



BUSHFIRE THREAT ASSESSMENT

FOR
A PROPOSED DWELLING
AT
LOT 925 REDWOOD DRIVE
GILLIESTON HEIGHTS

Prepared by:

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Disclaimer

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



Executive Summary

A Bushfire Threat Assessment Report (BTA) has been prepared by Firebird ecoSultants Pty Ltd at the request of Hudson Homes for a proposed dwelling at Lot 925 Redwood Drive Gillieston Heights. The report forms part of the supporting documentation for a DA to be submitted to Maitland City Council (MCC).

The report demonstrates compliance with Planning for Bushfire Protection 2006 (NSW RFS, 2006), AS3959-2009 Construction of Buildings in Bush Fire Prone Areas and the addendum to Appendix 3 of PBP 2006.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to the proposal. Recommendations are provided with regard to fuel management, access, provision of emergency services, building protection and construction standards to facilitate an acceptable level of bushfire protection.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements for the proposed subdivision:

- The proposed dwelling has been assessed as BAL-12.5
- Fencing – All new fencing and gates shall be constructed in accordance with the NSW Rural Fire Service Guideline: Fast Fact – Fences or Gates in Bushfire Prone Areas.
- Home owners should prepare a Bush Fire Survival Plan refer to the RFS Website http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_Bush_FireSurvivalPlan.pdf



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Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-2009	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BFPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BFSA	Bush Fire Safety Authority
CC	Construction Certificate
DSC	Dungog Shire Council
<i>EPA Act</i>	<i>NSW Environmental Planning and Assessment Act 1979</i>
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2006
PoM	Plan of Management
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation



CONTENTS

1	INTRODUCTION	1
1.1	Site Particulars	1
1.2	Description of the Proposal	3
1.3	Legislative Requirements	3
1.4	Objectives of Assessment	3
2	METHODOLOGY	4
2.1	Vegetation Assessment	4
2.2	Slope Assessment	4
3	SITE ASSESSMENT	5
3.1	Vegetation & Slope Assessment	5
4	BUSHFIRE ATTACK ASSESSMENT	ERROR! BOOKMARK NOT DEFINED.
4.1	Bushfire Attack Assessment	Error! Bookmark not defined.
5	DWELLING DESIGN & CONSTRUCTION	6
5.1	Determination of Bushfire Attack Levels	7
6	DWELLING DESIGN & CONSTRUCTION	9
7	BUSH FIRE PROTECTION MEASURES FOR INFILL DEVELOPMENT	11
7.1	Asset Protection Zones	11
7.2	Construction Standards and Design	11
7.3	Access Requirements	12
7.4	Water Supply	12
7.5	Landscaping	12
8	CONCLUSION & RECOMMENDATIONS	14
9	BIBLIOGRAPHY	15
	APPENDIX A PROPOSED SITE PLANS	A-1
	APPENDIX B ASSET PROTECTION ZONES	B-1



TABLES

Table 3-1: Vegetation Classification	5
Table 4-1: Bushfire Attack Assessment for the Proposed Dwelling	Error! Bookmark not defined.
Table 5-1: Determination of BALs for the proposed dwelling	7
Table 5-1: Proposed Dwelling Compliance with Development Standards	9

FIGURES

Figure 1-1: Site Location	2
Figure 4-1: APZs	Error! Bookmark not defined.



1 INTRODUCTION

A Bushfire Threat Assessment Report (BTA) has been prepared by Firebird ecoSultants Pty Ltd at the request of Hudson Homes for a proposed dwelling at Lot 925 Redwood Drive, Gillieston Heights hereafter referred to as the "site" (refer to Figure 1-1 for site locality). Refer to Appendix A for Proposed Site Plans.

This BTA is suitable for submission with a Development Application (DA) and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2006), hereafter referred to as PBP (RFS, 2006).

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the Environmental Planning and Assessment Amendment (Planning for Bushfire Protection) Regulation 2007 and the Rural Fires Amendment Regulation 2007 (RF Amendment Regulation 2007).

1.1 Site Particulars

Locality:	Lot 925 Redwood Drive, Gillieston Heights
LGA:	Maitland City Council (MC)
Current Land Use:	Vacant lot
Forest Danger Index:	100 FDI

Figure 1-1: Site Location





1.2 Description of the Proposal

This DA relates to the proposal for a dwelling. Refer to Appendix A for Proposed plans.

1.3 Legislative Requirements

The Site has been mapped as Bush Fire Prone Land Map (BFPLM) by MCC.

This report forms part of the supporting documentation for a Development Application (DA) to be submitted to MCC.

This BTA has been prepared using current legislative requirements and associated guidelines for assessment of bushfire protection, these being:

- PBP (RRS, 2006);
- AS3959-2009 Construction of Buildings in Bushfire Prone Area; and
- Addendum to Appendix 3 of PBP.

1.4 Objectives of Assessment

This report has been prepared to address the requirements of Clause 44 of the Rural Fires Regulation. This BTA also addresses the six key Bush Fire Protection Measures (BFRMs) in a development assessment context being:

- The provision of clear separation of buildings and bush fire hazards, in the form of fuel-reduced APZ (and their components being Inner Protection Areas (IPA's) and Outer Protection Areas (OPA's);
- Sitting and design of the proposal;
- Construction standards;
- Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
- Adequate water supply and pressure, and utility services; and
- Suitable landscaping, to limit fire spreading to a building.



2 METHODOLOGY

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent
- Confirmation of the vegetation assemblage typology present.

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 10m.



3 SITE ASSESSMENT

The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2006).

3.1 Vegetation & Slope Assessment

In accordance with PBP (RFS 2006), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site. This assessment is depicted in Table 3-1 and Figure 3-1 that shows the vegetation post development.

In accordance with PBP (RFS 2006), an assessment of the slope that the vegetation considered a bushfire hazard was undertaken and the results are presented in Table 3.1 below.

Table 3-1: Vegetation Classification

Proposed Dwelling		
Direction	Vegetation Type	Slope
North	N/A – residential allotments	N/A
East	Managed land followed by Dry Rainforest that is accordance with PBP is assessed as Rainforest	Downslope > 18 Degrees
South	Managed land followed by Dry Rainforest that is accordance with PBP is assessed as Rainforest	Downslope > 18 Degrees
West	N/A – residential allotments	N/A



4 DWELLING DESIGN & CONSTRUCTION

Building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2009, and accordingly the designer / architect should be made aware of this recommendation. It may be necessary to have dwelling plans checked by the architect involved to ensure that the proposed dwellings meet the relevant Bushfire Attack Level (BAL) as detailed in AS3959-2009.

The determinations of the appropriate BAL are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- Relevant FDI = 100
- Flame temperature
- Slope
- Vegetation classification; and
- Building location.

The following BAL, based on heat flux exposure thresholds, are used in the standard:

(a) **BAL – LOW** The risk is considered to be **VERY LOW**

There is insufficient risk to warrant any specific construction requirements but there are still some risks.

(b) **BAL – 12.5** The risk is considered to be **LOW**

There is a risk of ember attack.

The construction elements are expected to be exposed to a heat flux not greater than 12.5 k/m².

(c) **BAL – 19** The risk is considered to be **MODERATE**

There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat.

The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m².

(d) **BAL-29** The risk is considered to be **HIGH**

There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.



The construction elements are expected to be exposed to a heat flux no greater than 29 kW/m².

(e) **BAL-40** The risk is considered to be **VERY HIGH**

There is much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux no greater than 40 kW/m².

(f) **BAL-FZ** The risk is considered to be **EXTREME**

There is an extremely high risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux greater than 40 kW/m².

4.1 Determination of Bushfire Attack Levels

Using a FDI of 100, the information relating to vegetation, slope and according to Table A1.12.5 of PBP 2018 that determined the appropriate BAL. The results from this bush fire risk assessment are detailed below in Table 4-1–Bush Fire Attack Assessment and Figure 4-1 shows the vegetation.

Table 5-1: Determination of BALs for the proposed dwelling

Vegetation Type & Direction	Separation Distance from vegetation	Bushfire Attack Level (BAL)
Rainforest to the south and east	> 56m	BAL-12.5

Given the information in Table 5-1 above, the proposed dwelling has been assessed as BAL-12.5.

Figure 4-1 Vegetation Map





5 DWELLING DESIGN & CONSTRUCTION

The proposal is for a dwelling and therefore development standards apply. Table 5-1 details the proposed dwelling compliance with Development Standards for Residential Zones.

Table 5-1: Proposed Dwelling Compliance with Development Standards

Development Standards	Proposal	Compliance
<p>The development conforms to the specifications and requirements of the following that are relevant to the development:</p> <ol style="list-style-type: none"> 1. PBP 2006; and 2. Addendum: Appendix 3 PBP 2006; and 3. If another document is prescribed by the regulations for the purposes of Section 79BA of the EP&A Act – that document. 	<p>The proposed building site has been assessed as BAL-12.5</p>	<p>The proposed building site has been assessed as BAL-12.5</p>
<p>The part of the lot on which the development is to be carried out is not in bushfire attack level-40 (BAL-40) or the flame zone (BAL-FZ); and</p>	<p>The proposed dwelling does not occur on land that has been assessed as BAL-FZ or BAL-40.</p>	<p>Complies</p>
<p>The lot has direct access to a public road or a road vested in or maintained by the council; and</p>	<p>The dwelling has direct access to Redwood Drive that is a public road maintained by council</p>	<p>Complies</p>
<p>A reticulated water supply is connected to the lot; and</p>	<p>The site is connected to reticulated water.</p>	<p>Complies</p>
<p>A fire hydrant is located less than 60m from the location of the lot of the proposed development; and</p>	<p>A fire hydrant occurs within 60m of the lot.</p>	<p>Complies- the hydrant is located within 60m of the lot</p>
<p>Mains electricity is connected to the lot; and</p>	<p>The site is connected to electricity</p>	<p>Complies</p>
<p>Reticulated or bottled gas on the lot is installed and maintained in accordance with AS/NZS 1596:2008 The storage and handling of LP Gas and the requirements of relevant authorities (metal piping must be used); and</p>	<p>Can Comply</p>	<p>Can comply</p>
<p>Any gas cylinders on the lot that are within 10m of the dwelling house;</p>	<p>Can comply</p>	<p>Can comply</p>



Development Standards	Proposal	Compliance
<ul style="list-style-type: none">i. Have the release valves directed away from the dwelling house; andii. Are enclosed on the hazard side of the installation; andiii. Have metal connections to and from the cylinders; andiv. There are no polymer sheathed flexible gas supply lines to gas metres adjacent to the dwelling		
The requirements of AS3959-2009 set out in the BCA also apply	The proposed building site has been assessed as BAL-12.5	The proposed building site has been assessed as BAL-12.5



6 BUSH FIRE PROTECTION MEASURES FOR INFILL DEVELOPMENT

The intent of the BPM's is to minimise the risk of bush fire attack and provide protection for emergency services, personnel, residents and others assisting firefighting activities. There are six BPM's these are:

- APZ's;
- Sitting and design of the proposal;
- Construction standards;
- Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
- Adequate water supply and pressure, and utility services; and
- Suitable landscaping, to limit fire spreading to a building.

6.1 Asset Protection Zones

In order to comply with the intent and performance criteria of section 4.3.5 the development proposal must achieve the following:

In relation to Asset Protection Zones (APZ) – *a defensible space is provided onsite, and an APZ is provided and maintained for the life of the development.*

The landscaping of the site will ensure that any trees retained on site will have to be managed so that canopies are discontinuous and do not over hang any part of the building. This area will be maintained for the life of the development and it must be ensured that fine fuels are removed and vegetation is kept to the standard of an IPA.

6.2 Construction Standards and Design

In relation to sitting and design – *buildings are sited and designed to minimise the risk of bush fire attack.*

The following also have been recommended in the construction and design of the proposal:

- A defensible space is established around the proposed dwelling by pavement or grass.

The following also have been recommended in the construction and design of the proposal:



- Fencing – All new fencing and gates shall be constructed in accordance with the NSW Rural Fire Service Guideline: Fast Fact – Fences or Gates in Bushfire Prone Areas.

6.3 Access Requirements

In relation to access requirements – *safe, operational access is provided (and maintained) for emergency services personnel in suppressing a bush fire while residents are seeking to relocate, in advance of a bushfire.*

Access to the site will be via a driveway; this driveway would connect directly with Redwood Drive. Redwood Drive is a public road and occurs in the opposite direction of the proposed bushfire hazard.

The proposal can allow for a grass corridor around the structure for access from fire-fighters to the bushfire hazard.

6.4 Water Supply

In relation to water and utility services – *adequate water and electricity services are provided for firefighting operations. Gas and electricity services are located so as not to contribute to the risk of fire to a building.*

The area has reticulated water supply and hydrants. A hydrant occurs within 60m of the site.

6.5 Landscaping

In relation to landscaping – *it is designed and managed to minimise flame contact and radiant heat to buildings and the potential for wind driven embers to cause ignitions.*

Landscaping will ensure that any trees retained on site will have to be managed so that canopies are discontinuous and do not over hang any part of the building. This area will be maintained for the life of the development and it must be ensured that fine fuels are removed and vegetation is kept to the standard of an IPA within 29m of the dwelling. The owner of the site is responsible for the management and maintenance of the APZs.

In choosing plants for landscaping consideration should be given to plants that possess properties, which help to protect buildings. If the plants themselves can be prevented from ignition, they can improve the defence of buildings by:

- filtering out wind-driven burning debris and embers;
- acting as a barrier against radiation and flame; and
- Reducing wind forces.



Consequently landscaping of the site should consider the following:

- priority given to retaining or planting species which have a low flammability and high moisture content;
- priority given to retaining or planting species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season; and
- Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwelling.



7 CONCLUSION & RECOMMENDATIONS

In summary, a Bushfire Risk Assessment has been undertaken for a proposed dwelling at Part Lot 2 Redwood Drive, Gillieston Heights. The report forms part of the supporting documentation for a Development Application (DA) to be submitted to MCC.

If the recommendations contained within this report are duly considered and incorporated, it is considered that the fire hazard present is containable to a level necessary to provide an adequate level of protection to life and property on the subdivision. In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements for the proposed subdivision:

- The proposed dwelling has been assessed as BAL-12.5
- Fencing – All new fencing and gates shall be constructed in accordance with the NSW Rural Fire Service Guideline: Fast Fact – Fences or Gates in Bushfire Prone Areas.
- Home owners should prepare a Bush Fire Survival Plan refer to the RFS Website http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_Bush_FireSurvivalPlan.pdf



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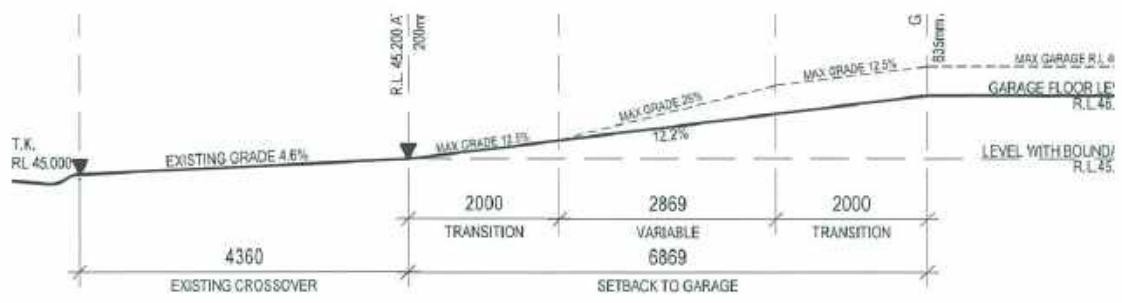
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APPENDIX A PROPOSED SITE PLANS



(B) DRIVEWAY GRADIENT (AS2890.1:2004)
 1:100

UNIT A	
66.57 m ²	
95.02 m ²	
18.09 m ²	
1.93 m ²	
m ²	
18.70 m ²	
m ²	
200.31 m ²	

UNIT B	
66.57 m ²	
95.02 m ²	
18.09 m ²	
1.93 m ²	
m ²	
18.70 m ²	
m ²	
200.31 m ²	

5.0m
6.0m

1.0m
n PER 1.0m OVER 3.0m

1.0m
n PER 1.0m OVER 3.0m

8.0m

3.0m
4.0m²

5.0m X 5.0m

648.2 m²
263.07 m²
40.6 %

388.92 m²

648.2 m²
263.07 m²
385.13 m²
59.4 %

259.28 m²

44.31 m²
25.16 m²

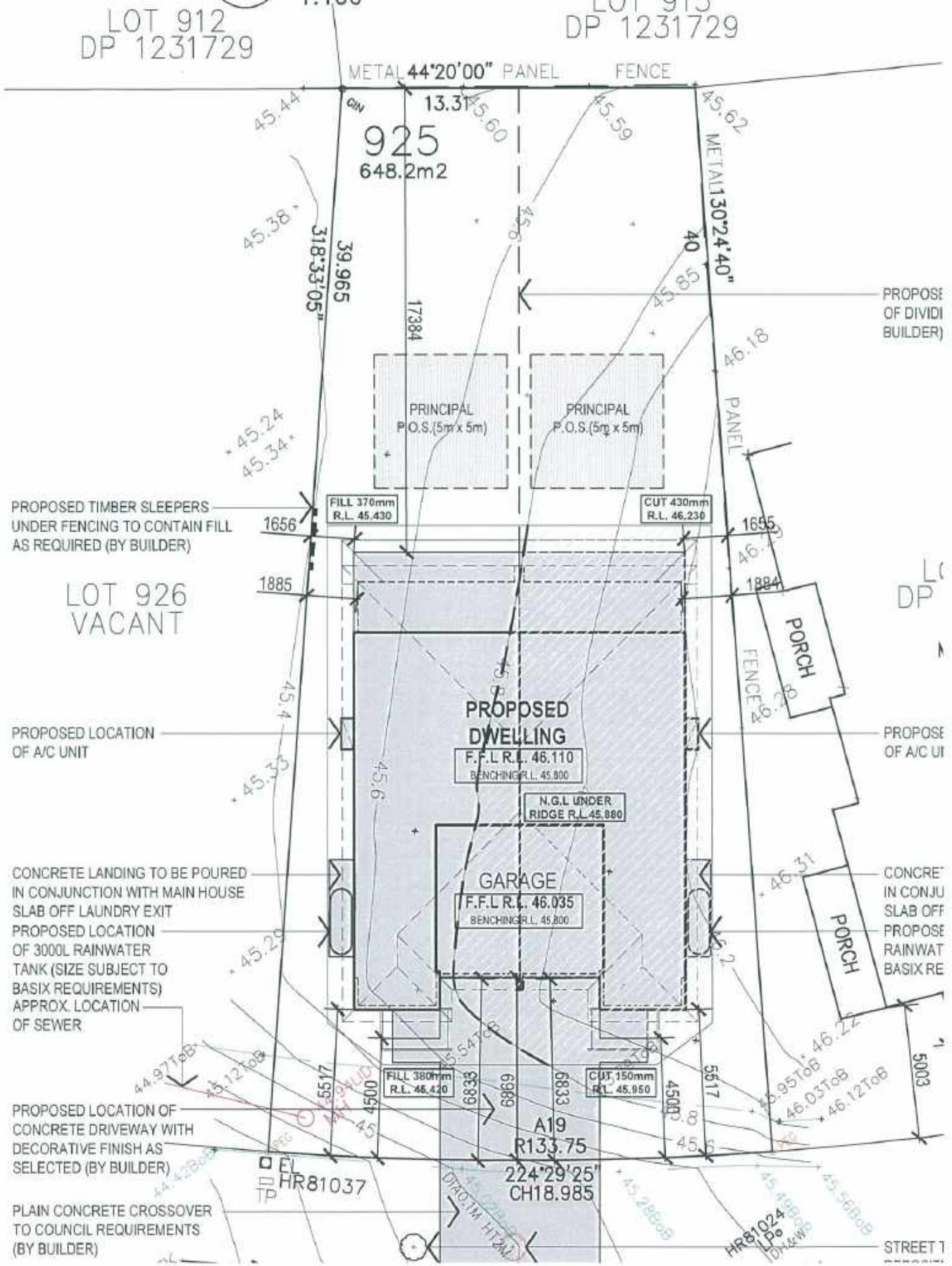
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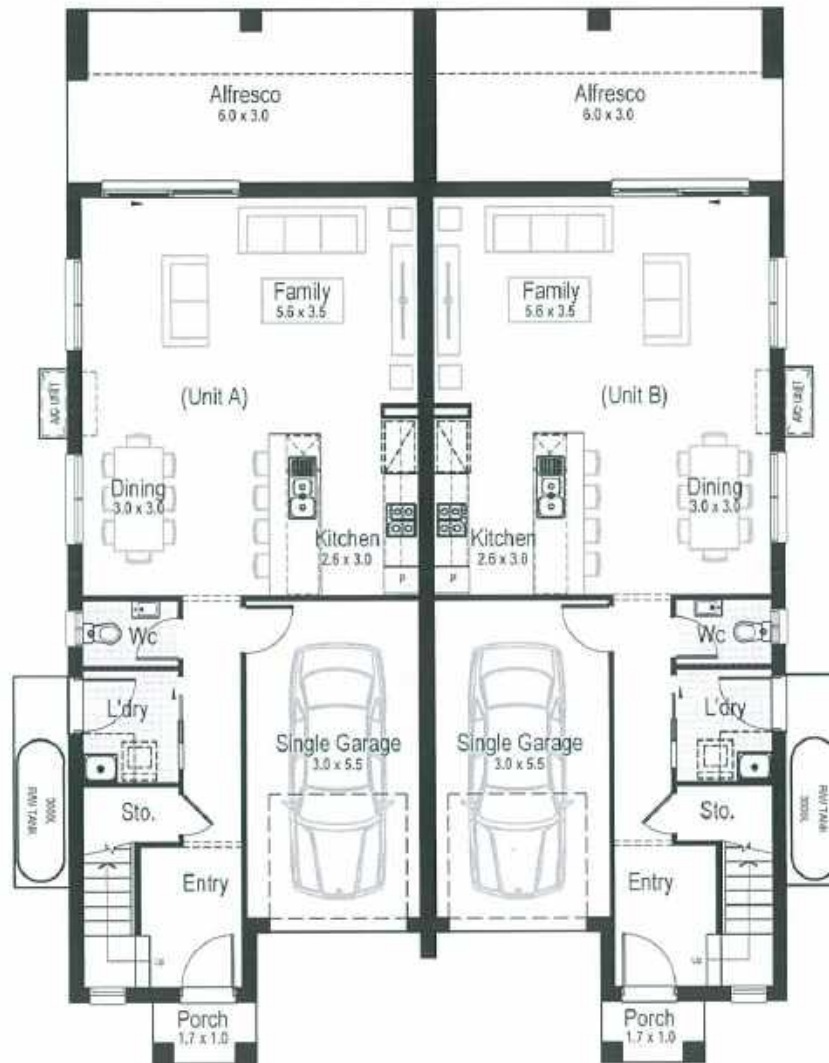
EXCAVATION

ACID OILS

5 (E REPORT)

ENGINEER AGED





Ground Floor

Maize 43 Classic

Beds 8 Baths 5 Cars 2 Squares 43.12

	Unit A	Unit B	
Ground Floor Living Area	66.57 m ²	66.57 m ²	
First Floor Living Area	95.02 m ²	95.02 m ²	
Garage	18.09 m ²	18.09 m ²	
Alfresco	18.70 m ²	18.70 m ²	
Balcony	0.00 m ²	0.00 m ²	
Porch	1.93 m ²	1.93 m ²	
Total Area	200.31 m ²	200.31 m ²	400.62 m ²
Overall Width			12.47 m
Overall Length			18.23 m

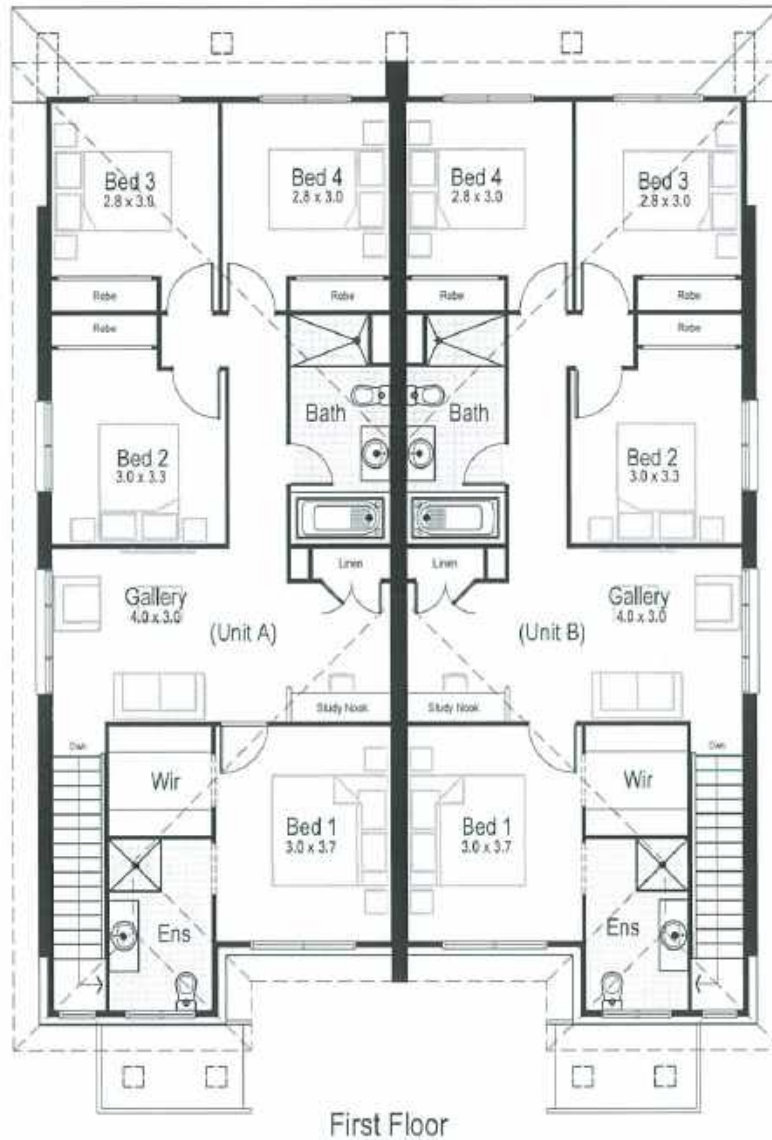
Notes:

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*Floor plans based on Classic facade and will adjust for alternatives

BOURBON/ KEETCH

24.09.19



Maize 43 Classic

Beds 8 Baths 5 Cars 2 Squares 43.12

	Unit A	Unit B	
Ground Floor Living Area	66.57 m ²	66.57 m ²	
First Floor Living Area	95.02 m ²	95.02 m ²	
Garage	18.09 m ²	18.09 m ²	
Alfresco	18.70 m ²	18.70 m ²	
Balcony	0.00 m ²	0.00 m ²	
Porch	1.93 m ²	1.93 m ²	
Total Area	200.31 m ²	200.31 m ²	400.62 m ²
Overall Width			12.47 m
Overall Length			18.23 m

Notes:

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BOURBON/ KEETCH

24.09.19

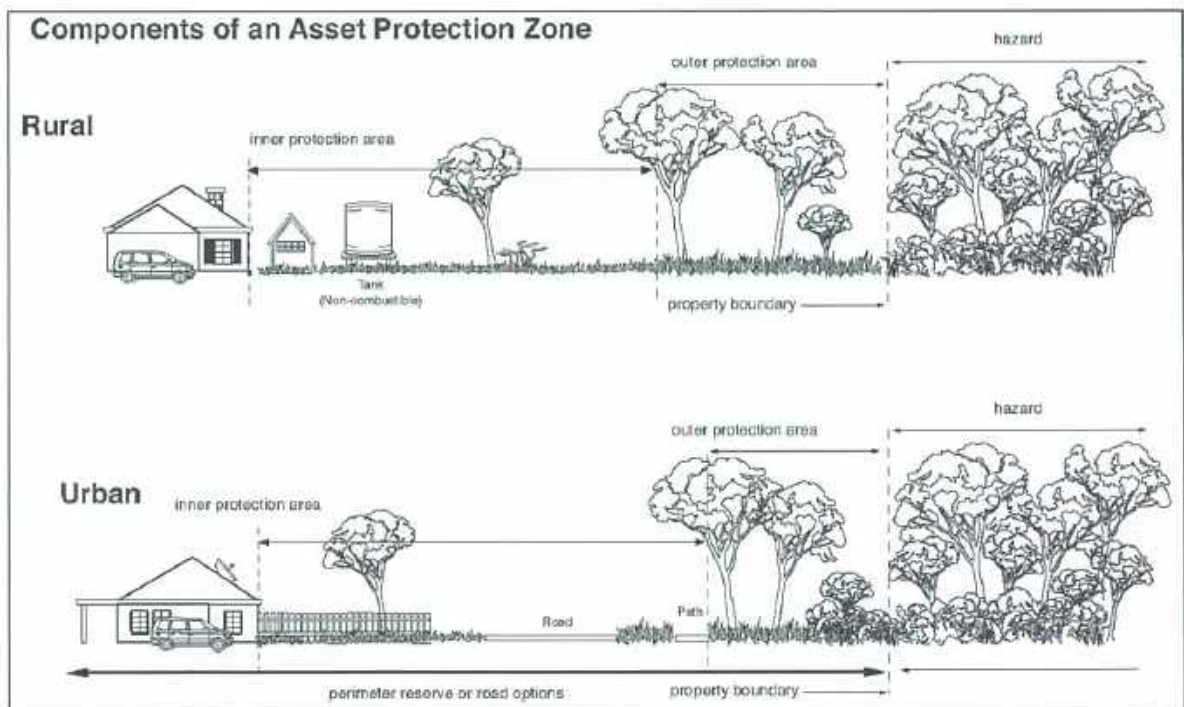
APPENDIX B ASSET PROTECTION ZONES

ASSET PROTECTION ZONES

An Asset Protection Zone (APZ) is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property (refer to Figure B-1 below). The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA). The respective IPA and OPA widths for the required APZs are as detailed in Table 5-1. An APZ can include the following:

- Lawns;
- Discontinuous gardens;
- Swimming pools;
- Driveways;
- Unattached non-combustible garages with suitable separation from the dwelling;
- Open space / parkland; and
- Car parking.

Figure 1: Components of an APZ (PBP 2006)



INNER PROTECTION AREA

The Inner Protection Area (IPA) extends from the edge of the OPA to the development. The IPA aims to ensure that the presence of fuels which could contribute to a fire event / intensity, are minimised close to the development. The performance of the IPA must be such that:

- There is minimal fine fuel at ground level which could be set alight by a bushfire; and
- Any vegetation in the IPA does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous.

The presence of a few shrubs or trees in the IPA is acceptable provided that they:

- Do not touch or overhang any buildings;
- Are well spread out and do not form a continuous canopy;
- Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.
- Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc are not permitted in the IPA

OUTER PROTECTION AREA

The Outer Protection Area (OPA) is located adjacent to the hazard. Within the OPA any trees and shrubs should be maintained in a manner such that the vegetation is not continuous. Fine fuel loadings should be kept to a level where the fire intensity expected will not impact on adjacent developments.