

REF: 3667BF  
DECEMBER 14, 2020  
Valid: 14/12/21



## BUSHFIRE HAZARD ASSESSMENT

23 LOT SUBDIVISION

7 REG GRUNDY DRIVE, BUNDANOON, NSW

LGA: Wingecarribee

Lot 18 DP 1219744

Applicant: RG CAPITAL

HARRIS ENVIRONMENTAL CONSULTING

kate@hec.eco

ORIGINAL DOCUMENT  
Received 18-12-2020



## BUSHFIRE HAZARD ASSESSMENT

### HARRIS ENVIRONMENTAL CONSULTING

ABN 541 287 40 549

Phone: 4236 0954 | 4862 1168

Mobile: 0403 237 072

Email: [kate@hec.eco](mailto:kate@hec.eco)

Web: [www.harrisenvironmental.com.au](http://www.harrisenvironmental.com.au)

This document is copyright ©

#### ASSESSOR & QUALIFICATIONS

*Kate Harris*

#### BPAD-L3-26927

GRAD DIP BUSH FIRE PROTECTION, UWS  
GRAD DIP ENVIRO MANG HERTS, UK,  
GRAD DIP NAT RES UNE,  
BSC APP SC, AGRICULTURE HAC

#### Report prepared by

*Zachary McCann*

B. SC (ENV), UOW

#### DISCLAIMER

The recommendations provided in the summary of this report are a result of the analysis of the proposal in relation to the requirements of Planning for Bushfire Protection 2019. Utmost care has been taken in the preparation of this report however there is no guarantee of human error. The intention of this report is to address the submission requirements for Development Applications on bushfire prone land. There is no implied assurance or guarantee the summary conditions will be accepted in the final consent and there is no way Harris Environmental Consulting is liable for any financial losses incurred should the recommendations in this report not be accepted in the final conditions of consent.

This bushfire assessment provides a risk assessment of the bushfire hazard as outlined in the PBP 2019 and AS3959 2018. It does not provide protection against any damages or losses resulting from a bushfire event.

## TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	5
1. PROPOSAL .....	6
2. ASSESSMENT REQUIREMENTS .....	7
<b>2.1 Regulation .....</b>	<b>7</b>
<b>2.2 Emergency Management.....</b>	<b>7</b>
<b>2.3 Landscape And Vegetation Management.....</b>	<b>8</b>
<b>2.4 Construction Standards .....</b>	<b>8</b>
3. SITE LOCATION .....	9
<b>3.1 General Location.....</b>	<b>9</b>
4. PLANNING LAYERS .....	11
5. SITE DESCRIPTION.....	13
<b>5.1 Slope And Aspect Of The Site.....</b>	<b>13</b>
<b>5.2 Identification Of Significant Environmental Features .....</b>	<b>14</b>
<b>5.3 Vegetation Formation Within 140 M Of Proposed Subdivision.....</b>	<b>15</b>
6. BUSHFIRE THREAT ASSESSMENT .....	19
<b>6.1 Asset Protection Zones (APZ).....</b>	<b>19</b>
<b>6.2 Outer Protection Zones .....</b>	<b>22</b>
<b>6.3 Relevant Construction Standard .....</b>	<b>23</b>
<b>6.4 Safe Operational Access .....</b>	<b>24</b>
<b>6.5 Adequate Water and Utility Services .....</b>	<b>26</b>
7. HOW THIS PROPOSAL MEETS DEEMED TO SATISFY.....	27
8. SUMMARY .....	35
9. REFERENCES.....	36

## FIGURES

Figure 1	Proposed Subdivision Plan .....	6
Figure 2	Location of Property .....	9
Figure 3	Extended Aerial view of the subject lot .....	10
Figure 4	Close Up Aerial .....	10
Figure 5	Bushfire Prone Map .....	11
Figure 6	LEP Zone Mapping .....	12
Figure 7	Vegetation Mapping .....	12
Figure 8	Slope .....	13
Figure 9	Bushfire Prone Vegetation within 140 m of proposed subdivision .....	16
Figure 10	Proposed BAL 29 Asset Protection Zones .....	21
Figure 11	IPA and OPA Requirements .....	22
Figure 12	Access .....	25

## TABLES

Table 1	Planning Layers .....	11
Table 2	APZ and BAL Determination for BAL 29 .....	19
Table 3	Available BAL 29 Building Envelopes .....	20
Table 4	Demonstration of PBP 2019 Table 5.3 a Compliance .....	27
Table 5	Demonstration of PBP 2019 Table 5.3 b Compliance .....	28
Table 6	Demonstration of PBP 2019 Table 5.3 c Compliance .....	31

## APPENDIX

Appendix i	Definition of Asset Protection Zones .....	37
Appendix ii	Biodiversity Values Map .....	38
Appendix iii	IPA and OPA Requirements .....	39

## EXECUTIVE SUMMARY

This report provides a Bushfire Hazard Assessment for a proposed 23 lot subdivision at 7 Reg Grundy Drive, Bundanoon, NSW.

The assessment demonstrates how the proposed 23 lots can meet BAL 29 or less.

This integrated development requires a Bushfire Safety Authority (BFSA) from the NSW RFS for residential and rural subdivision on land mapped as bushfire fire prone. The assessment has evaluated using the *Planning for Bush Fire Protection 2019* and building work is required to comply with the *Australian Standard AS 3959:2018 Construction of building in bushfire-prone areas* or the National Association of Steel Framed Housing (2014) Steel Framed Construction in Bush Fire Areas (Nash Standards).

The bushfire prone vegetation within 140 m of the proposed subdivision is classified as:

- Remnant on the northern and eastern elevations;
- Forest on the North Eastern elevation;
- Grassland on the southern elevation;
- Riparian Corridor within the centre of the subject area.

Asset Protection Zones (APZ) are provided in this report to demonstrate where future development would be setback from the bushfire hazard vegetation. The specific construction standards for any future dwellings will be determined when a DA for a specific dwelling is lodged in the future.

The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. The proposed road meets the acceptable solutions required for Non-Perimeter roads.

Property Access will be from Reg Grundy Road. Lots 1-16, 18-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore no specific access requirements are necessary.

Lot 17 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019*.

The access throughout the subdivision is a proposed public road. This road is proposed as a two-wheel drive, all weather perimeter road. The proposed width of 8 m kerb to kerb. The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.

Electricity and services are to be located so as not to contribute to the risk of fire to the proposed dwellings on each lot. Reticulated or bottled gas is to be installed and maintained in accordance with Australian Standard AS/NZS 1596:2008: The storage and handling of LPG gas to meet the requirements of relevant authorities.

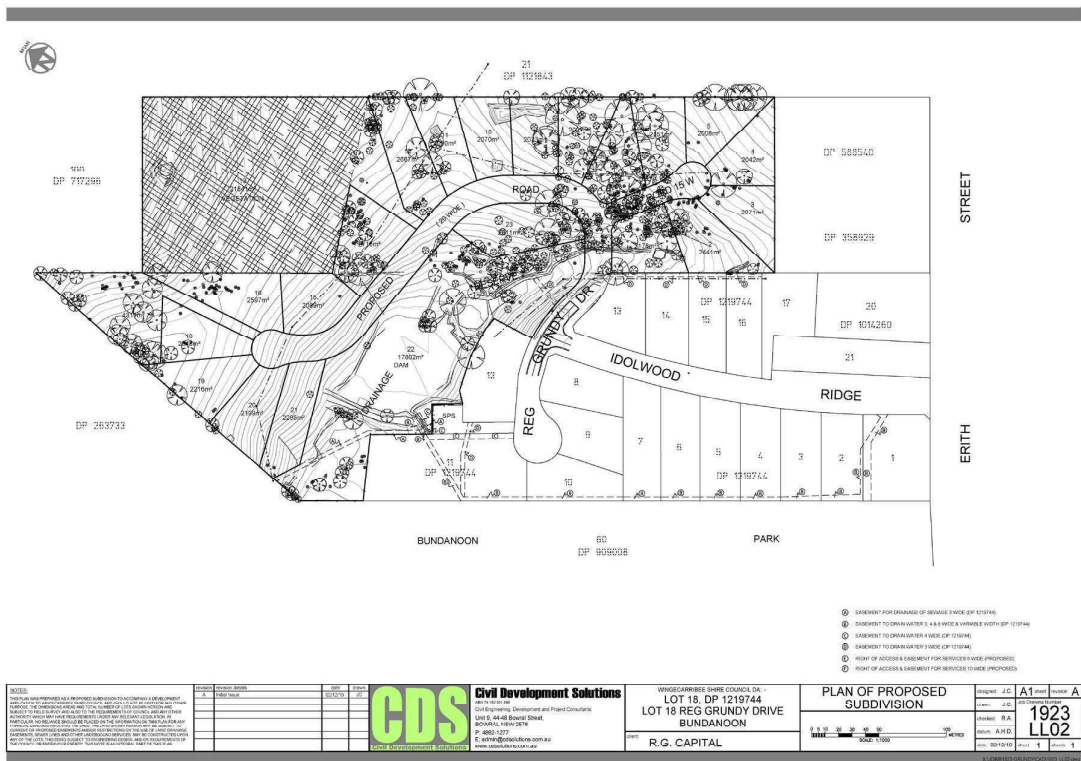
### 1. PROPOSAL

The owners of 7 Reg Grundy Drive, Bundanoo, NSW, propose a 23 Lot Subdivision on Lot 18 DP 1219744. The Lot proposes 22 Lots for residential development and one lot reserved for drainage.

Harris Environmental Consulting was commissioned to provide this bushfire assessment.

Figure 1 shows location for the proposed subdivision.

FIGURE 1 PROPOSED SUBDIVISION PLAN



## 2. ASSESSMENT REQUIREMENTS

### 2.1 Regulation

As this proposal involves a subdivision it requires Integrated DA approval. This involves obtaining a Bushfire Safety Authority (BFSA) from the NSW Rural Fire Services (RFS).

Integrated development applications under section 100B of the *Rural Fires Act* (RF Act) and section 91 of the *EP&A Act* require the following detailed information:

- Description of property;
- Classification of vegetation out to 140 m from the development;
- An assessment of the effective slope to a distance of 100 m;
- Identification of any significant environmental features;
- Details of threatened species, populations, endangered communities and critical habitat known to the applicant;
- Details of Aboriginal heritage known to the applicant; and
- A bushfire assessment that complies with the relevant requirements of the PBP (2019) and AS 3959 2018.

These relevant specific objectives for subdivision in Chapter 5 of the PBP (2019) include:

- Minimise perimeters of the subdivision exposed to the bush fire hazard;
- Minimise bushland corridors that permit the passage of bush fire;
- Provide for the siting of future dwellings away from ridge tops and steep slopes;
- Ensure that separation distances (APZ) between a bush fire hazard and future dwellings enable conformity with deemed to satisfy requirements of the BCA;
- Ensure the ongoing maintenance of asset protection zones;
- Provide clear and ready access from all properties to the public road for residents and emergency services;
- Ensure the provision of adequate supply of water and other services to facilitate effective firefighting.

### 2.2 Emergency Management

In the event of emergency, the residents are advised to become familiar with the RFS Bush Fire Alert Levels and develop a Bush Fire Survival Plan to ensure they know what to do in the event of a bush fire.

## 2.3 Landscape And Vegetation Management

To incorporate bushfire protection measures into future development, the owner is advised to consider the following:

- Maintain a clear area of low cut lawn or pavement adjacent to the house;
- Ensure any pastures within APZ are regularly slashed;
- Avoid planting trees species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopy;
- Avoid planting deciduous species that may increase fuel at surface/ground level by the fall of leaves;
- Avoid climbing species to walls and pergolas;
- Locate combustible materials such as woodchips/mulch, flammable fuel stores (LPG gas bottles) away from the building;
- Locate combustible structures such as garden sheds, pergolas and materials such as timber furniture away from the building;
- Ensure any vegetation planted around the house is a suitable distance away so these plants do not come into physical contact with the house as they mature;
- Incorporate suitable impervious area surrounding the house, including courtyards, paths and driveways.

## 2.4 Construction Standards

The Australian Standard AS3959 – 2018 is the enabling standard that addresses the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the construction of the Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area.

The following was determined for this site:

*Relevant fire danger index*.....FDI 100  
*Flame temperature* .....1090 K

The Building Code of Australia (BCA) is a performance based code which contains performance requirements and deemed to satisfy provisions relating to the construction of buildings in bushfire prone areas. These provisions include Class 1, 2, 3 & 4 buildings that are proposed for construction in designated bushfire prone areas. All class 10b (eg sheds) should be located >10 metres away from the dwelling, or be constructed to the relevant BAL.



### 3. SITE LOCATION

#### 3.1 General Location

As shown in Figure 2 the subject lot is located along Eirth Street located on the eastern side of the expanding urban settlement of Bundanoon. The site is accessed via the newly established Idolwood Ridge and will extend from the existing partially formed Reg Grundy Drive.

Figure 3 provides a broad scale aerial view of the subject site demonstrating the limited extent of surrounding vegetation. Figure 4 shows a close up aerial view of the subject area with plans overlaid.

FIGURE 2 LOCATION OF PROPERTY

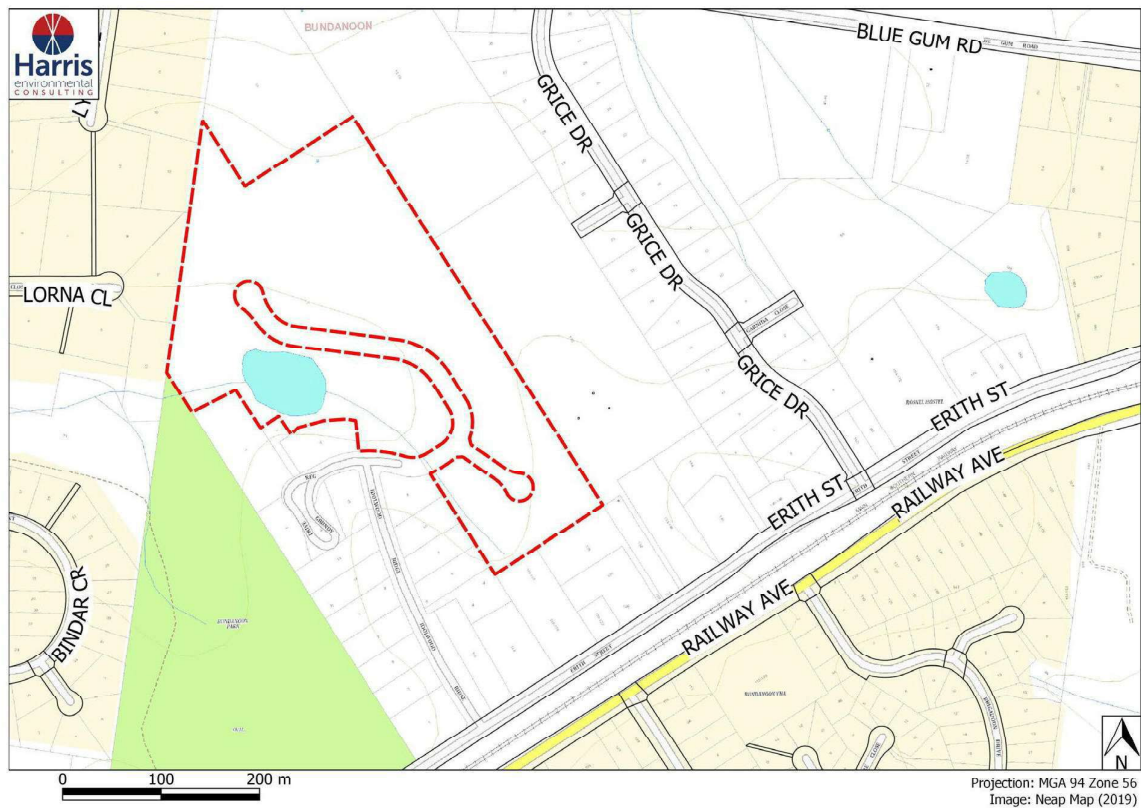


FIGURE 3 EXTENDED AERIAL VIEW OF THE SUBJECT LOT



FIGURE 4 CLOSE UP AERIAL



## 4. PLANNING LAYERS

The following planning layers are described in Table 1 and shown in the Figures below:

TABLE 1 PLANNING LAYERS

MAP	FIGURE	DESCRIPTION
<b>Bushfire Prone Land Map</b>	5	The subject lot is mapped “Vegetation Category 1” and “Vegetation Buffer 100m”.
<b>LEP Zone Map</b>	6	The subject lot is classified as “R2 Low Density Residential”.
<b>Vegetation Mapping</b>	7	Historic vegetation mapping of the South East NSW has classified the surrounding vegetation class as Southern Highlands Shale Woodland’ (Tozer et al 2010).
<b>Biodiversity Values Map</b>	Appx. II	There are no biodiverse values mapped in the proposed development.

FIGURE 5 BUSHFIRE PRONE MAP

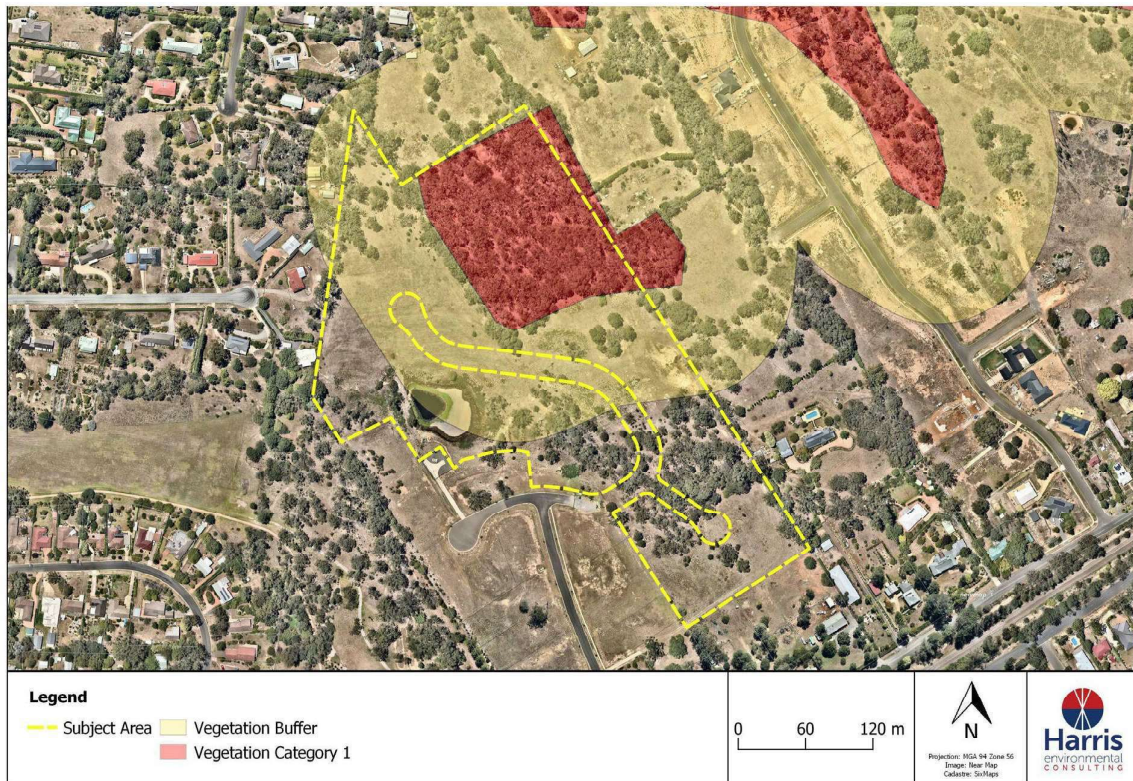


FIGURE 6 LEP ZONE MAPPING

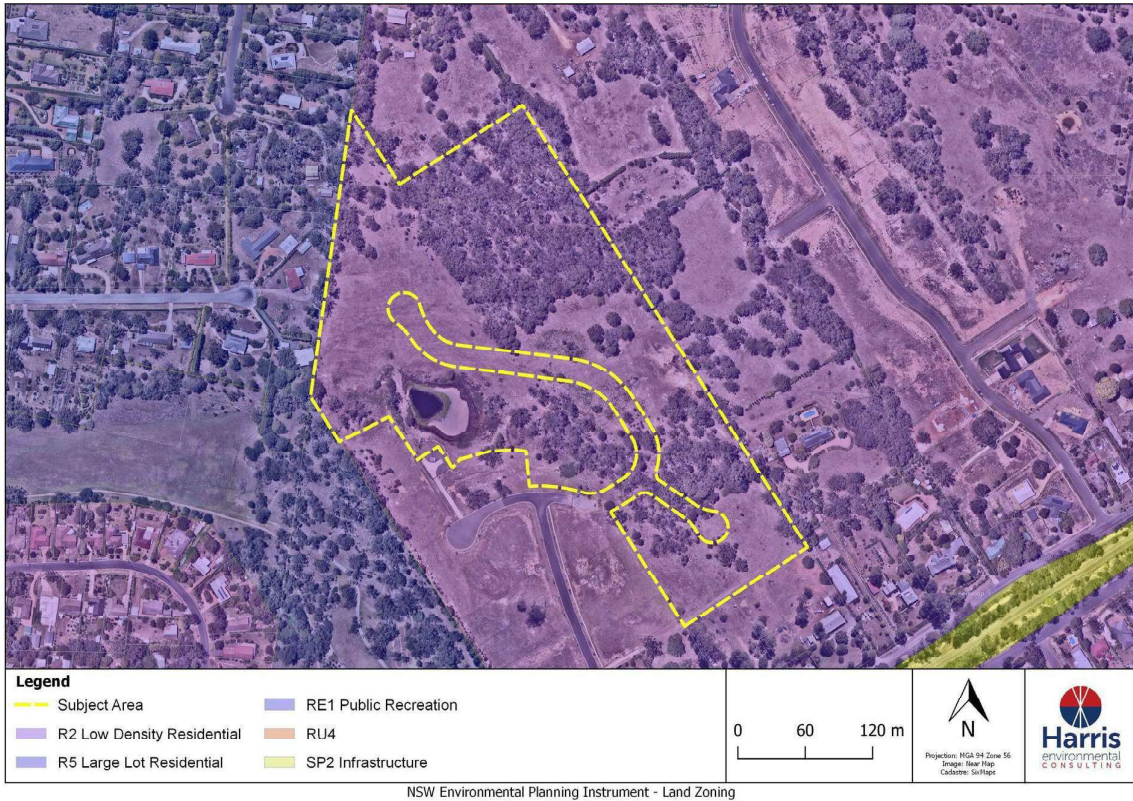
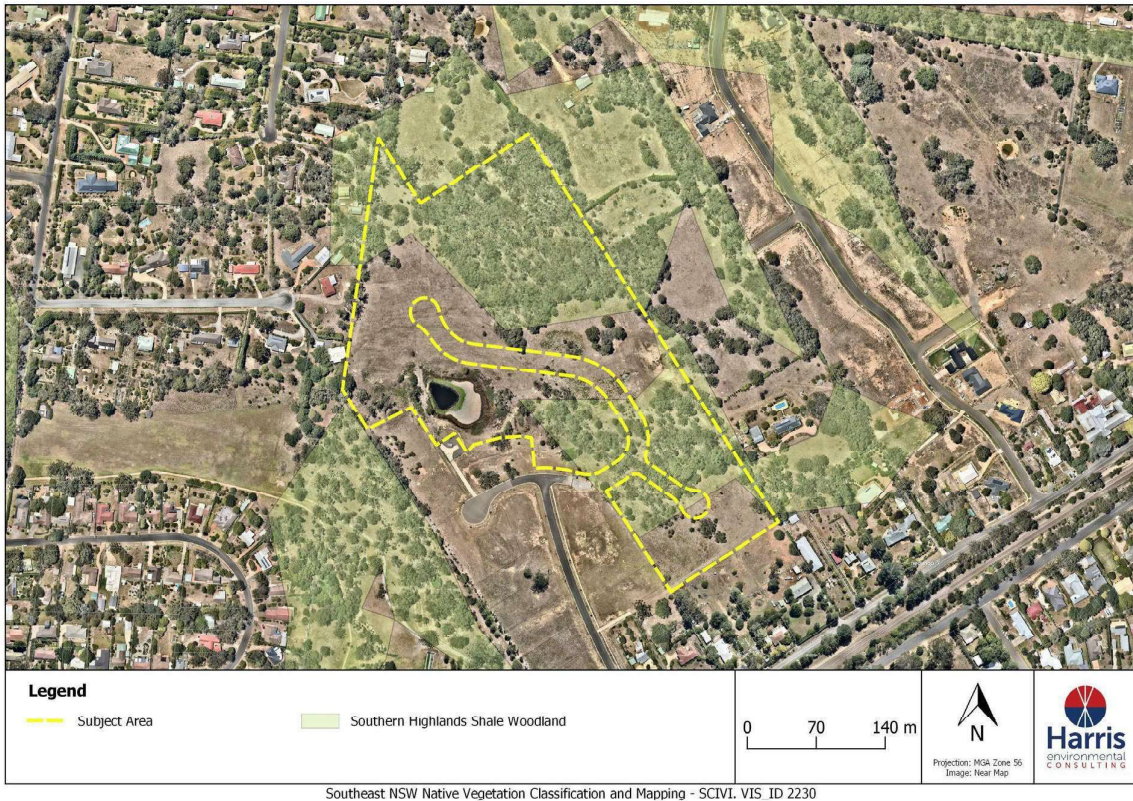


FIGURE 7 VEGETATION MAPPING



## 5. SITE DESCRIPTION

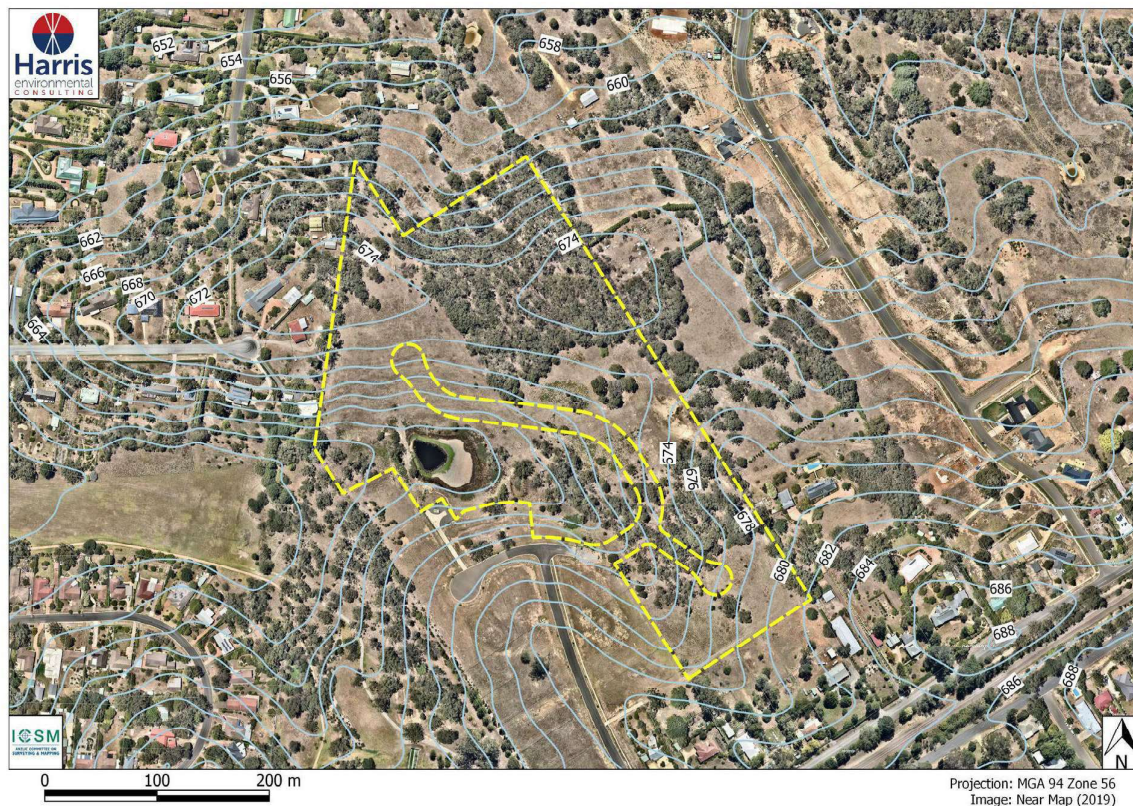
### 5.1 Slope And Aspect Of The Site

The slope that would most significantly influence fire behaviour was determined over a distance of 100m out from the proposed residence. This assessment was made using 2 m ( $\pm 0.3$ m) contour intervals and field inspection, using a clinometer.

The Australian Standard AS3959-2018 identifies that the slope of the land under the classified vegetation is much more important than the slope between the site and the edge of the classified vegetation.

The subject site is located on land that exhibits shallow undulations with a general north western gradient. The land reserved for drainage in the centre of the development exhibits a 0-5° inward slope that predominately trends westward. The square parcel of vegetation reserved on the northern elevation initially rises towards a high point of 674 m before sloping northward at 5-10°.

FIGURE 8 SLOPE



## 5.2 Identification Of Significant Environmental Features

A Biodiversity Development Assessment Report for Erith Street, Bundanoon for Civil Development Solutions on behalf of R.G. Capital has been prepared by Narla Environmental (2020). The report provides the following results:

- One (1) Plant Community Type, PCT 944: Mountain Grey-gum – Narrow-leaved Peppermint grassy woodland on shales of the Southern Highlands, southern Sydney Basin Bioregion was located within the Subject Land. This vegetation community is consistent with Southern Highlands Shale Woodlands in the Sydney Basin Bioregion in the Sydney Basin Bioregion, which is listed as an Endangered Ecological Community under the NSW Biodiversity Conservation Act 2016 (BC Act). This threatened ecological community was identified as an SAll entity, therefore a determination of whether or not the proposed impacts would be considered likely to cause a serious and irreversible impact was undertaken in accordance with Section 9.1 of the BAM (DPIE 2020a).
- Targeted surveys were conducted within the appropriate survey period for all species predicted to occur by the BAMC with One (1) Species Credit species being confirmed present as utilising the Subject Land. Biodiversity offset credit calculations have been performed in accordance with the BAM (DPIE 2020a) and using the BAMC Version 1.3.0.00 (DPIE 2020b). The following credits are required to be offset in order to mitigate the impacts upon biodiversity as a result of the proposed development for 71 Southern Myotis Species Credits.

In summary the report concludes that the surrounding vegetation formations have been classified as Southern Highlands Shale Woodland that corresponds to a Keith classification of Wet Sclerophyll Forest in a condition that had no trees and shrubs present.

The subject lot was identified as providing habitat for Southern Mitosis Species and the proposed development will be required to offset 71 species credits.

A Vegetation Management Plan (VMP) and Koala Assessment Report (KAR) have been created to outline the restoration and protection of the first order watercourse located along the southern border of the property, as well as the koala habitat to remain in the northern corner.

### 5.3 Vegetation Formation Within 140 M Of Proposed Subdivision

Figure 9 shows the managed and unmanaged land within 140 m of the proposed subdivision.

The square parcel of vegetation on proposed Lot 13 that extends eastward onto Lot 21 DP 1121843 has been classified as Southern Highlands Shale Woodland, that when assessed under Keith (2004) is classified as Forest. The vegetation is characterised by a dominant eucalypt canopy consisting of a low lying understory of Acacias and Pittosporum.

The land on Lot 21 DP 1121843 has been extensively cleared and is currently present as small remnant pockets amongst exotic grass species. The vegetation has been classified as Remnant using the simplified approach outlined in *Appendix A1.11.1 of the PBP 2019*. The predominate bushfire threat has been taken as Remnant and will use the APZ setbacks for Rainforest.

The land on Lot A DP 358929 and Lot 2 DP 1212031 to the south of proposed Lots 2, 3, 4 and 5 has been classified as Grassland. The land consists of unmanaged grassland that upon site inspection saw grass lengths over 10 cm in height.

The land on the eastern elevation on Lot 60 DP 909008 has been classified as managed according to Section A1.10 PBP 2019 as a maintained public reserve.

Within the centre of the subdivision on proposed Lot 22, the area is proposed to be retained for drainage purposes. It has assumed upon site inspection and aerial analysis that the area will be revegetated to meet the classification of riparian corridor. This will need to be reassessed in accordance with any Vegetation Management Plan produced at the individual DA assessment. For the purposes of this subdivision report the Land on Lot 22 has been classified as Riparian Corridor and will use the APZ setbacks for Rainforest.

FIGURE 9 BUSHFIRE PRONE VEGETATION WITHIN 140 M OF PROPOSED SUBDIVISION





Photo 1 *Remnant to the East*



Photo 2 *Forest to the North*



*Photo 3 Expected Riparian Corridor Revegetation*



## 6. BUSHFIRE THREAT ASSESSMENT

### 6.1 Asset Protection Zones (APZ)

Table A1.12.5 *Planning for Bushfire Protection 2019* has been used to determine the width of the required APZ for the existing dwelling and subject lot using the vegetation and slope data identified.

An FDI of 100 was used for this location.

Table 2 below shows the APZ and BAL determination for the proposed subdivision.

Table 3 demonstrates how the proposed building envelopes meet BAL 29 and demonstrates the area available in (m<sup>2</sup>) for development

Figure 8 shows the proposed setbacks and Asset Protection Zones required to provide BAL 29 building envelopes.

TABLE 2 APZ AND BAL DETERMINATION FOR BAL 29

Keith Vegetation Formation	Effective Slope		
	Up Slopes and Flat	>0°-5°	>5°-10°
	Distance (m) from asset to vegetation formation		
Forest	24	/	36
Rainforest	11	14	18
Grassland	10	/	/

TABLE 3 AVAILABLE BAL 29 BUILDING ENVELOPES

Proposed Lot	Hazard & Slope	Distance to Hazard	BAL 29 Building Envelope Size (m <sup>2</sup> )
1	Downslope 0-5° Riparian Corridor	27 m	1208
2	Upslope Grassland	10 m	1529
3	Upslope Grassland	10 m	1055
4	Upslope Grassland	10 m	1042
5	Upslope Grassland	10 m	1183
6	Level Low Hazard	35 m	1342
7	Level Low Hazard	25 m	1373
8	Level Low Hazard	10 m	1162
9	Level Low Hazard	10 m	1157
10	Level Low Hazard	10 m	1172
11	Upslope Forest	24 m	1066
12	Upslope Forest	24 m	982
13	Upslope Forest	24 m	992
14	Upslope Forest	24 m	1168
15	Upslope Forest	24 m	985
16	Downslope 5-10° Forest	36 m	817
	Upslope Forest	24 m	
17	Downslope 5-10° Low Hazard	18 m	1533
	Upslope Forest	24 m	
18	Downslope 5-10° Forest	36 m	1385
19	Downslope 5-10° Forest	74 m	1367
20	Downslope 0-5° Riparian Corridor	31 m	1337
21	Downslope 0-5° Riparian Corridor	14 m	702
22	Downslope 0-5° Riparian Corridor		N/A
23	Downslope 0-5° Riparian Corridor	14 m	791

FIGURE 10 PROPOSED BAL 29 ASSET PROTECTION ZONES



## 6.2 Outer Protection Zones

The vegetation classification for bushfire purposes on the northern elevation for this site is "Forest". Forest vegetation can be managed as an Inner Protection Area (IPA) and Outer Protection Area (OPA). The IPA is critical for providing a defensible space and managing heat intensities at the building surface. The OPA serves to reduce the potential length of flames, filtering embers and reducing the likelihood of crown fires.

The IPA should provide a tree canopy cover less than 15% and any tree canopies must be located greater than 2 metre from any part of the proposed dwelling roofline. Garden beds of flammable shrubs should not be located under trees and should be no greater than 10m from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above ground.

An OPA should provide a tree canopy cover of less than 30% and should have understory managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season (September).

The general location of the IPA and OPA are shown in Figure 11 and outlined below.

The IPA should be:

- 0-14 m from Lots 11-18 building envelopes.

The OPA should be:

- 14-24 m from Lots 11-18 building envelopes.

FIGURE 11 IPA AND OPA REQUIREMENTS



### 6.3 Relevant Construction Standard

The Australian Standard AS3939 – 2018 is the enabling standard that addresses the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the construction of the Class 1, 2 and Class 3 buildings within a designated Bushfire Prone Area.

The following was determined for this site:

*Relevant fire danger index*.....FDI 100  
*Flame temperature* .....1090 K

Lots 1 - 21 and 23 can provide building envelopes that meet **BAL 29** or less.

No habitable development is proposed on Lot 22

## 6.4 Safe Operational Access

The *PBP 2019* requires the provision of safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.

For subdivision purposes Non-Perimeter roads such as the one proposed are required to meet the performance criteria:

- Minimum 5.5m carriageway width kerb to kerb;
- Parking is provided outside of the carriageway width;
- Hydrants are located clear of parking areas;
- Roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
- Curves of roads have a minimum inner radius of 6m; the road cross fall does not exceed 3 degrees;
- A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

The proposed road meets the acceptable solutions required for Non-Perimeter roads.

Property Access will be from Reg Grundy Road. Lots 1-16, 18-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore no specific access requirements are necessary.

As shown in Figure 10, Lot 17 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019* as follows:

- Minimum 4m carriageway width;
- 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;
- The minimum distance between inner and outer curves is 6m;
- The crossfall is not more than 10 degrees; maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.



FIGURE 12 ACCESS



## 6.5 Adequate Water and Utility Services

No development is proposed and therefore this requirement is not applicable. However for future subdivision planning the applicant in the future will be required by the PBP to:

- Either ensure there is at least 10,000 water supply available for firefighting purposes at each proposed dwelling or;
- Provide access points for reticulated water that incorporates a ring main system for all internal roads.

Any bottled gas proposed will be required to be installed and maintained in accordance with AS1596 and the requirements of the relevant authority. If gas cylinders need to be kept close to the buildings, the release valves must be directed away from the building and away from any combustible material. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

The existing electrical supply to the surrounding area is provided as an above ground service. Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

## 7. HOW THIS PROPOSAL MEETS DEEMED TO SATISFY

The following table shows how the proposal meets the Performance Based Controls of the PBP (2019) chapter 5.

**TABLE 4 DEMONSTRATION OF PBP 2019 TABLE 5.3 A COMPLIANCE**

	<b>Performance criteria</b>	<b>Acceptable Solution</b>	<b>Demonstration of compliance</b>
<b>Asset Protection Zones</b>	Potential building footprints must not be exposed to radiant heat levels exceeding 29kw/m <sup>2</sup> on each proposed lot.	APZ is determined in accordance with Tables A1.12.2 based on 100 FDI.	All building envelopes proposed can provide a suitable envelope not exceeding 29kw/m <sup>2</sup> .
	APZ's are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of Appendix 4.	The APZ can be managed.
	APZ is provided for perpetuity	Is wholly within boundaries of the development site.	The APZ is located within the proposed subject lots.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimized.	APZs are located on lands with a slope less than 18 degrees.	The land is less than 18 degrees downslope.
<b>Landscaping</b>	Landscaping is managed to minimise flame contact, reduce heat levels, minimise embers and reduce the effect of smoke on residents and fire fighters.	Landscaping in accordance with Appendix 4.	No changes are proposed to the existing land.

**TABLE 5 DEMONSTRATION OF PBP 2019 TABLE 5.3 B COMPLIANCE**

	<b>Performance criteria</b>	<b>Acceptable Solution</b>	<b>Demonstration of compliance</b>
<b>Access (General Requirements)</b>	<p>Firefighter vehicles are provided with safe, all weather access to structures and hazard vegetation.</p> <p>Public road widths and design allow safe access for firefighters while residents are evacuating an area.</p> <p>Access to properties is provided in recognition of the risk to fire fighters and/or evacuating occupants.</p> <p>Capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.</p> <p>All weather access is provided.</p> <p>Road widths and design enable safe access for vehicles.</p>	<p>Property access roads are two-wheel drive, all weather roads;</p> <p>Perimeter roads are provided for residential subdivisions of three or more allotments</p> <p>Traffic management devices are constructed to not prohibit access by emergency service vehicles</p> <p>Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;</p> <p>All roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 m in length, incorporate a minimum 12 metre outer radius turning circle, and a clearly sign posted as a dead end.</p> <p>Where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;</p> <p>Where access/egress can only be achieved through forest, woodland or heath vegetation secondary access shall be provided to an alternate point on the existing public road system.</p>	<p>The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.</p>
	<p>The capacity of access roads is adequate for firefighting vehicles.</p>	<p>The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges/causeways are to clearly indicate load rating.</p>	<p>Will be required to comply.</p>
	<p>There is appropriate access to water supply.</p>	<p>Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;</p> <p>Hydrants are provided in accordance with AS 2419.12005.</p> <p>There is suitable access for a Category 1 fire appliance to</p>	<p>Required to comply.</p>

		within 4 of the static water supply where no reticulated supply is available	
<b>Perimeter Road</b>	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	Perimeter roads are two way sealed roads; 8 m carriageway width kerb to kerb; Parking is provided outside of the carriageway width and Hydrants are located clear of parking areas; There are through roads, and these are linked to the internal road system at an interval of no greater than 500 m; Curves of roads have a minimum inner radius of 6 m, The maximum grade of the road is 15 degrees and average grade is 10 degrees; The road cross fall does not exceed 3 degrees; A minimum vertical clearance of 4 m to any overhanging branches is provided.	No Perimeter roads proposed. Through roads do not exceed 500 m.
<b>Non-Perimeter Roads</b>	Access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while residents are evacuating.	Minimum 5.5 m width kerb to kerb; Parking is provided outside of the carriageway width; Hydrants are located clear of parking areas; Roads are through roads and these are linked to the internal road system at an interval of no greater than 500 m; Curves of the roads have a minimum inner radius of 6 m, The road cross fall does not exceed 3 degrees; A minimum vertical clearance of 4 m to any overhanging obstructions, including tree branches, is provided.	The proposed extension of Reg Grundy Drive complies with the acceptable solutions for non-perimeter roads.

<b>Property Access</b>	<p>Firefighting vehicles can access the dwelling and exit safely</p>	<p>Minimum 4m carriageway width;</p> <p>A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;</p> <p>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;</p> <p>The minimum distance between inner and outer curves is 6m;</p> <p>The crossfall is not more than 10 degrees; maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.</p> <p>A development comprising more than three dwellings has access by dedication of a road and not by right of way.</p>	<p>Property Access will be from Reg Grundy Road. Lots 1-16, 18-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore no specific access requirements are necessary.</p> <p>Lot 17 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b <i>PBP 2019</i>.</p>
------------------------	--	---	--

**TABLE 6      DEMONSTRATION OF PBP 2019 TABLE 5.3 C COMPLIANCE**

<b>Water Supply</b>	<p>An adequate water supply for firefighting purposes is installed and maintained.</p> <p>Water supplies are located at regular intervals</p> <p>The water supply is accessible and reliable for firefighting operations.</p> <p>Flows and pressure are appropriate.</p> <p>the integrity of the water supply is maintained.</p> <p>water supplies are adequate in areas where reticulated water is not available.</p>	<p>Reticulated water is to be provided to the development, where available; Or a 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.</p> <p>Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005;</p> <p>Hydrants are not located within any road carriageway; Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.</p> <p>Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.</p> <p>All above-ground water service pipes external to the building are metal, including and up to any taps.</p> <p>Connection for firefighting purposes is located within the IPA or non hazard side and away from the structure; a 65mm Storz outlet with a ball valve is fitted to the outlet; Ball valve and pipes are adequate for water flow and are metal; Supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank; A hardened ground surface for truck access is supplied within 4m of the access hole; Above-ground tanks are manufactured from concrete or metal; Raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see</p>	<p>No development is proposed and therefore this requirement is not applicable. However for future subdivision planning the applicant in the future will be required by the PBP to:</p> <ul style="list-style-type: none"> <li>• Either ensure there is at least 10,000 water supply available for firefighting purposes at each proposed dwelling or;</li> <li>• Provide access points for reticulated water that incorporates a ring main system for all internal roads.</li> </ul>
---------------------	--	--	---



		<p>Appendix F AS 3959); unobstructed access is provided at all times;</p> <p>Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;</p> <p>Underground tanks are clearly marked, all exposed water pipes external to the building are metal, including any fittings;</p> <p>Where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack; Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter;</p> <p>Fire hose reels are constructed in accordance with AS/NZS 1221:1997 <i>Fire hose reels</i>, and installed in accordance with the relevant clauses of AS 2441:2005 <i>Installation of fire hose reels</i>.</p>	
<b>Electricity Services</b>	<p>Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.</p>	<p>Where practicable, electrical transmission lines are underground;</p> <p>Where overhead, electrical transmission lines are proposed as follow:</p> <ul style="list-style-type: none"> <li>• Lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas;</li> <li>• No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 <i>Guideline for Managing Vegetation Near Power Lines</i>.</li> </ul>	

<b>Gas Services</b>	<p>Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.</p>	<p>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 used;</p> <p>All fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;</p> <p>Connections to and from gas cylinders are metal;</p> <p>If gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion;</p> <p>Polymer-sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used;</p> <p>Above-ground gas service pipes external to the building are metal, including and up to any outlets.</p>	
---------------------	--	--	--

## 8. SUMMARY

- Asset Protection Zones (APZ) are provided in this report to demonstrate where future development would be setback from the bushfire hazard vegetation. The specific construction standards for any future dwellings will be determined when a DA for a specific dwelling is lodged in the future.
- Asset Protection Zones consistent with the setbacks listed in Table 2.4.2 AS 3959.
- Asset Protection Zones for BAL 29 or less can be provided on the proposed lots and are wholly within the boundaries of the development site.
- The proposed subject lots will be located on Reg Grundy Drive. The existing development of road is a two-wheel drive, all weather road with the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.
- Property Access will be from Reg Grundy Road. Lots 1-16, 18-23 will be able to provide an unobstructed path less than 70m between the most distant external part of the proposed building envelope (or future dwelling) and the nearest part of the public road. Therefore no specific access requirements are necessary.
- Lot 17 will require property access that exceeds 70 m from the public road. The subject lot will be required to comply with the property access requirements outlined in Table 5.3b *PBP 2019*. This will be determined when a DA for a specific dwelling is lodged in the future.
- Firefighting water supply is not required as no development is proposed.
- Electrical services and gas services are not proposed.

## 9. REFERENCES

Australia, G. (2019). *ELVIS - Elevation - Foundation Spatial Data*. Elevation.fsd.org.au.  
<http://elevation.fsd.org.au/>

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

Narla Environmental (2020). *Biodiversity Development Assessment Report for Erith Street Bundanoon*. Report prepared for Civil Development Solutions on behalf of R.G. Capital

NSW Department of Planning and Environment (DPE) (2019). Planning Portal.  
<https://www.planningportal.nsw.gov.au/>.

NSW Office of Environment and Heritage (OEH) (2019). Biodiversity Value Map.  
<https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap>.

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

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

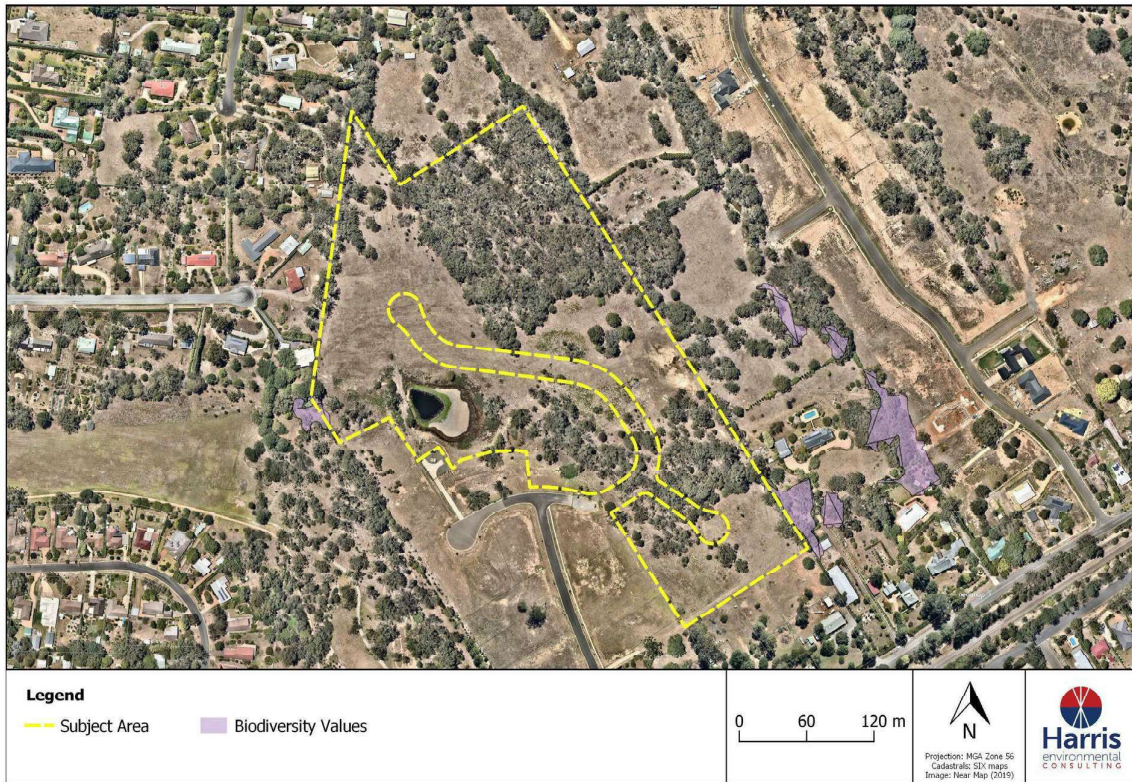
Tozer MG, Turner K, Keith DA, Tindall D, Pennay C, Simpson C, MacKenzie B, Beukers P, Cox S (2010). *Native Vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands*. *Cunninghamia* 11:359-406.

## APPENDIX I DEFINITION OF ASSET PROTECTION ZONES

Vegetation within the APZ should be managed in accordance with APZ specifications for the purposes of limiting the travel of a fire, reducing the likelihood of direct flame contact and removing additional hazards or ignition sources. The following outlines some general vegetation management principles for APZs:

- 1) Discontinuous shrub layer (clumps or islands of shrubs not rows);
- 2) Vertical separation between vegetation stratum;
- 3) Tree canopies not overhanging structures;
- 4) Management and trimming of trees and other vegetation in the vicinity of power lines and tower lines in accordance with the specifications in “Vegetation Safety Clearances” issued by Energy Australia (NS179, April 2002);
- 5) Maintain low ground covers by mowing / whipper snipper / slashing;
- 6) Noncombustible mulch e.g. stones and removing stores of combustible materials;
- 7) Vegetation to be planted should consist of fire retardant/ less flammable species strategically located to reduce attack from embers (i.e. as ember traps when in small clumps and short wind breaks).

APPENDIX II BIODIVERSITY VALUES MAP



## APPENDIX III IPA AND OPA REQUIREMENTS

### A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defensible space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

#### Trees

- 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

- 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.

### A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

#### Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

#### Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

#### Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

Typical Inner and Outer Protection Areas.

