



Firefront Bushfire Consulting



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BAL 12.5

Proposed Secondary Dwelling

Client: Mr. and Mrs. Refalo

Address: 212-218 The Driftway Londonderry

Lot: 25/-/DP21883

212-218 The Driftway Londonderry 2753

Date: 28 March 2021

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1.0 INTRODUCTION

Fire Front Bushfire Consulting has been engaged to provide a bushfire hazard assessment for the proposed new secondary dwelling to be located at 212-218 The Driftway Londonderry.

The proposed works are classified as a 1a building under Part A6 BCA Volume 2 of the NCC BCA.

This report is provided to assist Penrith City Council to determine an application for the above-mentioned works and to ensure the development meets the aims and objectives of Planning for Bushfire Protection, those objectives are as follows:

- Afford buildings and their occupants protection from exposure to a bush fire.
- 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 the likely fire spread to buildings.
- Ensure that appropriate operational access and egress for emergency service personnel and occupants is available.
- Provide for ongoing management and maintenance of BPMs.
- Ensure that utility services are adequate to meet the needs of firefighters.
- The proposed building is considered to be “Other Development” pursuant to Chapter 8 of Planning for Bushfire Protection 2019.

The proposed dual occupancy building is considered to be “Other Development” pursuant to Chapter 8 of Planning for Bushfire Protection 2019.

In Order to comply with PBP dual occupancies are required to consider the following:

- Satisfy the aim and objectives of PBP outlined in Chapter 1
- Consider any issues listed for the specific purpose for the development set out in this chapter
- Propose an appropriate combination of BPMs.

2.0 PURPOSE OF THIS REPORT

- To ascertain the threat-level the subject building is likely to be exposed to during a bushfire event.
- To assess the proposed works as submitted for consideration under a Development Application with Penrith City Council against the requirements of *Planning for Bushfire Protection 2019* and *Australian Standard 3959-2018* if applicable.
- To advise the applicant of construction standards for the proposed works.

- To advise the applicant if the proposal meets the aims and objectives of *Planning for Bushfire Protection 2019* and complies with *AS3959-2018* if not relying on a performance based approach.
- Identify nearest bushfire prone land, vegetation on both the subject and adjoining lands and identify expected bushfire behaviour impacting on the subject works
- Provide advice to the applicant on potential measures that may improve but not guarantee the buildings chances of survival during a bushfire event.

3.0 SCOPE OF THIS REPORT

This report is limited to the construction requirements and bush fire risk associated with the proposed new detached secondary dwelling. This report does not address the requirements for any surrounding land or existing dwellings, however consideration is given regarding the impact the surrounding land has on the subject works. The report will, however identify the Bushfire Attack Level the proposed works will be exposed to.

4.0 REGULATORY CONTROLS

An assessment has been made against the requirements of the *NCC Building Code of Australia 2019*, *Environmental Planning and Assessment Act 1979 (Part 4, Division 4.3, Section 4.14)*, *Planning for Bushfire Protection 2019* and *AS3959-2018* if applicable.

5.0 THE PROPOSAL

The proposal is for the construction of a detached Class 1 secondary dwelling to be located at the eastern side of the existing dwelling.

6.0 SITE AND ADJACENT DEVELOPMENTS

6.1 DESCRIPTION OF THE SITE

The site consists of an approximately 2.7 hectare lot situated on the southern side of The Driftway. The lot is legally known as Lot: 25/-/DP21883 and zoned RU4. The site is currently occupied by existing class 1 and 10 buildings.



Figure 1: Location of subject site.

6.2 DESCRIPTION OF SURROUNDING LANDS

The site is surrounded on three sides by rural lots of similar size and use as the subject premises. The land use is consistent with “Rural Lifestyle” lots.



Figure 2: Surrounding land use.

7.0 Environmental considerations

The proposed works do not pose a threat to any native habitat.

8.0 SITE ASSESSMENT METHODOLOGY

Appendix 1 of Planning for Bushfire Protection 2019 provides a methodology for undertaking a Site Bushfire Attack Assessment in relation to appropriate classification of relevant vegetation, determining the effective slope, fire danger index, provision of asset protection zones and construction levels. The site was assessed according to the following procedure:

STEP 1: DETERMINE VEGETATION FORMATION

The vegetation was assessed out to a distance of 140m in all directions. The vegetation deemed to have the most significant impact on the development was determined to be “Forest” in accordance with A1.2 of Planning for Bushfire Protection 2019.

This vegetation was measured on site as being located 60m from the proposed building footprint and was located on the opposite side of The Driftway (north of site).



Figure 3: Surrounding vegetation



Photo 1: Managed land to the east, designated area A in figure 3 above.



Figure 4: Surrounding vegetation



Photo 2: Managed land located to the east, designated as area B in Figure 4 above.



Figure 5: Surrounding Vegetation



Photo 3: Managed land located at rear of proposed dwelling and located on subject site in area designated as area C in Figure 5 above.



Figure 6: Surrounding Vegetation



Photo 4: Managed land located to the west in area designated as area D in Figure 6 above.

STEP 2: DETERMINE THE EFFECTIVE SLOPE OF THE LAND

The slope under the vegetation was assessed using Six Maps 10m contours and was determined to be level.

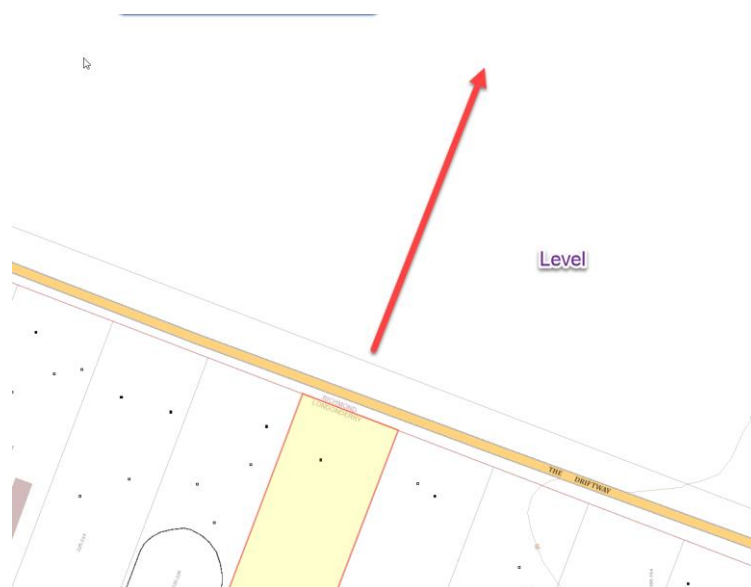


Figure 7: level surface under vegetation

STEP 3: DETERMINE THE FDI FOR THE LOCAL COUNCIL AREA.

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The Rural Fire Service and Penrith City Council's Bushfire Prone land mapping has designated the land as bushfire prone consisting Category 2 and Buffer Zone. Given the land is mapped as bushfire prone, the development must comply with Section 4.14 of the EP&A Act 1979.

This part of the act requires any development on bushfire prone land to comply with Planning for Bushfire Protection 2019. Given the site is located in the Greater Sydney region and is determined to be FDI 100

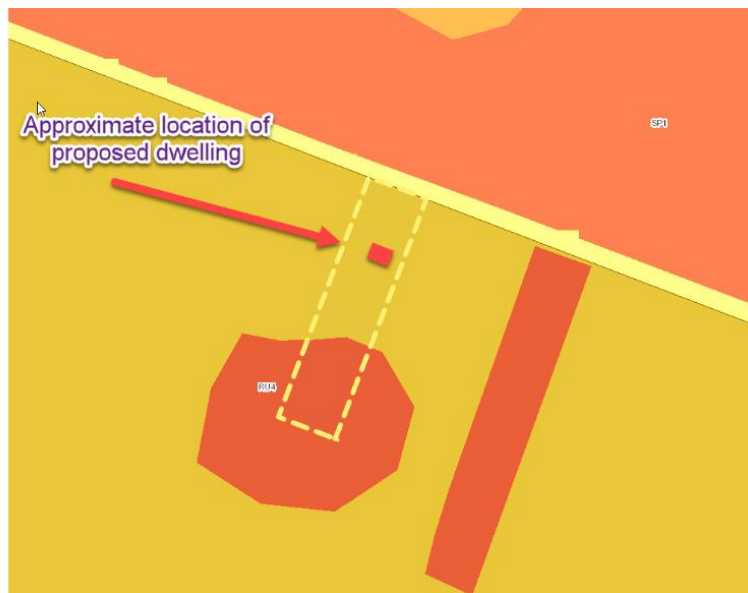


Figure 8: bushfire prone land map showing Category 1 vegetation and buffer zone.

Step 4: DISTANCE TO VEGETATION

The building is located approximately 60m metres from the forest vegetation to the north.



Photo 5: Distance to vegetation

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9.0 CATEGORY OF BUSHFIRE ATTACK:

Using the methodology as specified in in Appendix 1 of PBP the development has been assessed as having the following characteristics:

- Type of development: (Other Development)
- Type of Vegetation: (Forest)
- Slope under the vegetation: (Level)
- FFDI: (100)
- Distance to the vegetation: (60m (forest))

Based on the above information Table A1.12.5 is the appropriate table by which to assess the development, see following page.

Table A1.12.5

Determination of BAL, FFDI 100 – residential developments

KEITH VEGETATION FORMATION	BUSH FIRE ATTACK LEVEL (BAL)				
	BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
	Distance (m) asset to predominant vegetation class				
Rainforest	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 100
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	< 18	18 -< 24	24 -< 33	33 -< 45	45 -< 100
Grassy and Semi-Arid Woodland (including Mallee)	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 100
Forested Wetland (excluding Coastal Swamp Forest)	< 7	7 -< 10	10 -< 14	14 -< 21	21 -< 100
Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
Grassland	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 50

When assessed against Table A1.12.5 above the proposed works would be given a BAL rating of BAL 12.5 for all elevations.

10.0 ACCESS AND SERVICES

Planning for Bushfire Protection 2019 requires development on bushfire prone land to comply with the access and service requirements of Appendix 3 and Table 7.4a of that document.

In this regard the design of access roads should enable residents to be able to safely evacuate the area whilst at the same time permitting firefighting personnel to access the property, be able to support the weight of emergency vehicles and provide all-weather access.

Access:

No specific access requirements apply in a urban area where a 70 metre unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).

The area is not an urban area, therefore, the following requirements apply:

- minimum carriageway width of 4m;
- in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay
- a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches
- provide a suitable turning area in accordance with Appendix 3
- curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; and the minimum distance between inner and outer curves is 6m;
- The cross fall is not more than 10°; and maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads; and
- Dead ends greater than 200m must be provided with a turning head in accordance with A3.3. The access is less than 200m and is not required to have a turning head however there are multiple turning areas on the site.



Photo 6: Multiple areas available for access and turning of vehicles

The site is to be provided with access in accordance with Appendix 3 of PBP. The length of the access will be less than 200m and therefore does not require passing bays, all slope and cross fall requirements can be achieved.



Photo 7: Access road at rear of proposed building

Water Supply:

The table listed below determines both the Performance Requirements and Acceptable Solutions for water supply where reticulated water supply is provided. In this case reticulated water supply is provided, therefore the following acceptable solutions apply.

Although testing of hydrant pressure is beyond the scope of this report the hydrant was located approximately 42m from the proposed site with other hydrants available at regular intervals on The Driftway.

PERFORMANCE CRITERIA	ACCEPTABLE SOLUTIONS
The intent may be achieved where:	
an adequate water supply is provided for firefighting purposes.	- reticulated water is to be provided to the development, where available; and - a static water supply is provided where no reticulated water is available.
- water supplies are located at regular intervals; and - the water supply is accessible and reliable for firefighting operations.	- fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; - hydrants are not located within any road carriageway; and - reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
the integrity of the water supply is maintained.	all above-ground water service pipes external to the building are metal, including and up to any taps.

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Photo 8: Hydrant located directly in front of existing dwelling.

11.0 ASSET PROTECTION ZONES

The Performance Criteria and Acceptable solutions for Asset protection zones for Other Development must be determined in accordance with Table A1.12.2 as shown below. Secondary dwelling dwellings must not be subject to a radiant heat level exceeding 29kw/sqm. In order to achieve BAL 29 the development must not be located closer than 24m from the development. The proposed location is 60m from the vegetation and therefore easily complies with the minimum APZ requirements for secondary dwellings.

Table A1.12.2

Minimum distances for APZs – residential development, FFDI 100 areas ($\leq 29\text{kw/m}^2$, 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
Distance (m) from the asset to the predominant vegetation formation					
Rainforest	11	14	18	23	30
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	24	29	36	45	56
Grassy and Semi-Arid Woodland (including Mallee)	12	16	20	25	32
Forested Wetland (excluding Coastal Swamp Forest)	10	12	16	20	26
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	12	13	15	17

Recommendations for Inner Protection Areas:

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground; tree canopies should be separated by 2 to 5m; and preference should be given to smooth barked and evergreen trees.
- Shrubs create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided; shrubs should not be located under trees; shrubs should not form more than 10% ground cover; and clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.
- Grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and leaves and vegetation debris should be removed.

The site is provided with compliant asset protection zones to all sides of the development.

Recommendations Outer Protection Areas:

- tree canopy cover should be less than 30%;
- canopies should be separated by 2 to 5m.
- Shrubs should not form a continuous canopy
- Shrubs should form no more than 20% of ground cover.
- Grass should be kept mown to a height of less than 100mm; and leaf and other debris should be removed.

12.0 SITING AND DESIGN OF THE PROPOSED DEVELOPMENT

The site is well positioned for egress by occupants and access by emergency services personnel to the development.

The development is located within a large area of managed land with extensive distances to boundaries.

13.0 CONSTRUCTION LEVEL

The buildings is defined as a Class 1a building under Part A6 of the NCC Volume 2 BCA. Given the development must be assessed under Planning for Bushfire Protection pursuant to Clause 4.14 of the Environmental Planning and Assessment Act and Clause 8.3.2 of PBP, the development has been assessed as having a BAL rating of 12.5kw/sqm and must therefore be constructed to the requirements of Sections 3 and 5 of AS3959-2018 and Section 7.5 of PBP.

14.0 LANDSCAPING

Landscaping is to comply with the requirements of Appendix 4 of PBP and maintained in accordance with the RFNSW document entitled “Asset Protection Zone Standards”

Table 7.4a *Continued*

PERFORMANCE CRITERIA		ACCEPTABLE SOLUTIONS	
The intent may be achieved where:			
LANDSCAPING	landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	- compliance with the NSW RFS ‘Asset protection zone standards’ (see Appendix 4); - a clear area of low-cut lawn or pavement is maintained adjacent to the house; - fencing is constructed in accordance with section 7.6; and - trees and shrubs are located so that: - the branches will not overhang the roof; - the tree canopy is not continuous; and - any proposed windbreak is located on the elevation from which fires are likely to approach.	

Choice of species should consider the recommendations made in the paper “Landscape and Building Design for Bushfire Areas” by G.C Ramsay and L. Rudolph:

- Moisture content of leaves
- Volatile oil content of leaves
- Mineral Content of leaves
- Leaf fineness
- Density of foliage
- Continuity of plant form
- Height of lowest foliage above ground
- Size of plant
- Dead foliage on the plant
- Bark Texture
- Quantity of ground fuels
- Fineness of ground fuels
- Compaction ability of ground fuels

15.0 BUSHFIRE HAZARD REDUCTION RECOMMENDATIONS

Vegetation Management:

- Maintain a clear area of low cut lawn or pavement adjacent to the house
- Keep areas under fences, fence posts and gates and trees raked and cleared of fuel
- Utilise non-combustible fencing and retaining walls
- Breaking up the canopy of trees and shrubs with defined garden beds

- Organic mulch should not be used in bush fire prone areas and non flammable material should be used as ground cover, eg Scoria, pebbles, recycled crushed bricks.
- Planting trees and shrubs such that: - the branches will not overhang the roof; - the tree canopy is not continuous; and - there is a windbreak in the direction from which fires are likely to approach.

Property Maintenance:

Prior to each bushfire season special attention should be made to the following tasks:

- Removal of material such as litter from the roof and gutters
- Ensure painted surfaces are in good condition with decaying timbers being given particular attention to prevent the lodging of embers within gaps
- Check pumps and water supplies are available and in working order
- Driveways are in good condition with trees not being too close and forming an obstacle during smoky conditions
- Check tiles and roof lines for broken tiles or dislodged roofing materials
- Screens on windows and doors are in good condition without breaks or holes in flyscreen material and frames are well fitting into sills and window frames
- Drenching or spray systems are regularly tested before the commencement of the fire season
- Hoses and hose reels are not perished and fittings are tight and in good order
- Doors are fitted with draught seals and well maintained
- Mats are of non combustible material or in areas of low potential exposure
- Woodpiles, garden sheds and other combustible materials are located downslope and well away from the house.
- ensure that vegetation does not provide a continuous path to the house;
- Remove all noxious and environmental weeds
- Plant or clear vegetation into clumps rather than continuous rows
- Prune low branches two metres from the ground to prevent a ground fire from spreading into trees
- Locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission
- Plant and maintain short green grass (grass not to exceed 100mm in height) around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling
- Ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable

ground cover such as pebbles and crush tile; and • avoid erecting brush type fencing and planting “pencil pine” type trees next to buildings, as these are highly flammable.

- Ensure all leaf material is removed regularly from surrounding areas
- Future planting of unsuitable species of trees with the potential to impact on the survivability of the building post-approval should be discouraged
- Keep all grassland located on the site managed to a height not exceeding 100mm out to either the adjoining boundaries of 50m
- Ensure a maintenance schedule is enacted for the maintenance of all asset protection zones located on the property.

Frequency of Maintenance:

Although maintenance should be continued throughout the year, special attention should be given to the items mentioned above in late spring prior to the beginning of the bushfire season. However, given the increasing effects of Climate Change the frequency and timing of management may have to be adjusted depending on seasonal variations.

A sensible approach to maintenance with lawns being mowed every 2 – 3 weeks depending on seasonal changes (again, may require more frequent attention to maintain height not exceeding 100mm) is to be implemented along with implementation of “Property Maintenance” schedule in accordance with items listed on previous page.

16.0 CONCLUSION

The site has been designated as bushfire prone land (Category 2 and Category1). The site is currently occupied by an existing Class 1 dwelling.

The vegetation (forest) seen as having the most significant impact on the development was located 60m to the north of the proposed building footprint on the opposite side of The Driftway.

The site has excellent provision for property access with multiple, all-weather areas available for appliances to enter and exit in a forward direction.

The site is to be provided with suitable services and access to comply with Chapter 5 and Appendix 3 of PBP with a Hydrant being located directly in front of the property.

Given the development is considered to be “Other Development” pursuant to Chapter 8 of PBP the building is to be subject to a bushfire attack level not exceeding BAL 29. In this regard the development easily achieves this requirement and is subject to a bushfire attack level of BAL 12.5.

The development achieves the performance criteria of PBP in the following matters:

Is a defensible space provided onsite and has the APZ been determined in accordance with Chapter 3 and Table A1.12.2 of PBP 2019.	YES
Can the asset protection zone be maintained over the life of the development	YES
Is the building sited and designed to minimise the risk of attack	YES
Is it demonstrated the building can withstand bushfire attack in the form of embers, wind and radiant heat	YES
Is there safe operation access for emergency service and residents – does the access and egress comply with Appendix 3 and Table 7.4a	YES
Is there adequate water supply and electrical services and compliant access to services for emergency services.	Yes, however hydrant testing that undertaken as part of this report.
Is gas and electrical supply located to minimise risk to building	YES
Is landscaping designed to minimise flame and radiant heat	YES
The adequacy of sprinkler systems and other fire protection measures to be incorporated into the development;	N/A
The proposal does not increase the bushfire risk to adjoining land	YES
The extent to which the proposed development deviates from the standards, specific objectives, performance criteria and acceptable solutions set out in Chapters 5 to 8 of PBP.	YES – achieves all the performance criteria
Does the development not result in an increased bushfire management and maintenance responsibility on adjoining land owners	YES

Implementation of the recommendations of this report will improve the developments ability to withstand a bushfire event however neither this report nor its recommendations guarantee in any way survival of the dwelling or its occupants.

Signed



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