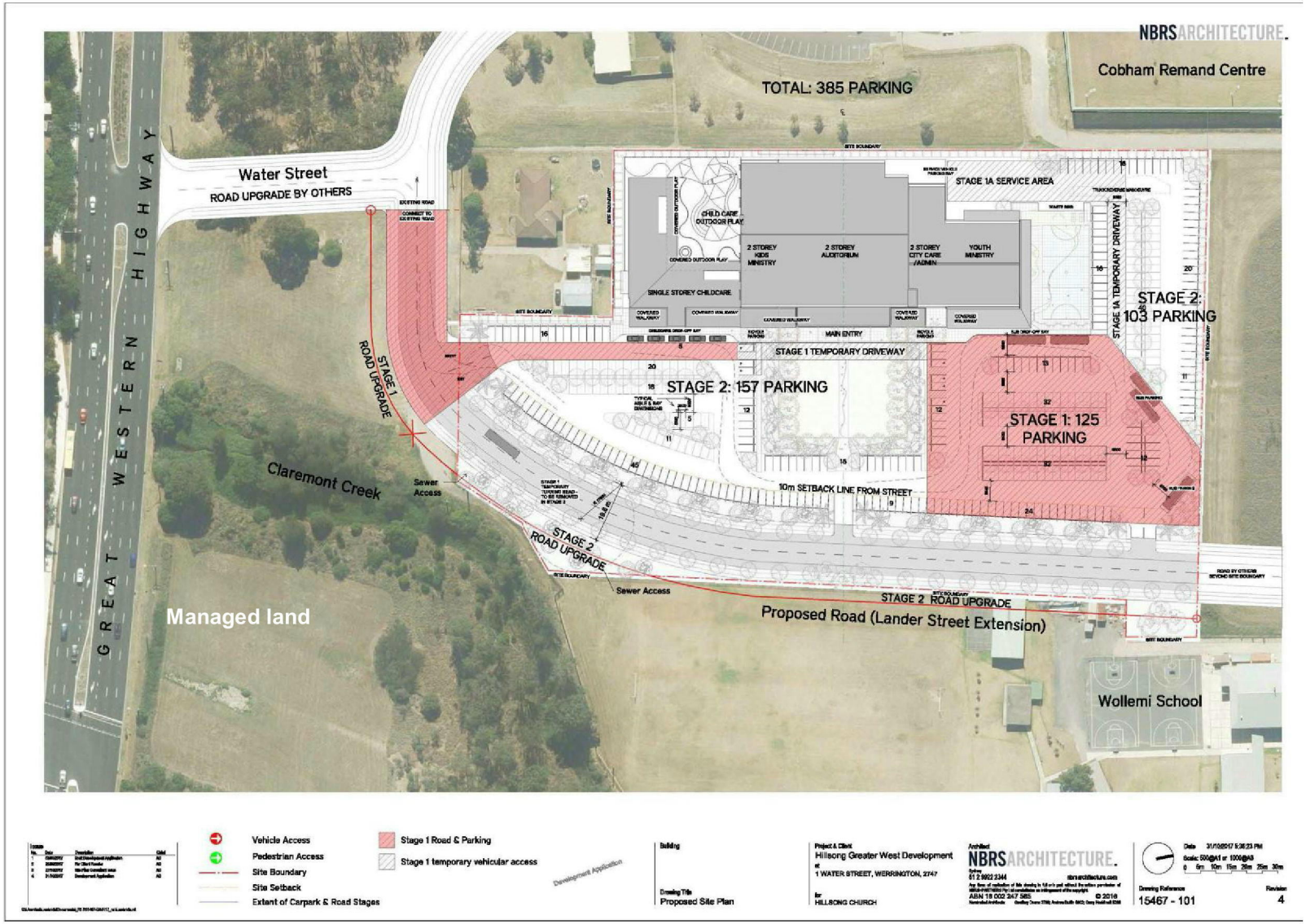

Figure 3: Plan of development

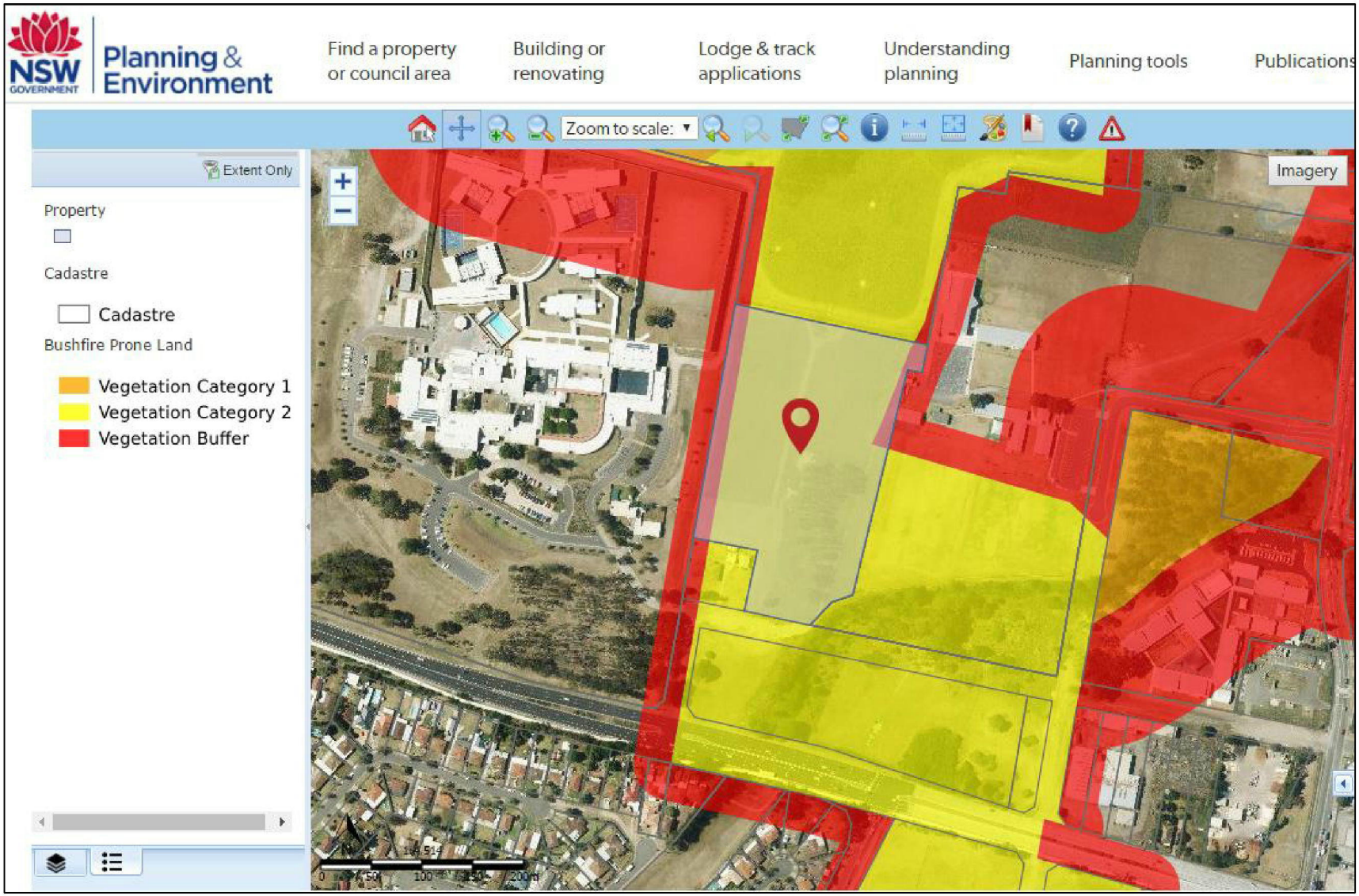

Figure 4: Penrith City Council Bush Fire Prone Land Map (Source: NSW Government Planning Portal)

2 Bushfire threat assessment

The subject land is identified as bush fire prone land by Penrith City Council as shown in **Figure 4**. The following assessment is prepared in accordance with Section 79BA of the *Environmental Planning and Assessment Act 1979,* Fact Sheet 2/14 and *Planning for Bush Fire Protection 2006* (RFS 2006), herein referred to as PBP.

2.1 Vegetation types

In accord with PBP the predominant vegetation class has been assessed for a distance of at least 140 m from the proposed church auditorium.

The subject land adjoins the Cobham Juvenile Justice Centre to the west which contains an extensive network of buildings and managed land for over 100 m. To the north is industrial and residential zoned land that is yet to be developed, with the timing for future development unknown. This land is currently in varying stages of management and consists of grassland with scattered trees and has been categorises as 'grassland' for the purposes of this assessment.

Immediately adjoining the subject land to the south is Water Street, and a small strip of industrial zoned land adjoining the multi-lane Great Western Highway. A vegetated area along Claremont Creek occurs along the south-east boundary of the subject land running in a north-south direction. This vegetation is narrow in width, and confined to an area of no more than 20 m either side of the creek; therefore categorised as a 'low hazard' in accordance with PBP.

The area to the east contains existing buildings and maintained curtilage associated with Wollemi College for greater than 100 m and is categorised as managed land.

2.2 Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the proposed development. This assessment was made with 2 m contour intervals. The subject land and surrounds are generally flat with slight slopes down towards Claremont Creek falling within the PBP slope range '>0-5 degrees downslope'.

3 Asset protection zones

Table A2.6 of PBP has been used to indicate the acceptable solution APZ dimensions for the development using the vegetation and slope data identified in **Section 2**. The APZ calculation is tabulated below and shown in **Table 1**.

Table 1: Threat assessment, APZ and category of bushfire attack

Direction from building	Slope[1]	Vegetation[2]	PBP required APZ[3]	Proposed APZ	AS 3959-2009 Construction Standard[4]	Comment
North	Upslope	Grassland	10 m	>50 m	BAL-LOW	APZ provided by managed area within subject land
South-east (riparian corridor)	>0-5° downslope	Low hazard	40 m	>80 m	BAL-12.5	APZ provided by car parking
South	>0-5° downslope	Low hazard	40 m	>70 m	BAL-12.5	APZ provided by adjoining managed land
All other directions	Managed land for > 100 m					

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

[2] 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".*

[3] Assessment according to table A2.6 of PBP.

[4] Assessment according to table 2.4.2 of AS 3959-2009.

3.1 APZ considerations

The APZ shown are based on the SFPP distances outlined in Table A2.6 of PBP to demonstrate that compliance can be achieved. This satisfies the requirement of Fact Sheet 2/14 that '*the performance criteria for asset protection zones for SFPP developments (Table A2.6 of PBP)*' is considered.

The APZ also satisfies the Fact Sheet 2/14 requirement that the development meets the SFPP specific objective of PBP '*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 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'*.

3.2 APZ maintenance plan

The required APZs are currently in place. Landscaping proposed as part of the development is to consider the following requirements of an Inner Protection Area (IPA) as described by PBP:

- No tree or tree canopy is to occur within 2 m of the building roofline.
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
  - are well spread out and do not form a continuous canopy
  - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
  - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species

3.3 Construction standard

The building construction standard for residential development 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). Although the building is not a residential development, the provisions of AS 3959-2009 are applicable. The BAL is based on the identified vegetation type, effective slope, and APZ managed separation distance between the development and the bushfire hazard.

Using AS 3959-2009 and the information from **Section 2** and **Section 3**, the auditorium is exposed to a **BAL-12.5** construction.

The provisions of Section 3 'Construction General' of AS 3959-2009 and the additional construction requirements outlined on Section A3.7 of the 2010 Appendix 3 Addendum to PBP are also required for the proposed auditorium where applicable.

4 Utilities and access

4.1 Water supply

The subject land is serviced by reticulated water with a hydrant located at the intersection of Water Street and Great Western Highway. This is located greater than 90 m from the rear of the auditorium. The existing reticulated water supply is to be extended into the subject land in accordance with *Australian Standard AS 2419.1 'Fire hydrant installations – System design installation and commissioning'* (Standards Australia 2005).

4.2 Gas and electrical supplies

The electricity supply to the proposed development is to be located underground. This complies with PBP.

Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2014) and the requirements of relevant authorities (metal piping must be used).

4.3 Access and egress

The subject land has its main entry from Water Street which will be upgraded and extended to support the proposed development and is to comply with the public road design requirements outlined in **Table 2**. Two separate entry and exit points will be provided from the car parks onto the proposed road.

The proposed occupancy rates will have an impact on the emergency access and egress of the development. However this is not considered to be problematic given multiple routes which can be utilised along the public road network and the low bushfire risk posed to the site.

In the unlikely event of a bushfire igniting the building it would be attended to by fire appliances from the hardstand surface of the proposed car parking area provided within the subject land.

The access and egress arrangements adequately address the requirement of Fact Sheet 2/14 '*the capacity of the existing and proposed road network to facilitate emergency evacuation*'.

Table 2: Performance criteria for proposed public roads

Intent may be achieved where:	Acceptable solutions	Complies
• firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	• public roads are two-wheel drive, all weather roads	Can comply
• public road widths and design that allows safe access for firefighters while residents are evacuating an area	• urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)	Perimeter road not provided
	• the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas	Can comply
	• traffic management devices are constructed to facilitate access by emergency services vehicles	Can comply
	• public roads have a cross fall not exceeding 3 degrees	Can comply
	• public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard	Can comply
	• curves of roads (other than perimeter roads) are a minimum inner radius of six metres	Can comply
	• maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient	Can comply
	• there is a minimum vertical clearance to a height of four metres above the road at all times	Can comply
	• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating	Can comply
• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles	• public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression	Can comply
• roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered	• public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression	Can comply
	• public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression	Can comply
• there is clear access to reticulated water supply	• one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression	Can comply
	• parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement . No services or hydrants are located within the parking bays	Can comply
• parking does not obstruct the minimum paved width	• public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road	Can comply

5 Assessment of environmental issues

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

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

6 Emergency management procedures

The preparation of bushfire emergency procedures for the development is the responsibility of Hills Christian Life Centre Ltd. 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*. This is to be prepared prior to the occupation of the new assembly building.

A template for an Emergency Management and Evacuation Plan is available on the NSW Rural Fire Service website http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0020/29270/Form.pdf.

Given the low risk nature of the site and that the Place of Worship is to be used by persons who will have their own transportation arrangements, emergency management is not considered to be a significant risk. Key staff/volunteers of the facility are to be adequately trained in the implementation of the Evacuation Plan. Given the distance to unmanaged vegetation, reduced potential for fire impact on the facility, and that staff and occupants are unlikely to actively participate in the firefighting response, the Fact Sheet 2/14 requirement that 'the *capacity and training of staff and occupants to participate in a firefighting response'* is addressed.

Emergency evacuation of the subject land is considered commensurate to the scale of the development and the following requirements of Fact Sheet 2/14 which have been adequately considered:

- The broader road network that may be affected – surrounding public road system complies with PBP and access to non-bushfire prone areas available.
- The impact on the road system during the evacuation of the facility – road system complies with PBP and will support increased traffic levels when the church auditorium is in use.
- The traffic level likely to be generated during an emergency evacuation – will result in an increase in traffic levels during peak occupancy. This needs to be considered in the emergency evacuation planning of the facility.
- Impacts of evacuation on approach and departure direction – multiple approach and departures available from the public road system.
- Review of intersection performance – multiple approach and departure routes available.
- Review of limitations/constraints of affected area/road network system – there will be an increased impact on road/area network system during peak occupancy.
- Road access management during an evacuation – no road access management necessary given the clear line of site available along Water Street towards the Great Western Highway.
- Management of potential traffic conflicts (i.e. emergency vehicles versus evacuating members of the public) – traffic management provisions to be put in place by Hills Christian Life Centre Ltd to ensure attendees evacuate safely.
- Provision for non-occupation on days of Extreme or Catastrophic Fire Danger, or other such conditions – it is not considered necessary for the proposed development to be closed on days where the FDR is Extreme or Catastrophic based on the following risk exposure and mitigation measures:
    - The bushfire hazard is of a low risk, i.e. a grassland area > 50 m and 'low hazard' riparian corridor > 70 from the proposed building;
    - Construction of proposed building will be compliant with BAL-12.5 and additional construction requirements outlined on Section A3.7 of the 2010 Appendix 3 Addendum to PBP;

  - Proposed building is immediately surrounded by a large cleared area (car parking) to the north, east and south providing a clear separation between the building and any hazard, more than sufficient area for defendable space and emergency access;
  - Multiple access routes within the site and along the public road network are available in the event of an emergency; and
  - An Evacuation and Emergency Response Plan consistent with the requirements of the NSW RFS guidelines is required prior to occupation.
- Emergency management planning commensurate with the risk – the preparation of an Emergency Management Plan and closure on Extreme and Catastrophic Fire Danger days is considered commensurate with the risk.
- Child care facilities within a place of public worship – the provisions for the auditorium will also apply to the child care and kids/youth ministry areas.

The development satisfies the Fact Sheet 2/14 requirement that it meets the SFPP specific objective of PBP '*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 firefighters 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'*.

7 Compliance with Fact Sheet 4/12

Fact Sheet 4/12 Requirements		Compliance
The aims and objectives of PBP	• The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, onsite amenity and protection of the environment. • More specifically, the objectives are to: (i) afford occupants of any building adequate protection from exposure to a bush fire; (ii) provide for a defendable space to be located around buildings; (iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition; (iv) ensure that safe operational access and egress for emergency service personnel and residents is available; (v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ); and (vi) ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bush fire fighting).	See Sections 3-6
The specific objectives for SFPP Developments as set out under clause 4.2.3 of PBP	• 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 firefighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated. • provide for safe emergency evacuation procedures. SFPP Developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire 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 bush fire is imminent.	See Section 3 See Section 6
The capacity and training of staff and occupants to participate in a firefighting response		See Section 6

Fact Sheet 4/12 Requirements		Compliance
The performance criteria for asset protection zones for SFPP developments (Table A2.6 of PBP)	• radiant heat levels of greater than 10kW/m2 will not be experienced by occupants or emergency services workers entering or exiting a building. • applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated. • APZs are managed and maintained to prevent the spread of a fire towards the building. • vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters.	See Section 3
The capacity of the existing and proposed road network to facilitate emergency evacuation		See Section 5
Depending on the scale of the development, this may include consideration of the traffic impacts of emergency evacuation of the development in relation to	• the broader road network that may be affected • the impact on the road system during the evacuation of the facility, • the traffic level likely to be generated during an emergency evacuation; • impacts of evacuation on approach and departure direction; • review of intersection performance • review of limitations/constraints of affected area/road network system • road access management during an evacuation • management of potential traffic conflicts (i.e. emergency vehicles versus evacuating members of the public) • Provision for non-occupation on days of Extreme or Catastrophic Fire Danger, or other such conditions • Emergency management planning commensurate with the risk. • Child care facilities within a place of public worship	See Section 6

It is noted that Fact Sheet 2/14 identifies that a bushfire engineering brief should be undertaken in accordance with the fire engineering design brief process in the *International Fire Engineering Guidelines* (2005 edition, ABCB). However, as the development exceeds the acceptable solutions of PBP for a SFPP development, a bushfire engineering brief is not considered necessary in this circumstance.

8 Recommendations and conclusion

The proposal consists of a new church auditorium on bushfire prone land and is able to satisfy the aim and objectives of PBP, the specific SFPP objectives of PBP and Fact Sheet 2/14.

The following recommendations have been made within this report to achieve compliance:

1. The following fuel management specifications are to be considered for any landscaping within the subject land:
    a. No tree or tree canopy is to occur within 2 m of the building roofline.
    b. The presence of a few shrubs or trees in the APZ is acceptable provided that they:
        - are well spread out and do not form a continuous canopy
        - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
        - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
    c. Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species.

2. Proposed building is to be constructed to BAL-12.5 in accordance with *AS 3959-2009 (Amdt 3) Construction of buildings in bushfire-prone areas*. It is important that the current version of AS 3959-2009 is consulted. Additionally, the construction requirements of Section A3.7 of PBP (within Appendix 3 Addendum) are to be implemented.

3. Water supply is to be installed in accordance with the requirements of *Australian Standard AS 2419.1 'Fire hydrant installations – System design installation and commissioning'* as outlined in **Section 4** of this report.

4. Reticulated or bottled gas on the lot is to be installed and maintained in accordance with Australian Standard AS/NZS 1596 'The storage and handling of LP Gas' (Standards Australia 2014) and the requirements of relevant authorities (metal piping must be used).

5. The proposed road is to be constructed in accordance with Section 4.1.3 (1) of PBP as outlined in **Section 4** of this report.

6. An Evacuation and Emergency Response Plan consistent with the requirements of the NSW RFS guidelines is required prior to occupation.

In the author's professional opinion the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development, a standard that is consistent with *Planning for Bush Fire Protection 2006*.

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