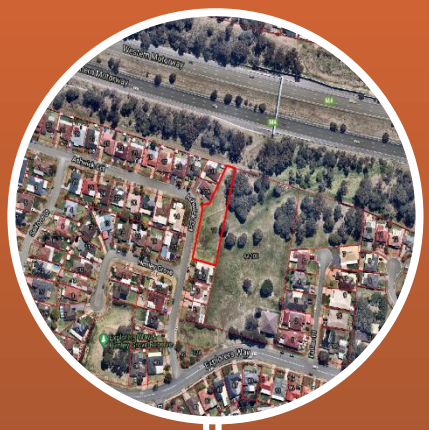
Bushfire Assessment Report

Proposed:
Subdivision

At:
11 Ashwick Circuit,
St Clair

Reference Number: 220551



25th January 2022

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FPA AUSTRALIA SILVER MEMBER Fire Protection Association Australia

Contents

Legal status:

This report has been prepared as a submission document in support of a development application to Council and in instances may rely upon information provided by a number of external sources including Councils, State Government Agencies and it is assumed that the information provided was accurate at the time. This report cannot be relied upon for commencement of works or construction until such time as it has been endorsed or otherwise included within the consent conditions issued by Council as part of the DA determination.

S4.14 applications (under the Environmental Planning and Assessment Act 1979) and all infill development applications *may be* referred by Council to the NSW Rural Fire Service for review and concurrence during the DA process. S100B applications under the Rural Fires Act 1997 (subdivisions and Special Fire Protection Purpose Developments), Flame Zone determinations and Alternate Solutions *must be* referred by Council to the NSW Rural Fire Service for review and receipt of a Bush Fire Safety Authority (BSA) or other such recommended conditions from the NSW Rural Fire Service before the consent can be granted.

The onus is on the applicant to cross reference this document with any conditions of consent issued by Council or any requirements supplied by the NSW Rural Fire Service following development approval. BCBHS can review and cross reference these documents however the onus is on the applicant to provide them to us and request this review – Building Code and Bushfire Hazard Solutions Pty. Ltd. is not in a position to track every DA through Council and we rely upon the applicant to undertake this role as project co-ordinator.

Where any discrepancy between this document and the development approval or the NSW Rural Fire Service requirements is found, the conditions of consent always take precedence until such time as an application to review, amend or vary these conditions is approved.

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Version Control			
Version	Date	Author	Details
1	9/12/2021	Stuart McMonnies BPAD Accreditation No. 9400	Draft Report
2	25/01/2022	Stuart McMonnies BPAD Accreditation No. 9400	Final Report

List of Abbreviations:

APZ	Asset Protection Zone
AS3959	Australian Standard 3959: 2018 'Construction of buildings in bushfire-prone areas'
BAL	Bushfire Attack Level
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Penrith City Council
DA	Development Application
ELVIS	Elevation and Depth Foundation Spatial Data
EP&A Act	*Environmental Planning and Assessment Act* - 1979
FRNSW	Fire and Rescue NSW
IPA	Inner Protection Area
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
NP	National Park
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP	*Planning for Bush Fire Protection* – November 2019
ROW	Right of Way
RF Act	*Rural Fires Act* - 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SFR	Short Fire Run
SWS	Static Water Supply

1.0 Introduction

Building Code and Bushfire Hazard Solutions P/L has been commissioned to prepare an independent Bushfire Assessment Report to accompany a Development Application seeking approval for the subdivision of 11 Ashwick Circuit, St Clair (Lot 35 DP 812241).

The proposal will result in the creation of one (1) residential allotment (proposed Lot 1) and an allotment which will be dedicated to Penrith City Council as a drainage reserve, with no dwelling entitlement (proposed Lot 2).

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service.

Penrith City Council's Bushfire Prone Land Map identifies the subject site as containing the 100 metre buffer zone from designated Category 1 Vegetation, therefore the site is considered 'bushfire prone'.

The subject development relates to the subdivision of bushfire prone land which can be lawfully used for residential purposes (proposed Lot 1) and is therefore classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The development is captured under section 100B of the *Rural Fires Act* 1997 and must obtain a Bush Fire Safety Authority from the Commissioner of the NSW Rural Fire Service.

It should be noted that while the proposal is technically captured under section 100B of the Rural Fires Act 1997 it must be noted that the proposal will not result in an increase in density, with one of the proposed allotments being dedicated to Penrith City Council as a drainage reserve, with no dwelling entitlement.

All property development within bushfire affected areas is subject to the relevant specifications and requirements detailed in Planning for Bush Fire Protection - 2019 (PBP). PBP, formally adopted on the 1st March 2020, provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

This report has assessed the subject site and proposal against the aim and objectives detailed in Chapter 1 'Introduction' and specific objectives and bushfire protection measures detailed in Chapter 5 'Residential and Rural Residential Subdivisions' of PBP.

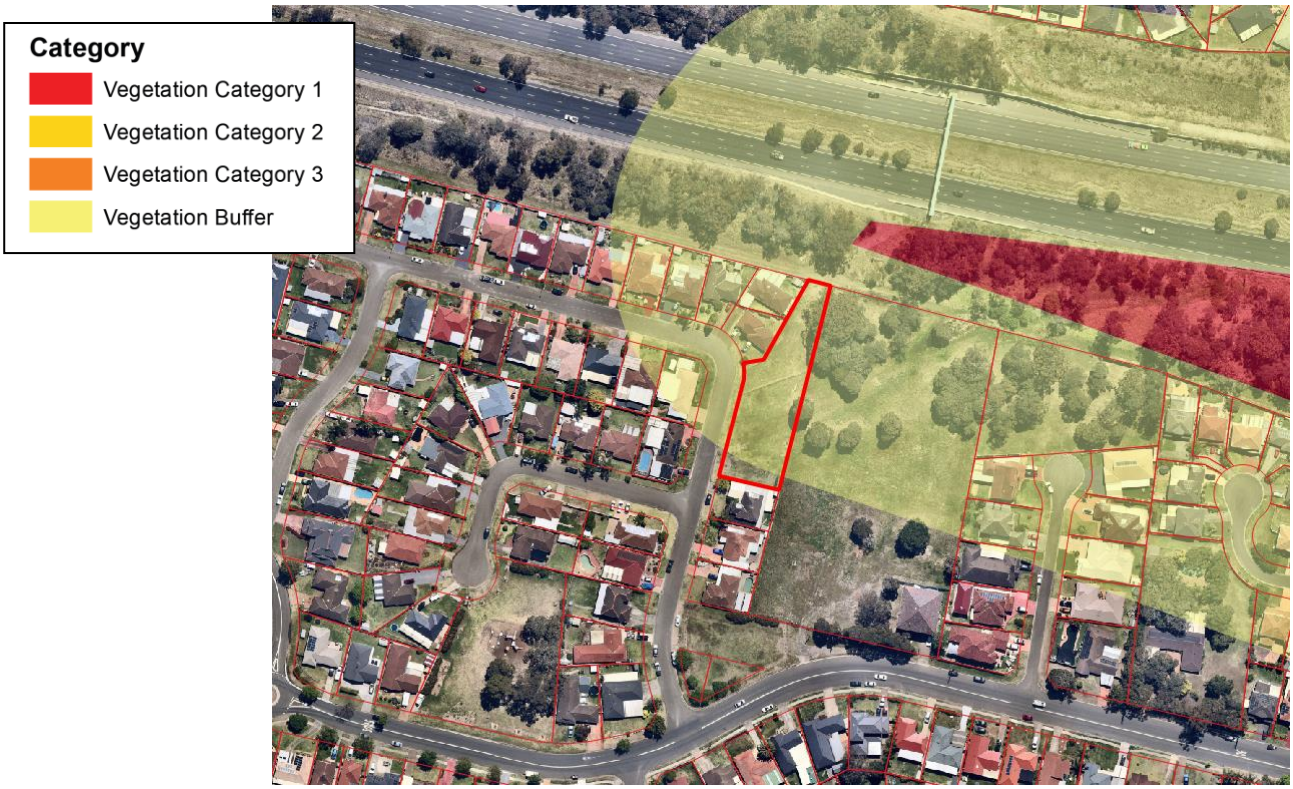

Figure 01: Extract from Penrith City Council's Bushfire Prone Land Map
Subject site (thick red outline)

2.0 Purpose of Report

The purpose of this Bushfire Assessment Report is to provide Penrith City Council and the NSW Rural Fire Service with an independent bushfire assessment together with appropriate recommended bushfire mitigation measures.

The recommendations contained within this report may assist in forming the basis of any specific construction conditions and/or bushfire mitigation measures that Council and/or the NSW Rural Fire Service may elect to place within any consent conditions issued for the subject Development Application.

3.0 Scope of this Report

The scope of this report is limited to providing a bushfire assessment and recommendations for the subject property. Where reference has been made to the surrounding lands, this report does not purport to directly assess those lands; rather it may discuss bushfire impact and/or progression through those lands and possible bushfire impact to the subject property.

4.0 Compliance Tables & Notes

The following table sets out the projects compliance with *Planning for Bush Fire Protection – 2019*.

	North	Northeast	South	West
Vegetation Structure	Cumberland Dry Sclerophyll Forest	Cumberland Dry Sclerophyll Forest	Managed land	Managed land
Slope	0 degrees across	1 degree down	n/a	n/a
Required Asset Protection Zone	8 metres*	9 metres*	n/a	n/a
Available Asset Protection Zone	8 metres	9 metres	n/a	n/a
Significant Landscape Features	Service trail / Western Motorway	Currently managed land / Active DA for Aged Care development – DA21/0607	Neighbouring residential allotments	Ashwick Circuit / Neighbouring residential allotments
Threatened Species	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Aboriginal Relics	APZ Existing	APZ Existing	APZ Existing	APZ Existing
Bushfire Attack Level	BAL 29*	BAL 29*	n/a	n/a

* Minimum required Asset Protection Zone and Bushfire Attack Level determined from Short Fire Run modelling (report attached).

Compliance Summary of Bushfire Protection Measures			
Bushfire Protection Measure (s5 PBP)	**Acceptable Solution**	**Performance Solution**	**Report Section**
Asset Protection Zones	☐	☒	7.03
Landscape	☒	☐	7.03
Access	☒	☐	7.03
Services	☒	☐	7.03

5.0 Aerial view of the subject allotment

Figure 02: Aerial view of the subject area C/- Nearmap – October 2021

6.0 Site Assessment

6.01 Location

The subject site is legally identified as Lot 35 DP 812241, known as 11 Ashwick Circuit, St Clair. The site is located within Penrith City Councils local government area and zoned R2: Low Density Residential.

The subject site has street frontage to Ashwick Circuit to the west and abuts neighbouring residential allotments to the northwest, east and south and the Western Motorway to the north.

The neighbouring property to the east has an active Development Application which seeks consent for the construction of a two (2) storey Residential Aged Care Facility and associated works (DA21/0607).

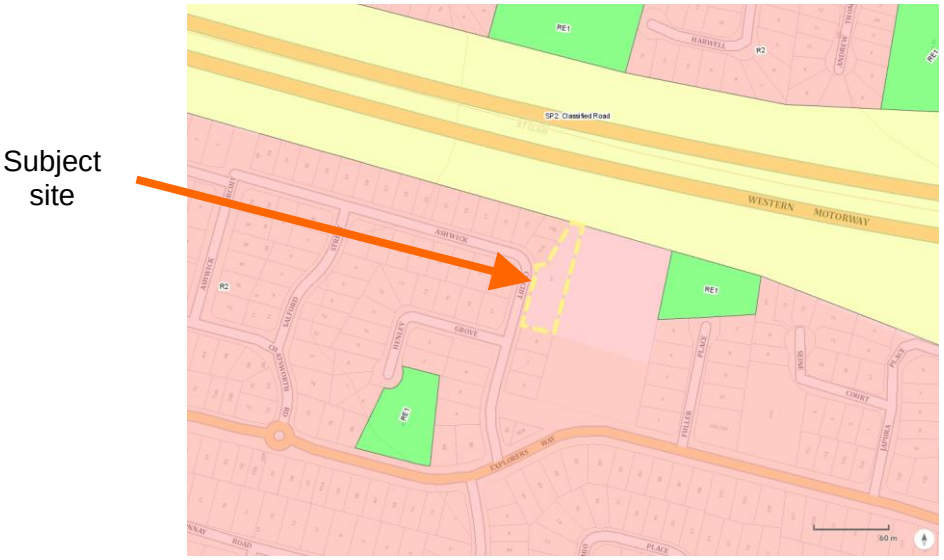

Figure 03: Land zoning of the subject area

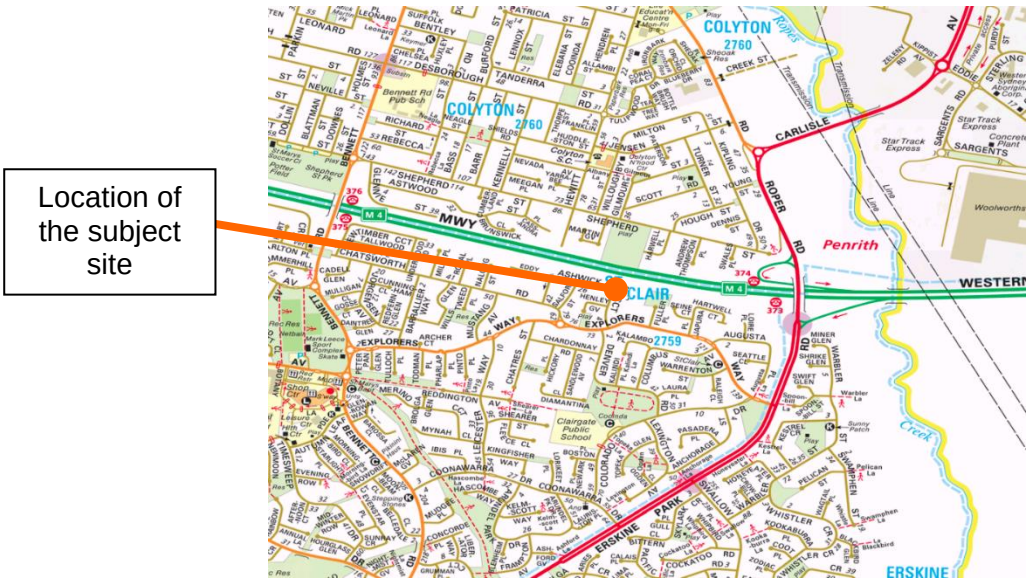

Figure 04: Extract from street-directory.com.au

6.02 Vegetation

In accordance with Appendix 1 'Site Assessment Methodology' of PBP we have undertaken an assessment of all vegetation formations within 140 metres of the development for each aspect as per Keith (2004).

The vegetation within the subject site, neighbouring private residential allotments and reserves to the northwest, east and south comprise of managed land consistent with A1.10 of PBP. It is of our opinion these properties do not pose a bushfire threat. This assessment is consistent with Council's Bush Fire Prone Lands Map.

The vegetation identified as posing a bushfire hazard to the subject site is within the unformed portion of the Western Motorway road reserve to the north.

The vegetation posing a hazard to the north was found to comprise of a narrow corridor of fully structured Forest, modified drainage channel and managed areas. The managed areas include service trails and a 5-6 metre slashed buffer adjacent the subject site and neighbouring properties.

Vegetation mapping (Data CumberlandPlain LT10pc_E_2222) identifies the adjacent Western Motorway road reserve as containing Shale Gravel Transition Forest, which attracts a Cumberland Dry Sclerophyll Forest (DSF) classification sensu Keith (2004).

The vegetation posing a hazard was found to provide a less than 50 metre fire run toward the subject site (approx. 30m) and therefore in accordance with A1.11.1 'Simplified Approach' of PBP can be assessed as a Remnant hazard and a rainforest structure applied to determine the minimum required APZ.

To better reflect the potential bushfire impact I have utilised Short Fire Run (SFR) modelling.

The underlying prerequisite for the use of SFR modelling is that the vegetation posing a hazard must be considered low risk vegetation. A review of the 'Fire History – Wildfires and Prescribed Burns' dataset, which maps wildfires over the last 107 years, found that there were no recorded wildfires in the vegetation to the north. There were also no visual indicators of any previous bushfires at the time of our inspection.

SFR modelling was subsequently adopted to determine the potential bushfire impact to the subject site. It should be noted that the use of SFR modelling was accepted for the active Development Application over the eastern neighbouring property (DA21/0607, RFS ref: DA20210907003839-Original-1).

While the adjacent hazard was found to have managed and disturbed areas, which have significantly reduced fuel loads, as a margin of safety a Cumberland DSF classification was applied across the entire area.

While historic high resolution aerial imagery shows frequent management of the eastern neighbouring property and there is an active DA for the development of this site consideration has also been given to a re-emerging hazard. In this regard SFR modelling was also undertaken to this aspect.

Photograph 02: View northwest from the northern boundary of the subject site

Photograph 03: View northeast from the northern boundary of the subject site

Photograph 04: View east from the eastern boundary of the subject site across the managed neighbouring allotment with active DA

6.03 Slope and Topography

The slope of the land under the classified vegetation has a direct influence on the forward rate of spread, fire intensity and radiant heat exposure. The effective slope is considered to be the slope under the classified vegetation which will most significantly influence bushfire behaviour toward the development site.

In accordance with A1.4 'Determine slope' of PBP the slope assessment is to be derived from the most detailed contour data available (1 metre contours sourced from ELVIS - Geoscience Australia) in conjunction with site observations to be:

- 0 degrees across slope within the hazard to the north
- 1 degree down slope within the assessed hazard to the northeast

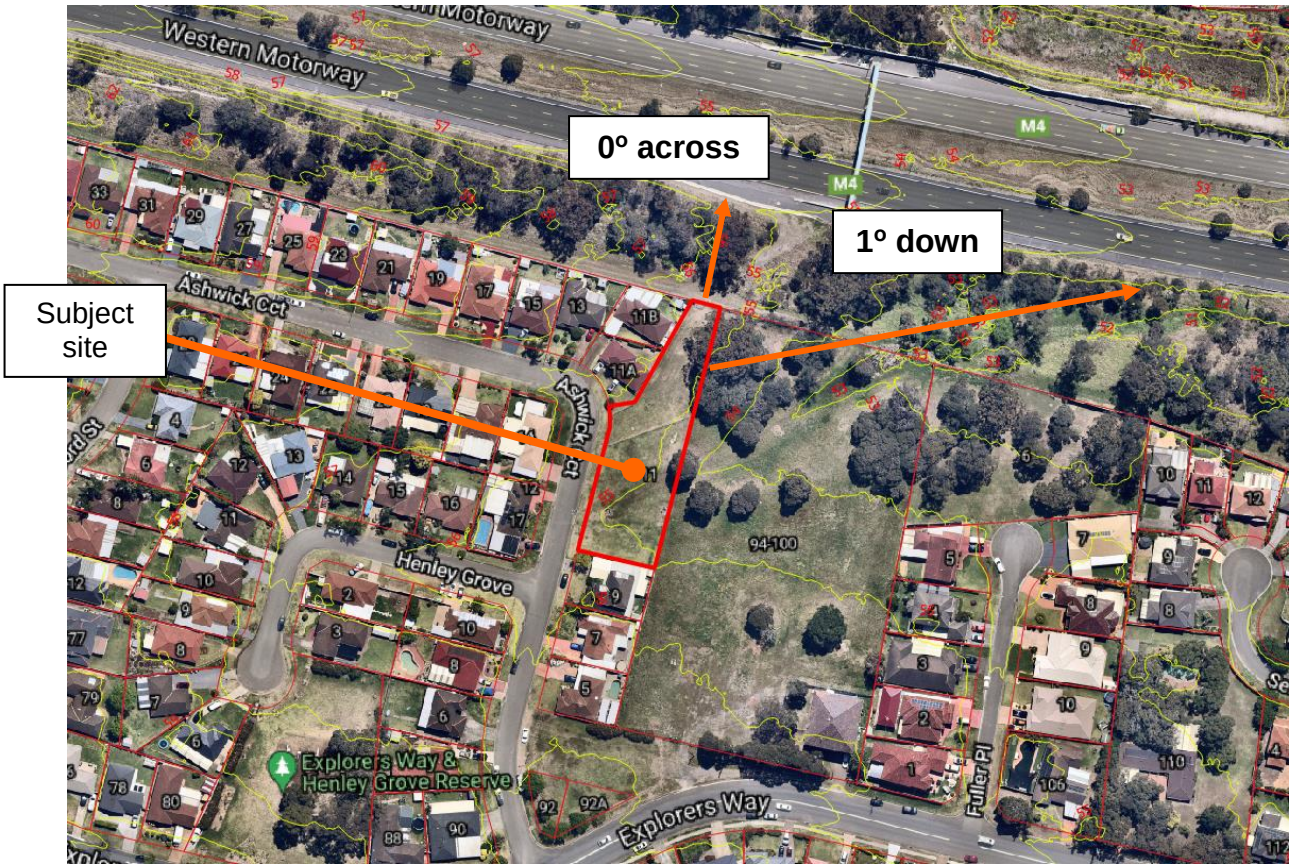

Figure 05: Extract from ELVIS – Geoscience Australia (1m contours)

6.04 Fire Weather

All development which attracts an Asset Protection Zone under PBP requires the identification of the relevant Forest Fire Danger Index (FFDI). The FFDI required to be used for development assessment purposes is based on the local government boundaries, being Penrith City Council in this instance.

In accordance with the NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017) Penrith City Council forms part of the Greater Sydney Region Fire Weather District and attracts an FFDI of 100.

7.0 Bushfire Assessment

7.01 Planning for Bush Fire Protection - 2019

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service.

Penrith City Council's Bushfire Prone Land Map identifies the subject site contains the 100 metre buffer zone from designated Category 1 Vegetation, therefore the site is considered 'bushfire prone'.

The subject development relates to the subdivision of bushfire prone land which can be lawfully used for residential purposes (proposed Lot 1) and is therefore classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The development is captured under section 100B of the *Rural Fires Act* 1997 and must obtain a Bush Fire Safety Authority from the Commissioner of the NSW Rural Fire Service.

It should be noted that while the proposal is technically captured under section 100B of the Rural Fires Act 1997 it must be noted that the proposal will not result in an increase in density, with one of the proposed allotments being dedicated to Penrith City Council as a drainage reserve, with no dwelling entitlement.

In accordance with the submission requirements for a Bush Fire Safety Authority detailed in clause 44 of the *Rural Fires Regulation* 2013 an assessment of the extent to which the proposed development conforms with or deviates from *Planning for Bush Fire Protection* (PBP) is required.

The application of PBP requires satisfactory demonstration of the aim and objectives and the specific objectives and bushfire protection measures relevant to the type of development.

In this instance the proposal relates to a residential subdivision and therefore in addition to the aim and objectives detailed in Chapter 1 'Introduction' the proposal must satisfy the specific objectives and bushfire protection measures detailed in Chapter 5 'Residential and Rural Residential Subdivisions' of PBP.

7.02 Specific Objectives

The following table lists the specific objectives for residential and rural residential subdivisions with a dwelling entitlement in accordance with section 5.2 of PBP and our comments of the proposal compliance or otherwise.

Specific Objective	Comment
minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);	The proposal does not result in any increased perimeter of the subdivision to a bushfire hazard.
minimise vegetated corridors that permit the passage of bush fire towards buildings;	There are no conservation areas or vegetated corridors proposed as part of this application.
provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;	The proposed allotment is not on top of any ridge-tops or steep slopes.

Specific Objective	Comment
ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;	The separation from the identified bushfire hazard includes managed land entirely within the subject site. This setback is further supported by a service trail within the adjacent Western Motorway road reserve.
ensure the ongoing maintenance of APZs;	It is expected that the property management within the proposed allotments will be enforced by way of a condition of consent, similar to recommendation 1 of this report, as part of this development process. This will ensure ongoing management of the APZs within the site.
provide adequate access from all properties to the wider road network for residents and emergency services;	The proposed new allotments will both retain street frontage to Ashwick Circuit. The most distant external point of any future dwelling within proposed Lot 1 will be within 70 metres of Ashwick Circuit.
provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression;	Attending fire vehicle can utilise the Western Motorway or existing service trails for hazard reduction of fire suppression activities.
ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.	Existing in-ground hydrants are available along Ashwick Circuit and surrounding streets for the replenishment of attending fire services.

7.03 Bushfire Protection Measures

Section 5.3 ‘Bush fire protection measures’ of PBP outlines the specific Bushfire Protection Measures (BPMs) applicable to residential and rural residential subdivisions, including APZs, Access and Services.

The following section addresses each BMP and the proposals compliance or otherwise.

Asset Protection Zones & Landscaping

An Asset Protection Zone (APZ) is an area between the development (in this instance existing houseboat) and the identified bushfire hazards where the fuels are maintained to a minimum to prevent the spread of fire between a hazard and an asset.

The depth of the APZs is determined by the vegetation structure of the identified bushfire hazard, Fire Danger Index, effective slope and the type of development (residential development or Special Fire Protection Purpose).

In this instance specialist Short Fire Run (SFR) modelling has been used to accurately represent the bushfire threat to the subject site and determine the minimum required APZ.

The NSW RFS have released a document titled 'Short Fire Run - Methodology for assessing bush fire risk for low risk vegetation' which provides an overview of the NSW RFS method for assessing lower threat bush fire hazards for SFR in bush fire prone areas. We have undertaken the SFR modelling for this matter consistent with this document.

Consistent with the NSW Rural Fire Service publication 'Short Fire Run – Methodology for assessing bush fire risk for low risk vegetation' the following assumptions and limitations have been adopted for this assessment.

Assumptions

- Wind direction and speed is constant in the direction of fire spread;
- Slope is considered relatively flat and uniform throughout the length of the fire run;
- Fuel load is distributed equally and is continuous for the entire fire run length;
- The shape of the fire is based on a uniform slope;
- The fire develops from a single ignition point and does not consider time of ignition or fire growth;
- Flaming is restricted to surface, near surface and elevated fuels;
- The fire does not become a crown fire (scorching and intermittent involvement of the canopy fuels permitted, no sustained crown fire).
- Fire run is measured perpendicular to contours.
- No allowance for ember showers has been considered.

Limitations

- Limited to 30 degrees for downslope inputs.
- Limited to 20 degrees for the site slope due to fuel management issues;
- Limited to 15 degrees for upslope;
- Limited to 150 metre fire run length, measured on the effective slope;
- Limited to maximum input of 2 metres in height for elevated fuel (Project Vesta) in forest formations only; and
- Forest and Heath formation fuel loads are as advised by University of Wollongong research.

Figure 06: Aerial view of the subject area showing the assessed transects.

Transect 1 (north):

Data	Recording	Comment
effective slope	0° across	Recorded onsite with inclinometer & verified from 1m contours.
site slope	0° across	Recorded onsite with inclinometer & verified from 1m contours.
elevation of receiver	2.94 metres	Calculated peak elevation of receiver.
vegetation formation and fuel load	Cumberland Dry Sclerophyll Forest 14 t/ha / 24.97 t/ha	Sourced from the on the CumberlandPlain LT10pc_E_2222 vegetation layer. Fuels loads consistent with Appendix A of SFR paper.
distance from asset to vegetation	8 metres	Calculated minimum required to achieve 29kW/m^2
regional climatic data (FFDI)	100	Sourced from NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017).
measured SFR length	35 metres	Measured from high resolution aerial imagery.
average elevated fuel height	0.9 metres	Maximum detailed within Appendix B of SFR paper.
flame temperature	1090K	Consistent with residential development under PBP.

The resultant modelling calculated the maximum radiant heat flux is **25.46 kW/m^2**.

Transect 2 (northeast):

Data	Recording	Comment
effective slope	1° down	Recorded onsite with inclinometer & verified from 1m contours.
site slope	1° down	Recorded onsite with inclinometer & verified from 1m contours.
elevation of receiver	3.35 metres	Calculated peak elevation of receiver.
vegetation formation and fuel load	Cumberland Dry Sclerophyll Forest 14 t/ha / 24.97 t/ha	Sourced from the on the CumberlandPlain LT10pc_E_2222 vegetation layer. Fuels loads consistent with Appendix A of SFR paper.
distance from asset to vegetation	9 metres	Calculated minimum required to achieve 29kW/m^2
regional climatic data (FFDI)	100	Sourced from NSW Rural Fire Service publication 'NSW Local Government Areas FDI' (2017).
measured SFR length	150 metres	Measured from high resolution aerial imagery.
average elevated fuel height	0.9 metres	Maximum detailed within Appendix B of SFR paper.
flame temperature	1090K	Consistent with residential development under PBP.

The resultant modelling calculated the maximum radiant heat flux is **28.18 kW/m^2**.

While proposed Lot 1 is capable of providing a building footprint achieving the 29kW/m^2 requirement, in this instance as the proposal does not result in an increase in density it is not considered necessary to burden the land with these minimum setbacks (by way of easements or other formal instrument).

A future dwelling application within proposed Lot 1 will naturally avoid building in the higher Bushfire Attack Levels due to the inherent higher costs.

All grounds within the subject property not built upon will be maintained as an Asset Protection Zone (Inner Protection Area) as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones'. Note: This will allow for gardens (including native trees and shrubs) in the APZ managed as clumps or islands, covering of no more than 20% of the area.

Access

The subject property has street frontage to Ashwick Circuit to the west. Persons seeking to egress any future dwelling within proposed Lot 1 will be able to do so via existing road infrastructure.

The Property Access requirements detailed in section 5.3.2 of PBP are applied where the most distant external point of any future dwelling is greater than 70 metres of a public road supporting the operational use of fire fighting vehicles.

In this instance the most distant external point of any future dwelling within proposed Lot 1 will be within 70 metres of a public road supporting the operational use of fire fighting vehicles and therefore the access requirements are not applicable.

Attending fire services have comprehensive access to the identified bushfire hazard via the Western Motorway and service trails for hazard reduction and / or fire suppression activities.

The existing access arrangements satisfactorily provide safe operational access to the subject site and water supply for emergency services, while future residents may be seeking to relocate from the area.

Services – Water, electricity & gas

Existing in ground hydrants are available along Ashwick Circuit for the replenishment of attending fire services.

The most distant external point of any future dwelling within the proposed allotments will be <90 metres from an operational hydrant and therefore a Static Water Supply is not required in consideration of AS2419.1 – 2021 and section 5 of PBP.

The existing water supply is considered adequate for the replenishment of attending fire services.

There are no new gas or electrical services proposed as part of this application.

Building Construction

No new building works are proposed as part of this application.

An independent assessment will be required under s4.14 of the *Environmental Planning and Assessment Act* 1997 at the time of any future application for the construction of a new dwelling or alterations and additions within the proposed new allotments.

7.04 Aim & Objectives

The following table details the aim and objectives of *Planning for Bush Fire Protection 2019* and the proposals ability to comply.

Aim / Objective	Comment
The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment.	With the inclusion of the recommendations made herein it is of our opinion that the aim of PBP has been satisfied.
(i) afford buildings and their occupants protection from exposure to a bush fire;	There are APZs available to achieve the minimum requirements for residential subdivisions under Chapter 5 of PBP. In conjunction with the application of the relevant Bushfire Attack Level to any future dwelling the building and its occupants will be afforded protection from exposure to a bushfire.
(ii) provide for a defendable space to be located around buildings;	The separation from the identified bushfire hazards includes managed land entirely within the subject site. A suitable defendable space is provided.
(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;	The application of the relevant Bushfire Attack Level at the time of future building construction will prevent the likely fire spread.
(iv) ensure that appropriate operational access and egress for emergency service personnel and occupants is available;	The subject site has street frontage to Ashwick Circuit to the west. Attending fire services have comprehensive access to the identified bushfire hazard via the Western Motorway and existing service trails for hazard reduction and / or fire suppression activities.

Aim / Objective	Comment
(v) provide for ongoing management and maintenance of bush fire protection measures, (BPMs); and	The grounds within the subject site not built upon are to be maintained in accordance with the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 4 of *Planning for Bush Fire Protection* 2019. Any new landscaping is to comply with the provisions of Table 7.4a and Appendix 4 of PBP.
(vi) ensure that utility services are adequate to meet the needs of firefighters.	Existing in-ground hydrants are available along Ashwick Circuit and surrounding streets for the replenishment of attending fire services. These hydrants are considered to be the logical water supply for fire services undertaking hazard reduction and / or fire suppression activities.

It is therefore of our opinion that the proposal can satisfactorily comply with the aim and objectives of *Planning for Bush Fire Protection 2019*.

7.05 Submission Detail

Clause 44 of the *Rural Fires Regulation* 2013 identifies various items which must be addressed and included within an application for a Bush Fire Safety Authority. The following table outlines these items and includes a corresponding response.

Submission Detail	Response
(a) a description (including the address) of the property on which the development the subject of the application is proposed to be carried out,	See section 6.01
(b) a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in Planning for Bush Fire Protection,	See section 6.02
(c) an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property),	See section 6.03
(d) identification of any significant environmental features on the property,	Not known By others
(e) the details of any threatened species or threatened ecological community under the Biodiversity Conservation Act 2016 *that is known to the applicant to exist on the property,*	Not known By others
(f) the details and location of any Aboriginal object (within the meaning of the National Parks and Wildlife Act 1974*) or Aboriginal place (within the meaning of that Act) that is known to the applicant to be situated on the property,*	No known sites
(g) a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters—	See section 7.0
(i) the extent to which the development is to provide for setbacks, including asset protection zones,	See section 7.03
(ii) the siting and adequacy of water supplies for fire fighting,	See section 7.03
(iii) the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency,	See section 7.03 The surrounding road network was found to have carriageways exceeding the non-perimeter road requirements detailed in PBP.
(iv) whether or not public roads in the vicinity that link with the fire trail network have two-way access,	The immediate surrounding public roads do not link with a registered fire trail network.

Submission Detail	Response
(v) the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response,	See section 7.03
(vi) the adequacy of bush fire maintenance plans and fire emergency procedures for the development site,	There are currently no bush fire maintenance plans or emergency procedures for the development site. It will be encouraged that the future residents of the properties complete a Bushfire Survival Plan.
(vii) the construction standards to be used for building elements in the development,	See section 7.03
(viii) the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development,	There is no existing bushfire sprinkler system, nor is one proposed. See section 7.03 for all bushfire protection measures
(ix) any registered fire trails on the property,	There are no registered fire trails within the subject site.

8.0 Recommendations

The following recommendations are provided as the minimum necessary for compliance with Planning for Bush Fire Protection – 2019. Additional recommendations are provided to supplement these minimum requirements where considered necessary.

Asset Protection Zones

1. The all grounds within proposed allotments which are not built upon are to be maintained in accordance with an Asset Protection Zone (Inner Protection Area) as detailed in the NSW Rural Fire Service's document '*Standards for Asset Protection Zones*' and Appendix 4 of Planning for Bush Fire Protection 2019.

Note: While proposed Lot 1 is capable of providing a building footprint achieving the 29kW/m^2 requirement, in this instance as the proposal does not result in an increase in density it is not considered necessary to burden the land with these minimum setbacks (by way of easements or other formal instrument).

9.0 Conclusion

The Development Application seeks approval for the subdivision of 11 Ashwick Circuit, St Clair (Lot 35 DP 812241).

The proposal will result in the creation of one (1) residential allotment (proposed Lot 1) and an allotment which will be dedicated to Penrith City Council as a drainage reserve, with no dwelling entitlement (proposed Lot 2).

Penrith City Council's Bushfire Prone Land Map identifies the subject site as containing the 100 metre buffer zone from designated Category 1 Vegetation, therefore the site is considered 'bushfire prone'.

The subject development relates to the subdivision of bushfire prone land which can be lawfully used for residential purposes and is therefore classified as integrated development under section 4.46 of the *Environmental Planning and Assessment Act* 1979. The development is captured under section 100B of the *Rural Fires Act* 1997 and must obtain a Bush Fire Safety Authority from the Commissioner of the NSW Rural Fire Service.

It should be noted that while the proposal is technically captured under section 100B of the Rural Fires Act 1997 it must be noted that the proposal will not result in an increase in density, with one of the proposed allotments being dedicated to Penrith City Council as a drainage reserve, with no dwelling entitlement.

All property development within bushfire affected areas is subject to the relevant specifications and requirements detailed in the document 'Planning for Bush Fire Protection - 2019' (PBP).

In accordance with the bushfire safety measures contained in this report, and consideration of the site specific bushfire risk assessment it is our opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development.

We are therefore in support of the subdivision application.

Should you have any enquiries regarding this project please contact me at our office.

Prepared by
Building Code & Bushfire Hazard Solutions P/L

[redacted]

Stuart McMonnies
Manager Bushfire Section
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Fire Protection Association of Australia BPAD – L3 Accredited Practitioner
Accreditation number – BPAD 9400

10.0 Annexure 01

List of Referenced Documents

Australian Building Codes Board (2019). *National Construction Code Volume Two - Building Code of Australia*. ABCB

ELVIS -Elevation -*Foundation Spatial Data*. Elevation.fsdf.org.au. Available at: http://elevation.fsdf.org.au/

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

NSW Department of Planning and Environment (2019). *Planning Portal*. Accessed at: https://www.planningportal.nsw.gov.au/

NSW Rural Fire Service (2019). *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities and Developers*.

NSW Rural Fire Service (2019). *Short Fire Run - Methodology for assessing bush fire risk for low risk vegetation*

Richard Hogan & Co Pty Ltd (undated). Plan of Proposed Subdivision, Draft Issue B, Surveyors reference 20410 – DRAFT D.P.

Rural Fire Service NSW (2005). *Standards for Asset Protection Zones*

Rural Fire Service NSW (2017). *NSW Local Government Areas FDI*

Standards Australia (2018). *AS3959 Construction of buildings in bushfire-prone areas.*

Standards Australia (2014). *AS/NZS 1596 The storage and handling of LP Gas*

Acknowledgements to:

Geoscience Australia
Nearmap
Street-directory.com.au

Attachments

Attachment 01: Bushfire Design Modelling

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 9/12/2021 **Assessment Date:** 30/11/2021

Site Street Address: 11 Ashwick Circuit, St Clair

Assessor: Stuart McMonnies; Bushfire Hazard Solutions

Local Government Area: Penrith **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005
Short Fire Run - Methodology for Assessing Bush Fire Risk for Low Risk Vegetation May 2019; NSW RFS

Run Description: North

Vegetation Information

Vegetation Type: Cumberland DSF

Vegetation Group: Dry Sclerophyll Forests (Shrub/Grass)

Vegetation Slope: 0 Degrees **Vegetation Slope Type:** Level

Surface Fuel Load(t/ha): 14 **Overall Fuel Load(t/ha):** 24.97

Vegetation Height(m): 0.9 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees **Site Slope Type:** Level

Elevation of Receiver(m) Default **APZ/Separation(m):** 8

Fire Inputs

Veg./Flame Width(m): 12.81 **Flame Temp(K):** 1090

Calculation Parameters

Flame Emissivity: 95 **Relative Humidity(%):** 25

Heat of Combustion(kJ/kg 18600 **Ambient Temp(K):** 308

Moisture Factor: 5 **FDI:** 100

Program Outputs

Level of Construction: BAL 29 **Peak Elevation of Receiver(m):** 2.94

Radiant Heat(kW/m2): 25.46 **Flame Angle (degrees):** 53

Flame Length(m): 7.37 **Maximum View Factor:** 0.38

Rate Of Spread (km/h): 1.68 **Inner Protection Area(m):** 8

Transmissivity: 0.88 **Outer Protection Area(m):** 0

Fire Intensity(kW/m): 21674

Short Fire Run Calculations

Fire Run(m): 35 **Length to Breadth Ratio:** 2.82

Full Ellipse Length(m): 56.27 **Headfire Backfire Ratio:** 29.85

Travel Duration (mins): 1.25 **Total Ellipse Length(m):** 36.17

ROS and H/B Ratio: 28.94

Run Description:	Northeast		
Vegetation Information			
Vegetation Type:	Cumberland DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrub/Grass)		
Vegetation Slope:	1 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	14	**Overall Fuel Load(t/ha):**	24.97
Vegetation Height(m):	0.9	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	1 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	9
Fire Inputs			
Veg./Flame Width(m):	54.91	**Flame Temp(K):**	1090
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Level of Construction:	BAL 29	**Peak Elevation of Receiver(m):**	3.35
Radiant Heat(kW/m2):	28.18	**Flame Angle (degrees):**	65
Flame Length(m):	7.75	**Maximum View Factor:**	0.424
Rate Of Spread (km/h):	1.8	**Inner Protection Area(m):**	9
Transmissivity:	0.874	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	23222		
Short Fire Run Calculations			
Fire Run(m):	150	**Length to Breadth Ratio:**	2.82
Full Ellipse Length(m):	60.29	**Headfire Backfire Ratio:**	29.85
Travel Duration (mins):	5	**Total Ellipse Length(m):**	155.02
ROS and H/B Ratio:	31.01		