

Bushfire Planning & Design

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Bushfire Hazard Assessment

7 Twynam Road Davidson 2085 (Lot 11/167/DP242262).



Project Details

Assessed as:	Residential Infill		
Assessed by	Matthew Noone (BPAD Accreditation No. BPAD-PD 25584)		
Highest BAL on any facade	BAL-12.5		
Planning for Bushfire Protection (2019) Compliance	The development conforms to the relevant specification and requirements of Planning for Bushfire Protection in accordance with Section 4.14 of the Environmental Planning and Assessment Act 1979.		
Project Description	Sole Occupancy Dwelling.		
Report Number	BR-434721-A		
Date of Issue	19/11/2021	Report Validity:	1 year from date of issue



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7 Twynam Road Davidson 2085

19/11/2021



BUSHFIRE RISK ASSESSMENT CERTIFICATION

Development Address	7 Twynam Road Davidson 2085.
Parcel number	(Lot 11/167/DP242262).
Development description	Sole Occupancy Dwelling.
Drawings Reviewed.	Attached to report BR-434721.
Assessed Bushfire Attack Level	BAL-12.5
Does the assessment rely on alternate solutions?	No.
Assessed by Matthew Noone BPAD Accreditation Scheme No.	FPA No. BPAD-PD 25584
Certificate Number:	BR-434721-A

I hereby certify, in accordance with s.4.14 of the Environmental Planning and Assessment Act 1979 that;

1	I am a person recognised by the NSW Rural Fire Service as a qualified consultant in bushfire risk assessment; and
2	Subject to the recommendations contained in the attached Bushfire Risk Assessment Report the proposed development conforms to the relevant specifications and requirements*

* The relevant specifications and requirements being; specifications and requirements of the document entitled Planning for Bush Fire Protection prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other document as prescribed by s.4.14 of the Environmental Planning and Assessment Act 1979.

I am aware that the Bushfire Assessment Report, prepared for the above mentioned site is to be submitted in support of a development application for this site and will be relied upon by Council as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with Planning for Bushfire Protection (2019).

The following have been provided and or included in our assessment.

- ☒ - Bushfire Risk Assessment Report.
- ☒ - Recommendations.
- ☒ - Statement of vegetation impact in relation to APZ.

DATE	ISSUED TO	REV.	Comments
19/11/2021	Clarendon Homes	A	Issued to support Development Application

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Bushfire Planning & Design cannot be held liable for the loss of life or property caused by a bushfire event. This report has considered the relevant planning instruments, bushfire constructions codes and practices applicable at the time of writing. Should additional information be provided after this report has been issued, we reserve the right to review and if necessary modify our report. Bushfire Planning and Design has no control over workmanship, buildings degrade over time and vegetation if not managed will regrow. In addition legislation and construction standards are subject to change. Due to significant variance of bushfire behaviour, we do not guarantee that the dwelling will withstand the passage of bushfire even if this development is constructed to the prescribed standards.

AS3959 (2018) states *"It should be borne in mind that the measures contained in this Standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature of behaviour of fire, and extreme weather conditions."*

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This report has been prepared by Matthew Noone trading as Bushfire Planning and Design. Matthew Noone holds a BPAD Level 2 accreditation with the Fire Protection Association of Australia. Under the BPAD accreditation scheme a BPAD Level 2 consultant can provide advice and undertake all types assessments with the exception of alternate solutions. In the event that alternate solution is proposed it will be undertaken outside of our accreditation. Alternate solutions are considered a deviation from the prescribed standards and as per s.4.14 of the Environmental Planning and Assessment Act (1979) are required to be required to be referred to the New South Wales Rural Fire Service (RFS) for review.

This report has been based on our interpretation of Planning for Bushfire Protection (2019), AS3959 (2018) and the methodology for site specific bushfire assessment. As a consultant, our view can be subjective. Our opinions may differ from the opinions provided by you the Client (or Client Representative), the Council, the RFS or another bushfire consultant. The Rural Fire Service (RFS) has a higher authority and can upon their review, increase a nominated BAL-rating or entirely reject a development proposal. Any such recommendations made by the RFS take precedence. Our role is intermediary between our Client (or Client Representative) and the consenting authority. We apply our knowledge of the relevant bushfire protection standards to provide the best possible outcome for our Client (or Client Representative), both from a bushfire safety and financial perspective. Should the RFS modify our recommendations or reject the proposal to which this report relates to we will not be held liable for any financial losses as a result. By using this document, you the Client (or Client Representative) agree to and acknowledge the above statements.

Bushfire Planning and Design accepts no liability or responsibility for any use or reliance upon this report and its supporting material by any unauthorized third party. The validity of this report is nullified if used for any other purpose than for which it was commissioned. Unauthorized use of this report in any form is deemed an infringement of our intellectual property. By using this document to support your development you the Client (or Client representative) agree to these terms.

TABLE OF CONTENTS

Page No.

05	SECTION 01 - BACKGROUND AND BRIEFING NOTES
05	1.1 BUSHFIRE PRONE LAND
06	1.2 DEVELOPMENT PROPOSAL
06	1.3 REGULATORY FRAMEWORK
07	1.4 SITE LOCATION AND DESCRIPTION
08	SECTION 02 - BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT
08	2.0 INTRODUCTION
08	2.1 SLOPE DETERMINATION
08	2.2 PREDOMINANT VEGETATION CLASS
09	2.2.1 VEGETATION PHOTOS
10	2.3 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT.
10	2.4 RECOMMENDED ASSET PROTECTION ZONES (APZs).
12	SECTION 03 - ASSET PROTECTION ZONES (APZs)
12	3.0 APZ PERFORMANCE CRITERIA (PBP 2019)
13	3.1 - INNER APZ (IPA) GUIDELINES
13	3.2 - OUTER APZ (OPA) GUIDELINES
14	SECTION 04 - CONSTRUCTION
15	SECTION 05 - ACCESS
17	SECTION 06 - WATER
18	SECTION 07 - ELECTRICITY & GAS
19	SECTION 08 - RECOMMENDATIONS
20	SECTION 09 - CONCLUSION
21	SECTION 10 - REFERENCES
21	SECTION 11 - APPENDICES

SECTION 01 - BACKGROUND AND BRIEFING NOTES

The subject site whether in whole or part is recorded as bushfire affected on a relevant map certified under Section 10.3 (2) of the Environmental Planning and Assessment Act 1979 (Refer figure 1.1). The development relates to the development of bushfire prone land and therefore must address the legislative requirements stipulated in Section 4.14 of the Environmental Planning and Assessment Act 1979. The development is required to comply with the New South Wales Rural Fire Service document Planning for Bushfire Protection (2019).

1.1 BUSHFIRE PRONE LAND

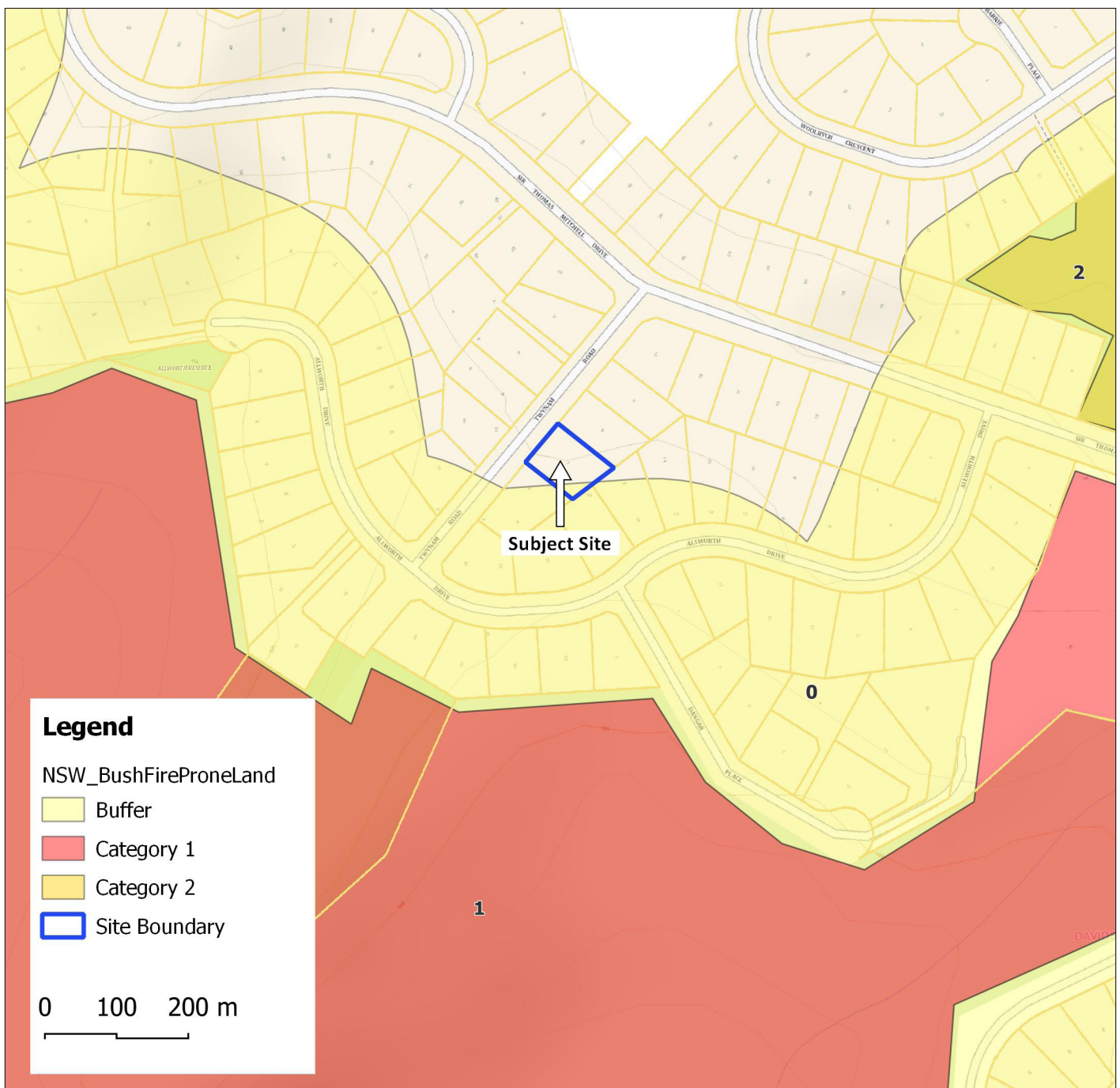


Figure 1.1: Bushfire Prone Land Map (NSW Planning Portal (2021) found at <https://www.planningportal.nsw.gov.au>) accessed 19/11/2021.

1.2 DEVELOPMENT PROPOSAL

The development relates to the construction of a sole occupancy dwelling. The existing dwelling will be demolished to facilitate the construction of the new dwelling.

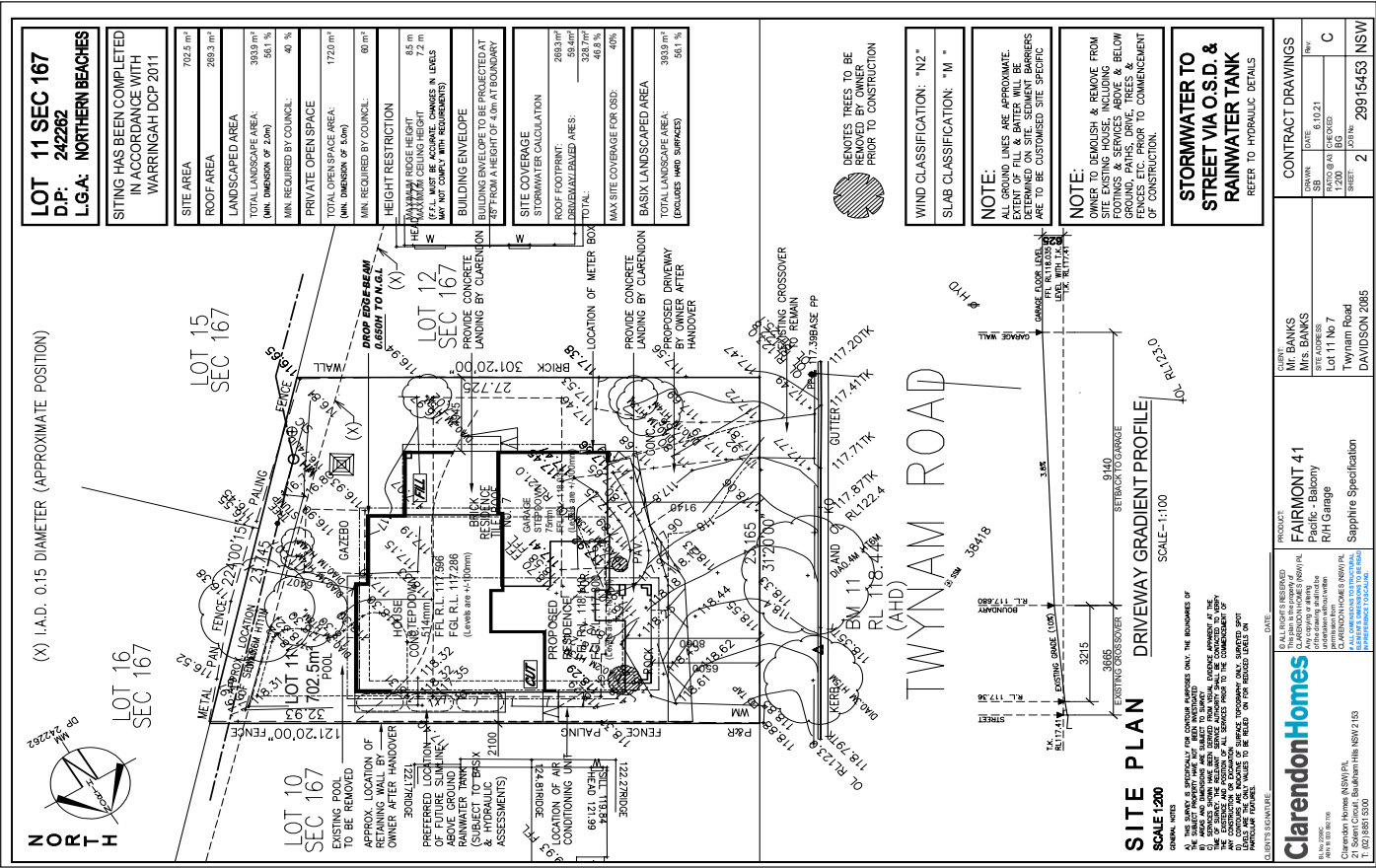


Figure 1.2: Architectural Concept Image

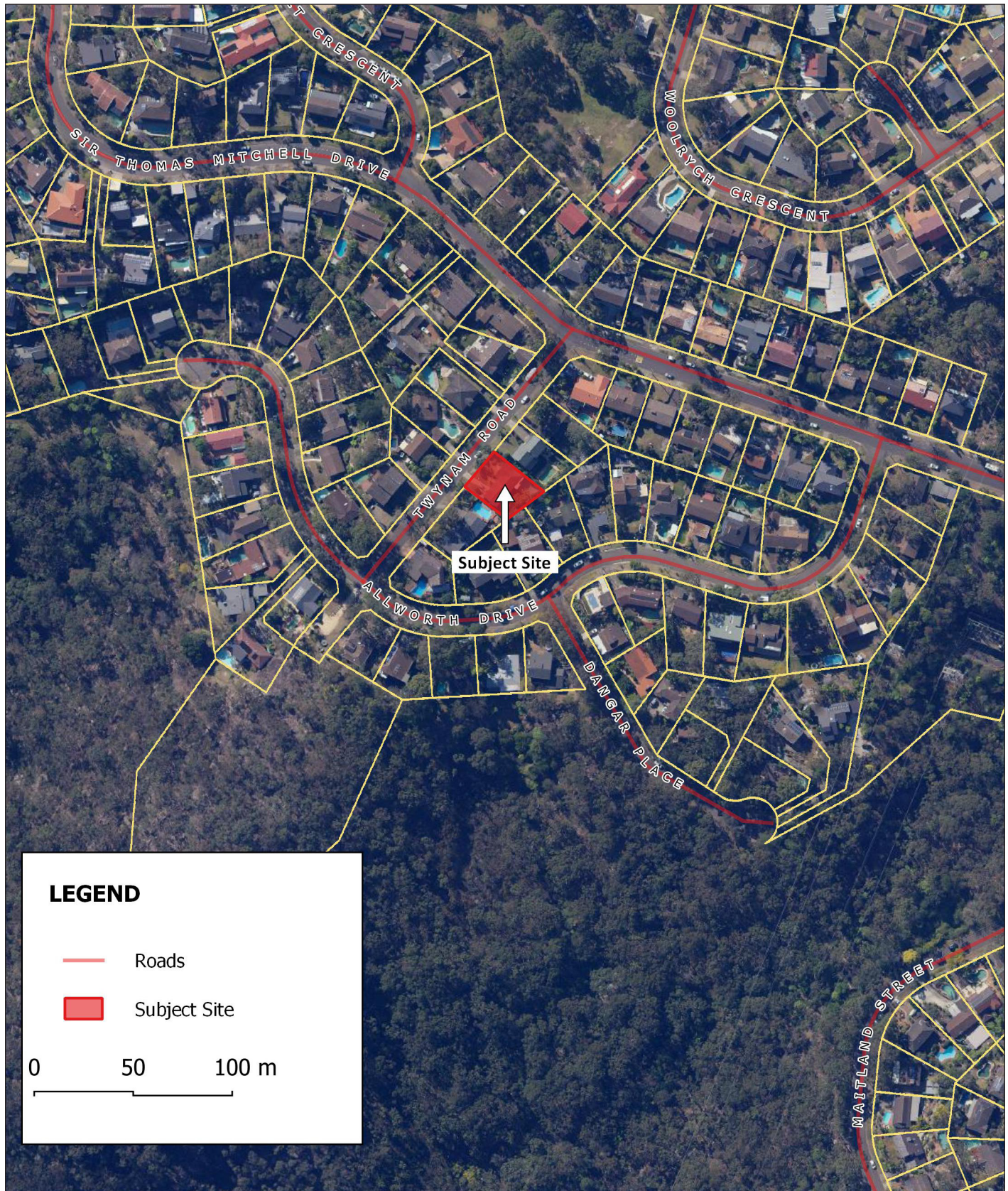
1.3 REGULATORY FRAMEWORK

The main legislation, planning instruments, development controls and guidelines that are related to this project are as follows;

- 4.14 Consultation and development consent— certain bush fire prone land
- (1) Development consent cannot be granted for the carrying out of development for any purpose (other than a subdivision of land that could lawfully be used for residential or rural residential purposes or development for a special fire protection purpose) on bush fire prone land unless the consent authority:
- (a) is satisfied that the development conforms to the specifications and requirements of the document entitled Planning for Bush Fire Protection, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning (or, if another document is prescribed by the regulations for the purposes of this paragraph, that document) that are relevant to the development (“the relevant specifications and requirements”), or
- (b) has been provided with a certificate by a person who is recognised by the NSW Rural Fire Service as a qualified consultant in bush fire risk assessment stating that the development conforms to the relevant specifications and requirements. (EPA & A, 1979).

1.4 SITE LOCATION AND DESCRIPTION

The subject site is located in Davidson which is within the Northern Beaches Local Government Area (LGA). An existing dwelling is located on the site. The subject site represents a well managed residential allotment. The allotment is surrounded by managed residential curtilage to the north, south, east and west. The subject site and surrounding allotments are zoned R2 Low Density Residential. Forest vegetation is located to the south of Allworth Drive.



SECTION 02 - BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

2.0 INTRODUCTION

For the purpose of this bushfire assessment, the vegetation is required to be described to a distance of 140m from the boundary and the slope to 100m from boundary. Vegetation type and slope under vegetation are the factors that will significantly affect bushfire behaviour.

‘Research has shown that 85% of buildings are lost in the first 100m from bushland and that ember attack is a significant form of attack on properties’ (RFS 2006).

2.1 SLOPE DETERMINATION

The effective slope has been assessed for a distance of at least 100m from the proposed development. The slope data has been calculated from a 1m LiDAR Digital Elevation Model (DEM). The source data sets have been captured to standards that are generally consistent with the Australian ICSM LiDAR Acquisition Specifications which require a fundamental vertical accuracy of at least 0.30m (95% confidence) and horizontal accuracy of at least 0.80m (95% confidence). The slope arrows indicated in figure A represent the slope calculated across the length of the arrow direct from the digital elevation model. The calculated slope as shown in Figure A has not been manipulated or modified in any way.

2.2 PREDOMINANT VEGETATION CLASS

This assessment includes vegetation both within and external to the site boundaries. Where mixes of vegetation formations are located together, the vegetation formation providing the greater hazard shall be used for the purpose of assessment. The combination of vegetation and slope that yields the worst case scenario shall be used (A1.2 PBP 2019).

Space left intentionally blank.

2.2.1 VEGETATION PHOTOS



Photo 1: Forest to the south (Taken from Dangar Place).



Photo 2: Forest to the south (Taken from Dangar Place).

2.3 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT.

To clarify the findings below, Forest vegetation is located greater than 95m to the south of the proposed dwelling. The land in all other directions is managed residential land for 100m.

Based on the parameters identified in Table 1 below, the proposed dwelling is to be constructed to BAL-12.5 as specified in AS3959 (2018).

TABLE 1 (To be read in conjunction with Figure A).						
LGA = Northern Beaches Council				Forest Fire Danger Index = FDI 100		
ASPECT ¹	Vegetation Class ²	Max Effective Slope ³	Site slope ³	Required APZ ⁴	Proposed APZ / EML ⁵	BAL-Rating
S	Forest	10-15 ⁰ D-S	N/A	77-100m	> 95m	BAL-12.5
AOD	Managed Land					
Abbreviations						
AOD All other directions		EML Extent of managed land			NVC Narrow vegetation corridor	

¹	Cardinal direction from each proposed building facade based on grid north.
²	Vegetation Classifications are as described in PBP (2019) A1.2.
³	Site slope is calculated from 1m LiDAR contours.
⁴	Minimum APZ required stated as Acceptable Solutions within Table 1.12.2 and A1.12.5. PBP (2019).
⁵	Actual dimensional setback from the face of the building to the assessed vegetation. Achieved Asset Protection Zone (APZ) or extent of managed land (EML).
⁶	Where the direct line of sight between the proposed building and assessed vegetation is obstructed (by a wall or building) the assessed rating can be lowered by one BAL-rating (PBP 2019, s. A1.8).
⁷	Remnant bushland and narrow vegetation corridors (NVC) as stated in PBP (2019) s.A1.11 are assessed as rainforest as a simplified approach or be assessed as Short Fire Run using method 2 (AS3959).
⁸	Deeming provisions for grassland s.7.9 PBP (2019).
⁹	BAL-rating determined via method 2 (AS3959)
¹⁰	Exotic vegetation assessed as Rainforest as per PBP (2019) Table A1.9.

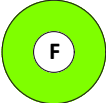
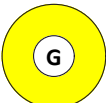
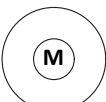
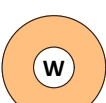
2.4 APZ PROVISIONS.

No specific Asset Protection Zone (APZ) required. The subject site is surrounded by managed residential land. The inherent management of the subject site and surrounding allotments is sufficient to achieve the nominated BAL-ratings and defensible space. The site is to be managed as an inner APZ for perpetuity. No vegetation is required to be removed for the purpose of managing an APZ.

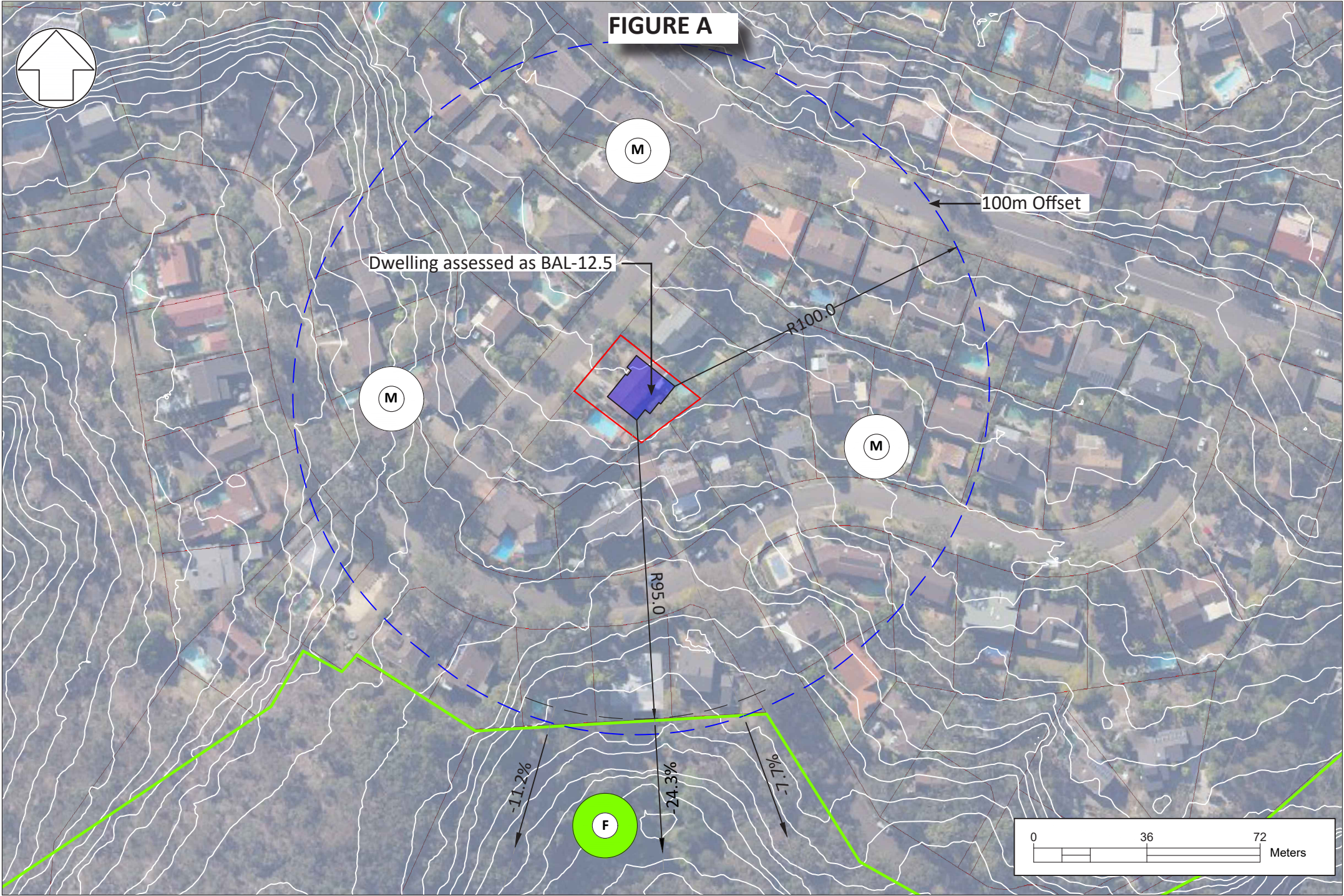
BUSHFIRE PLANNING AND DESIGN

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VEGETATION KEY (solid)

-  Forest
-  Grassland
-  Managed Land
-  Under Development
-  Woodland

- LEGEND BAL (dashed)
- | | | |
|---|----------|---|
|  | BAL-FZ |  |
|  | BAL-40 |  |
|  | BAL-29 |  |
|  | BAL-19 |  |
|  | BAL-12.5 |  |
|  | BAL-LOW |  |



50m Offset 100m Offset Site Hydrant

SECTION 03 - ASSET PROTECTION ZONES (APZs)

Intent of measures: to minimise the risk of bush fire attack and provide protection for emergency services personnel, residents and others assisting fire fighting activities.

3.0 APZ PERFORMANCE CRITERIA (PBP 2019)

- | | |
|---|---|
| • | APZs are to be provided commensurate with the construction of the building. |
| • | A defensible space is to be provided. |
| • | APZs are to be managed and maintained to prevent the spread of a fire to the building. |
| • | The APZ is to be provided in perpetuity. |
| • | APZ maintenance is to be practical, soil stability is not compromised and the potential for crown fires is minimised. |

The asset protection zones (APZ) requirements have been derived from the methodology of A1.12.2 or A1.12.3 in Appendix 1 of PBP (2019). Asset protection zones and in particular the Inner Asset Protection Zones are critical for providing defensible space and reducing flame length and rate of spread (PBP 2019). APZs are designed to provide sufficient open space for emergency workers to operate and for occupants to egress the site safely. They are divided into Inner and Outer Asset Protection Zones (IPAs and OPAs) and are required to be maintained for the life of the development. The IPA provides for defensible space and a reduction of radiant heat levels at the building line and the OPA provides for the reduction of the rate of spread and filtering of embers.

GENERAL RECOMMENDATIONS

- | | |
|---|--|
| • | The APZ should be located completely within the boundary of the site. The required APZ will often be satisfied by surrounding managed land. |
| • | Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions (refer to Section 3.1 and 3.2). |
| • | The APZ should not be located on slopes greater than 18° unless terracing is introduced. |
| • | Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions |
| • | A clear area of low-cut lawn or pavement is maintained adjacent to the asset requiring protection. |

3.1 - INNER APZ (IPA) GUIDELINES

The Inner APZ (IPA) is the managed area closest to the asset (eg. dwelling). The IPA is managed to minimal fuel conditions and aims to mitigate the impact of direct flame contact and radiant heat on the development. The IPA also aims to provide defensible space.	
TREES	
•	Canopy cover should be less than 15% (at maturity) within the Inner APZ.
•	Trees (at maturity) should not touch or overhang the building.
•	Lower limbs should be removed up to a height of 2m above ground.
•	Canopies should be separated by 2 to 5m.
•	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.
•	Shrubs should not be located under trees shrubs should not form more than 10% ground cover.
•	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).
•	Leaves and vegetation debris should be removed.

3.2 - OUTER APZ (OPA) GUIDELINES

The Outer APZ (OPA) is the part of the APZ that is located between the IPA and the bushfire vegetation threat. The reduction in the available fuels and canopy connections in the OPA aims to mitigate the intensity of an approaching fire and restricts the pathways to crown fuels thus reducing the level of direct flame, radiant heat and ember attack on the IPA and asset (dwelling).	
TREES	
•	Canopy cover should be less than 30% (at maturity) within the Outer APZ.
•	Trees should have canopy separation canopies should be separated by 2 to 5m.
SHRUBS	
•	Shrubs should not form a continuous canopy.
•	Shrubs should form no more than 20% of ground cover.

SECTION 04 - CONSTRUCTION

PERFORMANCE CRITERIA (PBP 2019)

It must be demonstrated that the proposed building can withstand bush fire attack in the form of wind, smoke, embers, radiant heat and flame contact. The BAL construction requirements have been determined in accordance with the appropriate table from A1.12.2 to A1.12.7 (PBP 2019) and in accordance with the NCC and as modified by section 7.5.

The building requirements for the specified BAL-rating will mitigate bush fire attack in the form of wind, smoke, embers, radiant heat and flame contact. The proposed dwelling is to be constructed to BAL-12.5 as indicated in Figure A and as specified in AS3959 (2018). This includes the general requirements of Section 3 of AS3959 (2018) and the additional construction requirements stipulated in s.7.5 of the New South Wales Rural Fire Service (RFS) document Planning for Bushfire Protection (PBP 2019).

It is the building contractor's responsibility to source a copy of the relevant AS3959 (2018) standard to ensure the proposed development is constructed to the correct BAL-rating specifications.

- | | |
|---|--|
| • | Where the fence is within 6m of a building or in areas of BAL-29 or greater, they should be made of non-combustible material only. |
| • | There are no bush fire protection requirements for Class 10a buildings located more than 6m from a dwelling in bush fire prone areas. Where a Class 10a building is located within 6m of a dwelling it must be constructed in accordance with the NCC. |

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SECTION 05 - ACCESS

Intent of measures: To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area.

PERFORMANCE CRITERIA (PBP 2019)

- | | |
|---|--|
| • | Fire-fighting vehicles are provided with safe, all-weather access to structures and hazard vegetation. |
| • | The capacity of access roads is adequate for fire-fighting vehicles. |
| • | There is appropriate access to water supply. |
| • | Fire-fighting vehicles can access the dwelling and exit the property safely. |

PUBLIC ROADS

Twynam Road is a sealed public road. The public road system is deemed to be adequate for emergency services appliances. Figure 5.1 shows the road systems in the area.

PROPERTY ACCESS

There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided 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 fire fighting vehicles

ADDITIONAL COMMENTS IN RELATION TO ACCESS

The proposed development can comply with the intent of PBP (2019) with regards to site access requirements.

FIGURE 5.1



SECTION 06 - WATER

Intent of measures: To provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

PERFORMANCE CRITERIA (PBP 2019)

- An adequate water supply is to be provided for fire-fighting purposes.
- Water supplies are to be located at regular intervals.
- The water supply is to be accessible and reliable for fire-fighting operations.
- Flows and pressure are to be appropriate
- The integrity of the water supply is to be maintained.
- A static water supply is to be provided for fire-fighting purposes in areas where reticulated water is not available.

WATER - SPECIFIC REQUIREMENTS

The proposed development can comply with the PBP (2019) with regards to water requirements.

Reticulated water is provided however the hydrant sizing, spacing or pressures have not been tested. No additional water for the suppression of bushfire is required for the proposed development.

The following points are to be adhered to for the life of the development.

- All above-ground water service pipes (including taps and connections) external to the building are to be metal.

ADDITIONAL COMMENTS IN RELATION TO THE PROVISION OF WATER

The proposed development can comply with PBP (2019).

SECTION 07 - ELECTRICITY & GAS

Intent of measures: To provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

PERFORMANCE CRITERIA (PBP 2019)

- Location of electricity services is to limit the possibility of ignition of surrounding bush land or the fabric of buildings.
- Location and design of gas services is not to not lead to the ignition of surrounding bushland or the fabric of buildings.

ELECTRICITY AND GAS - SPECIFIC REQUIREMENTS

The proposed development can comply with the PBP (2019) with regards to electricity and gas requirements. The following points are to be adhered to (where applicable) for the provision of electricity and gas services where applicable.

ELECTRICITY REQUIREMENTS

- Where practicable place electrical transmission lines are underground or,
- If overhead electrical transmission lines are proposed:- lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).
- No part of a tree is to be closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

GAS REQUIREMENTS

- Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is to be used.
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side.
- Connections to and from gas cylinders are to be metal.
- Polymer-sheathed flexible gas supply lines are not to be used.
- Above-ground gas service pipes are to be metal, including and up to any outlets.

ADDITIONAL COMMENTS IN RELATION TO THE PROVISION OF ELECTRICITY AND GAS.

The proposed development can comply with PBP (2019) with regard to the provision of gas and electricity.

SECTION 08 - RECOMMENDATIONS

The following points are recommended for inclusion in the DA conditions of consent;

1.	Construction	Construct the dwelling to BAL-12.5 (Section 2 & 4).
2.	APZs	Site to be managed as an inner APZ for perpetuity (Section 3).
3.	Access	None.
4.	Services	All above ground water, electricity and gas fittings are to be metal (Section 6 & 7).
5.	In the event that Council or the NSW Rural Fire Service modifies our recommendations then this report should no longer be referred to. The bushfire requirements as stated in the DA Consent conditions will take precedence.	
6.	We strongly recommend that the applicant cross references the bushfire requirements within the DA consent conditions and our report and alert us to any discrepancies.	

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SECTION 09 - CONCLUSION

The development relates to the construction of a sole occupancy dwelling. The existing dwelling will be demolished to facilitate the construction of the new dwelling.

The development is captured under Section 4.14 of the Environmental Planning and Assessment Act 1979; Consultation and development consent – certain bush fire prone land. For the purpose of bushfire assessment the development is considered infill development as described in the New South Wales Rural Fire Service document Planning for Bushfire Protection (2019).

The subject site is located in Davidson which is within the Northern Beaches Local Government Area (LGA). An existing dwelling is located on the site. The subject site represents a well managed residential allotment. The allotment is surrounded by managed residential curtilage to the north, south, east and west. The subject site and surrounding allotments are zoned R2 Low Density Residential. Forest vegetation is located to the south of Allworth Drive.

No specific Asset Protection Zone (APZ) required. The subject site is surrounded by managed residential land. The inherent management of the subject site and surrounding allotments is sufficient to achieve the nominated BAL-ratings and defensible space. The site is to be managed as an inner APZ for perpetuity. No vegetation is required to be removed for the purpose of managing an APZ.

The proposed development is assessed as BAL-12.5 as indicated in Figure A and as specified in AS3959 (2018) the Australian Standard for the Construction of Buildings in a Bushfire Prone Area.

The project can comply with the construction requirements of AS3959 (2018) and the performance requirements of the BCA. The objectives and performance requirements of PBP (2019) are also achieved.

Site access, including access via the public road system is suitable for emergency response vehicles. The development complies with PBP (2019) with regards to the provision of water. The requirements for electricity and gas can also be complied with.

Should Council or the NSW Rural Fire Service have any objection to any part of this report, please provide the professional courtesy to get in contact to discuss.

Regards,



Matthew Noone

Grad.Dip. Design for Bushfire Prone Areas.

BSc (Geology)

0406077222

T/A Bushfire Planning and Design



SECTION 10 - REFERENCES

AS3959 (2018)	Australian Standard, Construction of buildings in bushfire-prone areas, AS 3959, Third edition 2018 Standards Australia International Ltd, Sydney.
BCA (2019)	Building Code of Australia 2019, Building Code of Australia, Australian Building Codes Board, Canberra 2019.
EPA Act (1979)	Environmental Planning and Assessment Act 1979, NSW Government, NSW, legislation found at www.legislation.nsw.gov.au
PBP (2019)	Planning for Bushfire Protection, a Guide for Councils,Planners, Fire Authorities, Developers and Home Owners. Rural Fire Service 2019, Australian Government Publishing Service, Canberra.
RFS (2015)	Rural Fire Service, Guide For Bush Fire Prone Land Mapping, Version 5b.

SECTION 11 - APPENDICES

Appendix A - Architectural Drawings.

APPENDIX A - ARCHITECTURAL DRAWINGS



