

Bush Fire Assessment Report

in relation to the proposed
alterations and additions to two existing dwellings, new
office building and carpark, and two replica historical
villages to be used as a film set at:



**Lot 2 DP 1111318
12-14 Zouch Road Denham Court
(subject site)**

1. Document Tracking

Item	Detail
Project Name	Bush Fire Assessment Report, proposed alterations and additions to two existing dwellings, new office building and carpark, and two replica historical villages to be used as a film set
Project Address	Lot 2 DP 1111318 12-14 Zouch Road Denham Court
Client Name	Watchtower Bible & Tract Society Australia
Project Number	19/0427
Plan Reference	Plans by RDC Asia/Pacific project number AUSB01-31-08, drawing number C-001, 2 and 3, dated 8 July 2019
Prepared by	Laura Richards
Approved by	Catherine Gorrie
BAL	AS3959-2009 BAL 29 to the south, east and west and BAL 19 to the north – residential building additions only

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Document Control

Version	Primary Author	Description	Date Completed
1	Laura Richards	Draft	28/06/2019
2	Catherine Gorrie	Draft for client sign-off	4/07/2019
3	Catherine Gorrie	Final plan version	15/07/2019

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NOTE: This bush fire assessment shall remain valid for 12 months from the date of issue.

2. Executive Summary

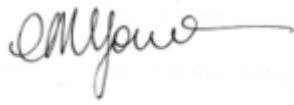
Bushfire Consulting Services was commissioned by Watchtower Bible & Tract Society Australia to provide a bush fire assessment for alterations and additions to two existing dwellings, new office building and carpark, and two replica historical villages to be used as a film set. The subject site is mapped as designated bush fire prone land by Liverpool City Council and is located within 100 metres of bush fire prone (hazardous) vegetation. The bush fire attack level (BAL) associated with the proposed development has been assessed as AS3959-2009 BAL 29 to the south, east and west and BAL 19 to the north – residential building additions only.

The development is a combination of infill development and other development which is not categorised as “infill, “residential and rural subdivision” or “Special Fire Protection Purpose” (SFPP), development. As such, this report makes recommendations in accordance with sections 4.3.5 of the NSW RFS document ‘Planning for Bush Fire Protection’ (PBP) (NSW RFS 2006), for infill development and the aim and objectives of PBP for the office and carpark and replica historical villages to be used as a film set. The recommendations address the required bush fire protection measures, including:

- establishment and maintenance of asset protection zones (APZs)
- siting and design of the development
- construction requirements, if applicable, under AS3959-2009 (Standards Australia 2009), and section A3.7 of PBP Addendum: Appendix 3 (NSWRFS 2010)
- adequate access for emergency personnel
- adequate water supply, and utility requirements to reduce the risk of ignition by electrical or gas supplies
- landscaping to reduce the risk of ignition by embers, and to minimise flame contact and radiant heat on the proposed development

Where all recommendations are implemented, the report concludes that the proposal can comply with the aim, objectives and performance criteria of PBP.

3. Compliance Summary

This Assessment has been Certified by: Catherine Gorrie BPAD-Level 3 Accredited Practitioner FPAA Cert No: BPAD20751	
What is the recommended level of compliance with AS3959-2009?	Residential Buildings 1 & 2 - AS3959-2009 BAL 29 to the east, south and west and BAL 19 to the north Office and carpark and replica historical villages to be used as a film set - AS3959-2009 Not a Deemed to Satisfy Solution for this building class
Can this proposal comply with AS3959-2009 and Addendum to Appendix 3 of Planning for Bush Fire Protection (PBP)?	Yes
Does this development comply with the aim and objectives of PBP?	Yes
Is referral to the NSW Rural Fire Service (RFS) required?	No
Plan Reference:	Plans by RDC Asia/Pacific project number AUSB01-31-08, drawing number C-001, 2 and 3, dated 8 July 2019
Bushfire Consulting Services Report Issue No: Date of Issue:	3 5/07/2019

4. List of Abbreviations

APZ	Asset Protection Zone
AS3959	Australian Standard 3959 – 2009 including Amendment 3
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPAD	Bushfire Planning and Design (Accreditation Scheme)
BPMS	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Liverpool Council
CDC	Complying Development Certificate
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act – 1979
FPAA	Fire Protection Association of Australia
IPA	Inner Protection Area
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection 2006
RF Act	Rural Fires Act – 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

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6. Introduction

This report has been commissioned by Watchtower Bible & Tract Society Australia to provide a bush fire assessment for the proposed alterations and additions to two existing dwellings, new office building and carpark, and two replica historical villages to be used as a film set at Lot 2 DP 1111318, 12-14 Zouch Road Denham Court.

The subject property is “bushfire prone land” as per the local Council bushfire prone land map as defined by section 10.3 (s10.3) of the *Environmental Planning & Assessment Act (EP&A) 1979* and therefore the requirements stipulated by legislation apply.

Planning for Bush Fire Protection 2006 describes this type of development as follows;

Additions to two existing residences	“infill development”
New Office Building and carpark and two historical villages to be used as a film set	“other development” that requires the application of Bushfire Protection Measures

and therefore the requirements of section 4.14 (s4.14) of the EP&A Act are applicable.

The bush fire assessment report and recommendations are derived from the NSW EP&A Act, the Rural Fire Service document *Planning for Bush Fire Protection 2006* and Australian Standard 3959-2009 ‘Construction of Buildings in Bushfire Prone Areas’.

7. Purpose of this Report

The purpose of this report is to provide the owners, the Council, the Certifier and the Rural Fire Service with a description of the development as well as the vegetation type, slope and any other factors influencing the likely bushfire behaviour, sufficient to show that the development will be protected from the likely bushfire threat as outlined in the current legislation.

This independent report is submitted as part of the development application to Council to assist the Council in determining the conditions of consent appropriate to the development.

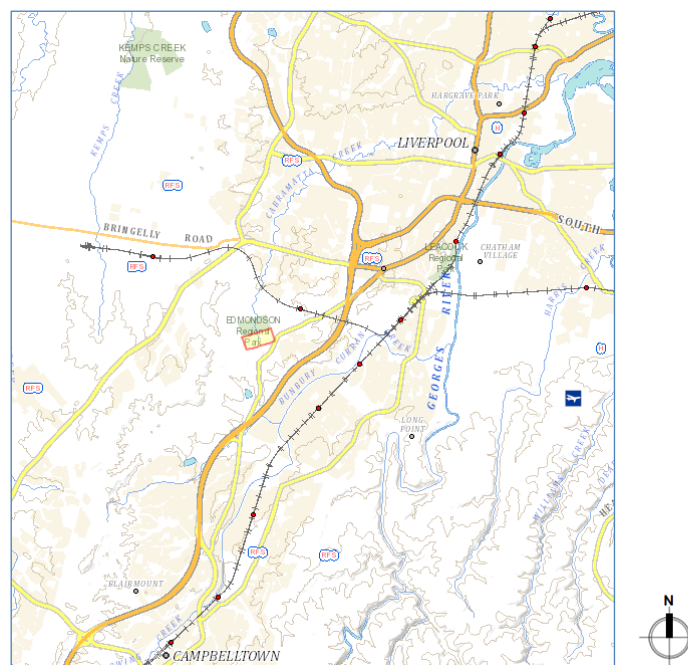
8. Site Assessment

Bushfire Consulting Services Pty Ltd attended the site on 25 June 2019. The assessment relates to the plans referenced on page 2 of this report. The NSW Department of Planning Spatial Information Exchange mapping website has also been used as a reference, and Ocean Shores to Desert Dunes by David Keith, in determining the vegetation type.

9. Location

The site is located and known as Lot 2 DP 1111318, 12-14 Zouch Road Denham Court. The property is part of Liverpool local government area.

Figure 1: Location Map: Source: Land & Property Management Authority (LPMA) SIX Viewer



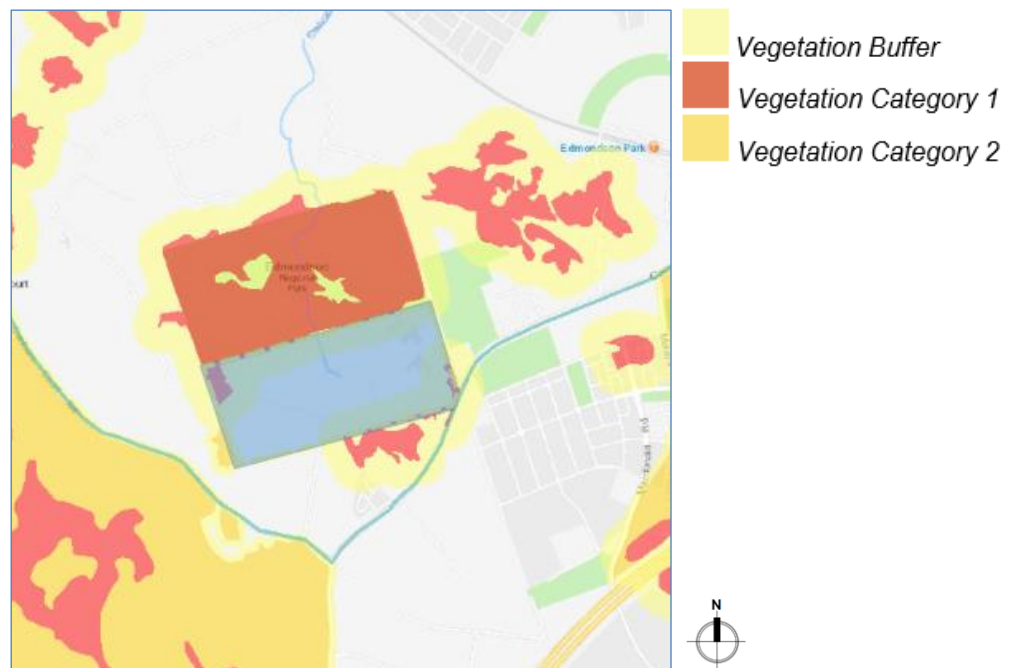
Site location outlined in red

Figure 2: Aerial Map: Source: LPMA SIX Viewer



Site location outlined in red

Figure 3: Bushfire Prone Land Map: Source: NSW Government Planning Viewer



Approximate site location outlined in blue

10. The Proposal and Assessment Methodology

The proposal is for alterations and additions to two existing class 3 residences, a new office building including offices and green room building with associated support spaces, two historical replica educational villages to be used as a film set, and a carpark. In terms of the NCC, the classification of the buildings are as follows:

The two existing residential buildings – Class 3.

A Class 3 building is described as a residential building, other than a Class 1 or 2 building, which is a common place of long term or transient living for a number of unrelated persons. Example: boarding-house, hostel, backpackers accommodation or residential part of a hotel, motel, school or detention centre.

The Class 3 additions are captured by Volume 2 of the NCC which requires the application of AS3959-2009.

The proposed office – Class 5

Proposed Historical Replica Villages to be used as a film set – Class 5

A Class 5 building is described as an office building used for professional or commercial purposes, excluding buildings of Class 6, 7, 8 or 9

The proposed carpark – Class 7a

A Class 7a Building is described as being a building which is a carpark.

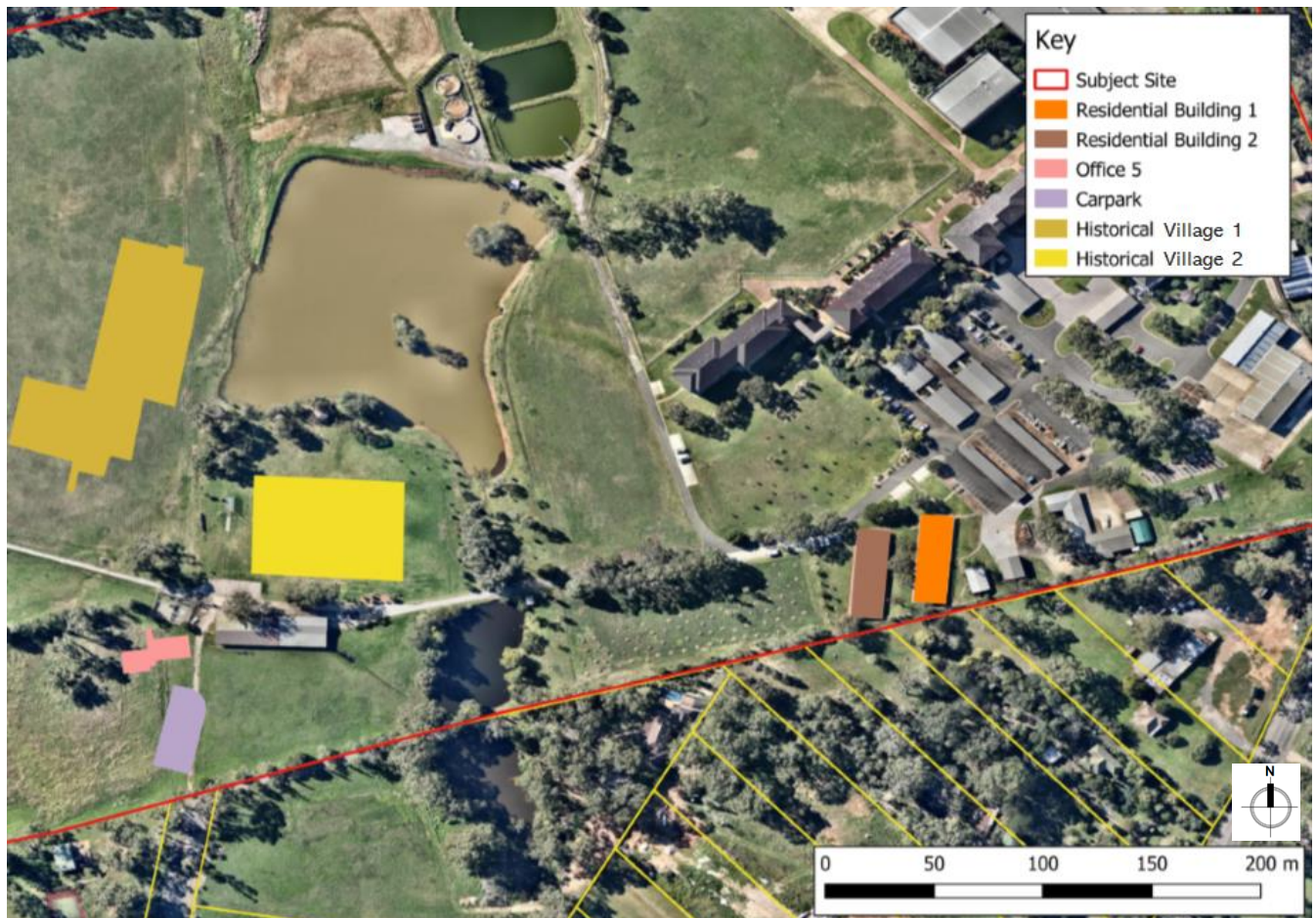
The proposed replica historical buildings – Class 8

A Class 8 building is a building in which a process (or handicraft) is carried out for trade, sale, or gain. The building can be used for production, assembling, altering, repairing, finishing, packing, or cleaning of goods or produce.

The NCC does not provide for any bushfire specific performance requirements for Class 5, 7 or 8 buildings that are not a Special Fire Protection Purpose and, as such, AS3959-2009 does not apply as a deemed to satisfy provision. The proposal for the office, carpark and historical replica villages need only comply with the general fire safety provisions of the BCA.

This report seeks to demonstrate how the proposal can meet the various requirements.

Figure 4: Proposed new works: Nearmap, site plan, BFCS Overlays
(Nearmap Imagery 31/03/2019)



Part lot boundary outlined in red

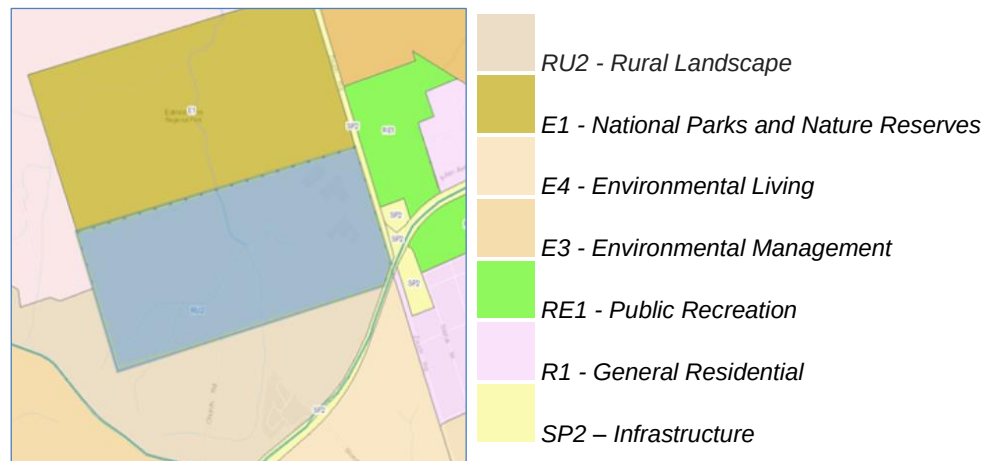
11. Property Description

The allotment is approximately 40.35ha in area. It is bounded by Zouch Road to the approximate east. It currently contains a religious establishment comprising of an Electrical Station Generator, Garden Shed, Kingdom Hall, a two storey Maintenance Workshop, four offices, from between 1 and four storeys, 5 residences from between 1 and four storeys, two support residences, 4 stores, swimming pool, tennis court, 3 carports, carwash shelter, gatehouse, greenhouse, 2 gazebos, various service tunnels, wastewater treatment plant, telecommunications tower, all of which are to be retained.

12. Zoning

The land is zoned RU2 - Rural Landscape under Liverpool LEP 2008.

Figure 5: Zoning Map: Source: NSW Government Planning Viewer



Approximate site location outlined in blue

13. Vegetation Classification for the Site and Surrounds

The nearest bushfire threat emanates from bushland located approximately 30m to the south of the two existing residential buildings where additions are proposed. Hazardous vegetation is located approximately 124m north of the proposed Historical Replica Villages and 116m southeast of the proposed office building. The curtilage surrounding the subject buildings and the vast majority of the site presents as managed land comprised of mown lawns, garden beds, occasional shrubs and established trees.

Hazardous vegetation was classified for a distance of 140m from all aspects of the proposed development according to the methodology of PBP Appendix 2 and PBP Addendum: Appendix 3 section A3.5 (Figure 5). Based on a site visit and determination of vegetation formation using the Keith 2004 Identification Key and conversion to Specht classifications, the primary bushland vegetation having the potential to affect the subject development is most representative of Forest.

Residential Building 1

Direction	Vegetation Classification
North, east and west	N/A
South	Absence of Classified Vegetation for 32m then Forest

Residential Building 2

Direction	Vegetation Classification
North, east and west	N/A
South	Absence of Classified Vegetation for 40m then Forest

Figure 6: Separation distance Residential Buildings: Source: Nearthmap, Site Plan and LiDar data



Office Building

Direction	Vegetation Classification
North, east, south and west	N/A, no classified vegetation within 100m

Historical Village Replica 1

Direction	Vegetation Classification
North	Absence of Classified Vegetation for 124m then Forest
South, east and west	N/A

Historical Replica Area 2

Direction	Vegetation Classification
North	Absence of Classified Vegetation for 90m then Forest
South, east and west	N/A

14. Slope

The slope has been measured manually on site over a distance of 100m from the proposed building footprint where accessible, under the classified vegetation community constituting the hazard. The slope was found to be consistent with the topographical data from LiDar.

Residential Buildings 1 and 2

Direction from Building Footprint	Slope Description
North	N/A
East	N/A
South	Downslope >0-5°
West	N/A

Note: Effective 'slope' refers to the slope under the classified vegetation in relation to the building, not the slope between the building and the classified vegetation.

Figure 7: Slope Diagram for residential building 1: Source: SIX maps with overlay by BFCS P/L



Residential building 1 highlighted in orange and building 2 highlighted in brown

15. Fire Weather

The development is located in the Liverpool area which is part of the Greater Sydney Region, which has a Fire Danger Index of 100.

16. Access and Egress

The site has direct access to Zouch Road, which is a public road. Internal roadways are existing throughout the site, and are to be extended to the new office building and the two historical replica buildings. The new carparking area is adjacent to the office building and roadways are a minimum width of 3.5m, with allowance for vehicle manoeuvring at the carpark entrance. The historical replica villages are to have

vehicular access with a roadway between the two villages which loops around village 2, providing forward egress for fire trucks and other vehicles. There are three vehicular access points to Zouch Road and suitable access for fire fighting vehicles and evacuation is available.

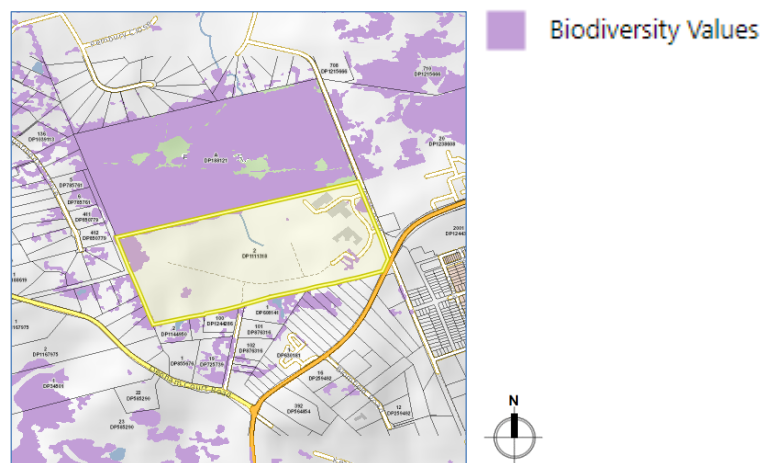
17. Water Supply

The site has reticulated water supply to part of the site, which will be extended to supply the new works.

18. Biodiversity Values

A search of the NSW Office of Heritage and Environment and Heritage's Biodiversity Values Map has been carried out which indicates land with high biodiversity value within the lot, as defined by the Biodiversity Conservation Regulation 2017. It does not appear that the new works are located on any part of the land that is mapped.

Figure 8: Biodiversity Values Map: NSW Office of Environment and Heritage
<https://www.lmhc.nsw.gov.au/Maps/index.html?viewer=BOSETMap>



Site location outlined in yellow. Areas mapped in purple indicate land with high biodiversity value

19. Environmental

There are no features on or adjoining the site which may mitigate the impact of a high intensity bushfire on the proposed development. The proposed bushfire protection measures will not adversely impact on the environment. It should be noted that this report has not focused on environmental issues and as such they may require further specialist investigation.

20. Assessment of Bushfire Risk

The following is derived from AS3959-2009 and the simplified method for determining the Bushfire Attack Level – Method 1, as outlined in AS3959-2009.

Residential building 1

Aspect	Required APZ	Vegetation Classification	Slope Under Classified Vegetation	Anticipated Radiant Heat Flux kW/m ²	Bushfire Attack Level (BAL) required
North	>100m	N/A	N/A	N/A	BAL 19
East	>100m	N/A	N/A	N/A	BAL 29
South	32m	Forest	Downslope >0-5°	<29	BAL 29
West	>100m	N/A	N/A	N/A	BAL 29

Residential building 2

Aspect	Required APZ	Vegetation Classification	Slope Under Classified Vegetation	Anticipated Radiant Heat Flux kW/m ²	Bushfire Attack Level (BAL) required
North	>100m	N/A	N/A	N/A	BAL 19
East	>100m	N/A	N/A	N/A	BAL 29
South	40m	Forest	Downslope >0-5°	<29	BAL 29
West	>100m	N/A	N/A	N/A	BAL 29

21. *Reduction in BAL due to Shielding

Once the highest BAL is determined it is applied to the entire dwelling. The construction requirements for the next lower BAL than determined for the site may be applied to an elevation of the building where the elevation is not exposed to the source of the bushfire attack (AS3959-2009 clause 3.5). An elevation is deemed to be not exposed to the source of the bushfire attack if all of the straight lines between that elevation and the source of bushfire attack are obstructed by another part of the building.

In this instance, the north aspect of both of the residential dwellings will be fully shielded from exposure to the source of the bushfire attack by the building itself. Therefore the BAL for the north elevations can be reduced by one level to BAL 19. The BAL is only permitted to be reduced by one level.

22. Assessment of Compliance with PBP

The proposed development conforms to PBP as follows:

Performance Criteria	Meets or not	Comment
APZs	Y	According to PBP Table A2.4, the minimum APZ required is 25m. The APZ is achievable when including adjacent managed land. It is proposed that the curtilage around each residential building continue to be managed as and APZ for a minimum of 25m to the north east and west and to the boundary to the south. The land is already suitably managed and vegetation modification is not required
Defendable Space	Y	Adequate defendable space is available to all sides of the proposed dwellings and pedestrian firefighter access is available
Siting and Design	Y	Siting and design is appropriate for the allotment

Performance Criteria	Meets or not	Comment
Landscaping	Y	Future landscaping is to comply with PBP 2006 Appendix 5
Construction Standards	Y	Must comply with AS3959-2009 BAL 29 to the east, south and west and BAL 19 to the north
Access and Egress	Y	Safe operational access is available to emergency services personnel while residents are seeking to relocate in advance of a bushfire
Water Supply	Y	A reticulated water supply is available, and hydrants and hose reels are located around the site, with additional reels planned for the new works as necessary, subject to expert design
Electricity and Gas Supply	Y	Any proposed bottled gas supply location will comply with PBP where it is located so as to not lead to ignition of the surrounding bushland or the building. Where practicable, electrical transmission lines will be located underground
Emergency and Evacuation Planning	Y	The site already has a Fire and Emergency Evacuation Manual, and Owners or Operators are to ensure it addresses the Rural Fire Service document "A Guide to Developing a Bushfire Evacuation Plan"

23. Aim and objectives of PBP

The proposed Office and historical replica villages are required to comply with the aim and objectives of PBP which states that the general fire safety construction provisions (BCA) are taken as acceptable solutions for this building class, **but the aim and objectives of PBP** apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management".

Given the above, the aim and objectives of PBP are as follows:

- Afford occupants of any building adequate protection from exposure to a bushfire
- Provide for a defensible space to be located around buildings
- Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition
- Ensure that safe operational access and egress for emergency service personnel and residents is available
- Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zone (APZ)
- Ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bushfire fighting).

The following table outlines the relevant items and their compliance:

Aim and Objectives	Comment	Compliance
Afford occupants of any building adequate protection from exposure to a bushfire	Suitable setbacks (of at least 100m) will limit exposure to a bushfire	Yes
Provide for a defensible space to be located around buildings	There is ample defensible space around the structure	Yes
Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition	Separation from the vegetation forming a hazard is provided, as the buildings are located at least 100m from any classified vegetation	Yes
Ensure that safe operational access and egress for emergency service personnel is available	Access is available and considered adequate	Yes

Aim and Objectives	Comment	Compliance
Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zone (APZ)	Normal building and landscaping maintenance will provide this	Yes
Ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bushfire fighting)	The building is to be constructed to the general fire safety requirements of the BCA which includes enhancing the on site reticulated water supply and addition fire hose reels which are subject to an independent expert design	Yes

24. Recommendations

The following recommendations are made for the bushfire measures for the proposed alterations and additions to two existing dwellings, new office building and carpark, and two replica historical villages to be used as a film set at Lot 2 DP 1111318, 12-14 Zouch Road Denham Court, and are based upon the relevant provisions of the NSW Rural Fire Service Guideline entitled *Planning for Bush Fire Protection 2006*.

1. Construction Standard – Two Residential Buildings only

The proposed additions shall be constructed to sections 3 and 7 of AS3959-2009 (BAL 29) to the east, south and west and sections 3 and 6 of AS3959-2009 (BAL 19) to the north, with the exception that the construction requirements shall be varied to comply with the requirements of Section A3.7 of the NSW Rural Fire Service Addendum to Appendix 3 of *Planning for Bush Fire Protection 2006*.

2. Asset Protection Zones

At the commencement of building works and in perpetuity the residential buildings are to continue to have their APZs maintained for a distance of 25m to the north east and west and to the boundary to the south, as outlined within section 4.1.3 and Appendix 5 of “Planning For Bush Fire Protection 2006”, and the NSW Rural Fire Service’s document, “Standards for Asset Protection Zones”.

The following points are a guide to Asset Protection Zone Area requirements. The Asset Protection Zone Area should comprise the following:

- Minimal fine fuel on the ground.
- Vegetation that does not provide a continuous path to the building for the transfer of fire.
- Shrubs and trees that do not form a continuous canopy and vegetation is planted in clumps, rather than continuous rows.
- Species that retain dead material or deposit excessive quantities of ground fuel are avoided.
- Shrubs and trees are pruned so that they do not touch or overhang the building.
- Vegetation is located far enough away from the building so that plants will not ignite the building by direct flame contact or radiant heat emission.

3. Emergency and Evacuation Planning

The site’s Fire & Emergency Evacuation Plan is to be updated to incorporate the provisions of the Rural Fire Service document “A Guide to Developing a Bushfire Evacuation Plan”

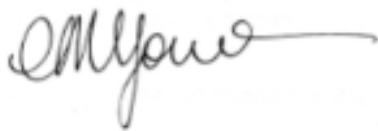
25. Summary

This document consists of a bush fire assessment for the proposed alterations and additions to two existing dwellings, new office building and carpark, and two replica historical villages to be used as a film set at Lot 2 DP 1111318, 12-14 Zouch Road Denham Court. The report concludes that the proposed development is on designated bushfire prone land and the legislative requirements for development in bushfire prone areas are applicable.

The proposed development will be constructed to the minimum standards required in accordance with the guidelines of *Planning for Bush Fire Protection 2006*. This report has considered all of the elements of bushfire attack and provided the proposed development is constructed in accordance with the recommendations of this report, it is my opinion that the development satisfies the Objectives and Performance requirements of *Planning for Bush Fire Protection 2006* and *Australian Standard AS3959-2009*.

Notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains and although the standard is designed to improve the performance of such buildings, there can be no guarantee because of the variable nature of bushfires that any one building will withstand bushfire attack on every occasion.

This report is a bush fire assessment that provides the required information to assist local Council and the Rural Fire Service in determining compliance in accordance with Planning for Bush Fire Protection and AS3959-2009. The local Council is the final consenting authority and the construction of the building must comply with the recommendations included in the Council's conditions of consent.



Catherine Gorrie

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Grad Dip Bushfire Protection (UWS 2010)

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26. References

Environmental Planning & Assessment Act 1979

Planning for Bush Fire Protection 2006 (Rural Fire Service)

Addendum: Appendix 3, Planning for Bush Fire Protection 2010 (Rural Fire Service)

Australian Standard 3959-2009 'Construction of Buildings in Bushfire Prone Areas'

NSW Department of Planning Spatial Information Exchange mapping website

Building Code of Australia (Building Codes Board)

Keith, D., Ocean Shores to Desert Dunes, the Native Vegetation of NSW and the ACT
Department of Environment and Conservation, NSW 2006.

27. Appendix 1 Site Plan



28. Appendix 2 Site Photos

Source: BFCS P/L 25/06/2019



Residential building 1



Residential building 2



The vegetation to the south of the two residential buildings



View to the south of residential building 1



The playing field and position of one of two historical villages



Proposed office location



Proposed location of second historical village

The following are various photos of the managed land on the subject site:



View to the north from residential building 2 showing managed Land



*Managed Land on the subject site viewed from the rear of the existing development
near the southern lot boundary*



View to the west from the playing field



View to the west from the proposed office location



View to the south from the second historical village



View to the east from the second historical village