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Date: 4/8/23

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## BUSHFIRE HAZARD ASSESSMENT

INDUSTRIAL SUBDIVISION AND GENERAL INDUSTRY

DEVELOPMENT

2 & 10 BOWMAN ROAD, MOSS VALE, NSW

LGA: Wingecarribee

Lot 2, DP 1070888 & Part Lot 51 DP 130176

Applicant: SAAS Aus Pty Ltd

HARRIS ENVIRONMENTAL CONSULTING

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### Version Control

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## Bushfire Hazard Assessment Certificate

<b>Property Address:</b>	2 & 10 Bowman Road, Moss Vale, NSW, Lot 2, DP 1070888 & Part Lot 51 DP 130176
<b>Description of Proposal:</b>	Industrial Subdivision and General Industry Development
<b>Plan Reference:</b>	Environment and Planning, Sketch of Proposed Site Layout, 28/7/22.
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### 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.

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## EXECUTIVE SUMMARY

This report provides a Bushfire Hazard Assessment for a proposed Industrial Subdivision and General Industry Development at 2 & 10 Bowman Road, Moss Vale, NSW. Letara Judd (BPAD L2) undertook a site inspection on 25 August 2022.

The assessment confirms the site is mapped Bushfire Prone.

The bushfire prone land within 140 m of the proposed development are:

Building 1	Aspect	Vegetation Classification and slope	Distance from the nearest part of the external wall
	West	0-5° Downslope Grassland	15 m
Building 2	North	0-5° Downslope Grassland	9 m
	West	Upslope Grassland	13 m
		Upslope Woodland	25 m
	South	0-5° Downslope Grassland	15 m
Building 3A	West	Upslope Grassland	38 m
Building 3B	East	Upslope Grassland	15 m
	West	Upslope Grassland	36 m
	South	5-10° Downslope Grassland	33 m

The proposed development can be constructed to the following Bushfire Attack Level (BAL) as specified by AS3959 - 2018 Construction for Buildings in Bushfire Prone Areas, PBP 2019 and/or *NASH Standard Steel Framed Construction in Bushfire Areas* (2014).

- **Building 1:**
  - **BAL 29:** floor, roof, northern southern and western facades
  - **BAL 19:** eastern facades
- **Building 2:**
  - **BAL 40:** floor, roof, north east and north western facades
  - **BAL 29:** south east and south west facades
- **Building 3:**
  - **BAL 19:** roof, floor, eastern and southern facades;
  - **BAL 12.5:** northern and western facades.

Asset Protection Zones (APZ) should be established from the commencement of building works and maintained for perpetuity for the following dimensions:

- **Building 1:**
  - 15 m across northern, western and southern elevations;
  - To the property boundary on the eastern elevation.
- **Building 2:**
  - 9m on the north and east;
  - 12 m on the south and west.
- **Building 3:**
  - 22 m across the north and west;
  - 28 m on the south;
  - To the boundary on the east.

The site is located on Bowman Road. This is a two-wheel drive, all-weather road. Road surfaces and bridges are sufficient to carry fully loaded firefighting vehicles.

The existing access from the no through road Bowman Road provides an adequate turning area for a fire tanker that requires an inner minimum turning radius of 6m and outer minimum radius of 12m. The access is required to comply with the PBP- Property Access Table 7.4a. This includes:

- A minimum carriageway width of four metres;
- Curves a minimum inner radius of six metres;
- The minimum distance between inner and outer curves is six metres;
- The cross fall is not more than 10 degrees;
- Maximum grades for sealed roads do not exceed 15 degrees (28 per cent) and not more than 10 degrees (18 percent) for unsealed roads;
- The internal road surfaces and bridges have a capacity to carry fully loaded firefighting vehicles (23 tonnes) and provide signage that clearly indicates the bridge capacity; and
- There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.

A reticulated water supply:

- Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005;
- Hydrants are not located within any road carriageway;
- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
- Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.

Any bottled gas will 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.

Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

# 1 PROPOSAL

The owners of 2 & 10 Bowman Road, Moss Vale, NSW, for a proposed Industrial Subdivision and General Industry Development at Lot 2, DP 1070888 & Part Lot 51 DP 130176. The assessment confirms the site is mapped as bushfire prone. Letara Judd (BPAD L2) undertook a site inspection on 25 August 2022.

Harris Environmental Consulting was commissioned to provide this bushfire assessment.

This proposal has been assessed under the PBP 2019 8.3.1 'Buildings of Class 5 to 8 under the National Construction Code (NCC). The NCC does not provide for any bush fire specific performance requirements for these classes of buildings. As such AS 3959 and the NASH Standard are not considered as a set of Deemed to Satisfy provisions, however compliance with AS 3959 and the NASH Standard must be considered when meeting the aims and objectives of PBP. Construction is considered on a case-by-case basis.

Figure 1 shows the site location.

Figure 2 provides a broad scale aerial view of the site.

Figure 3 shows a close up of the site.

Figure 4 shows the proposed plans.

**Figure 1 Site location**

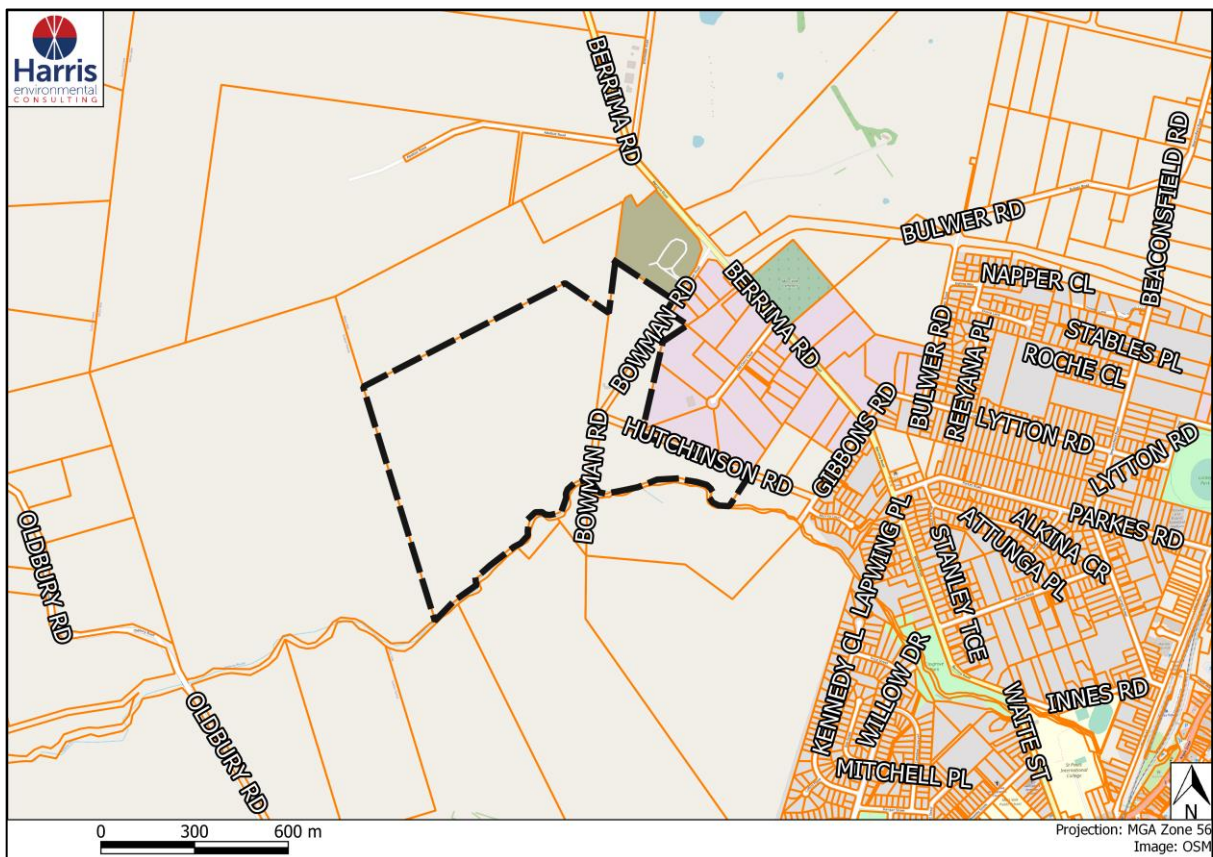


Figure 2 Broad scale aerial view of the site

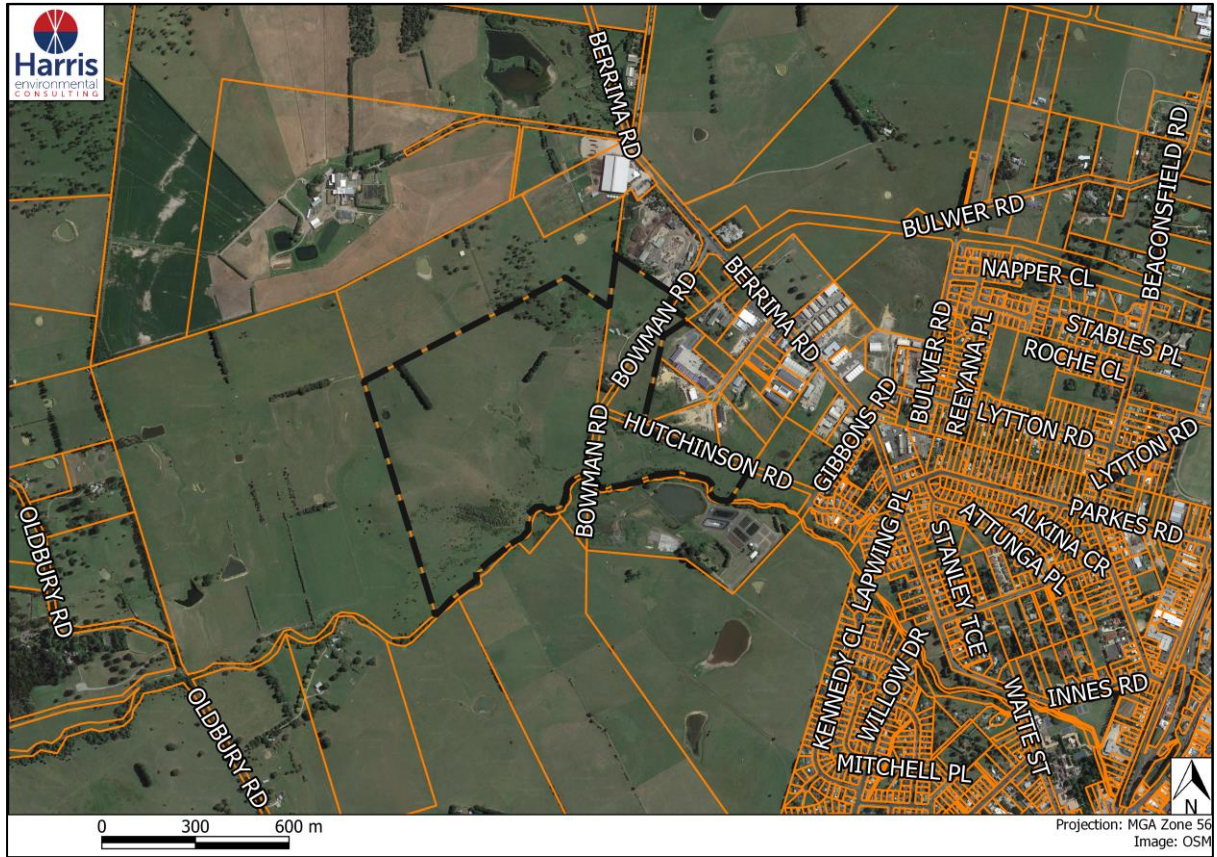
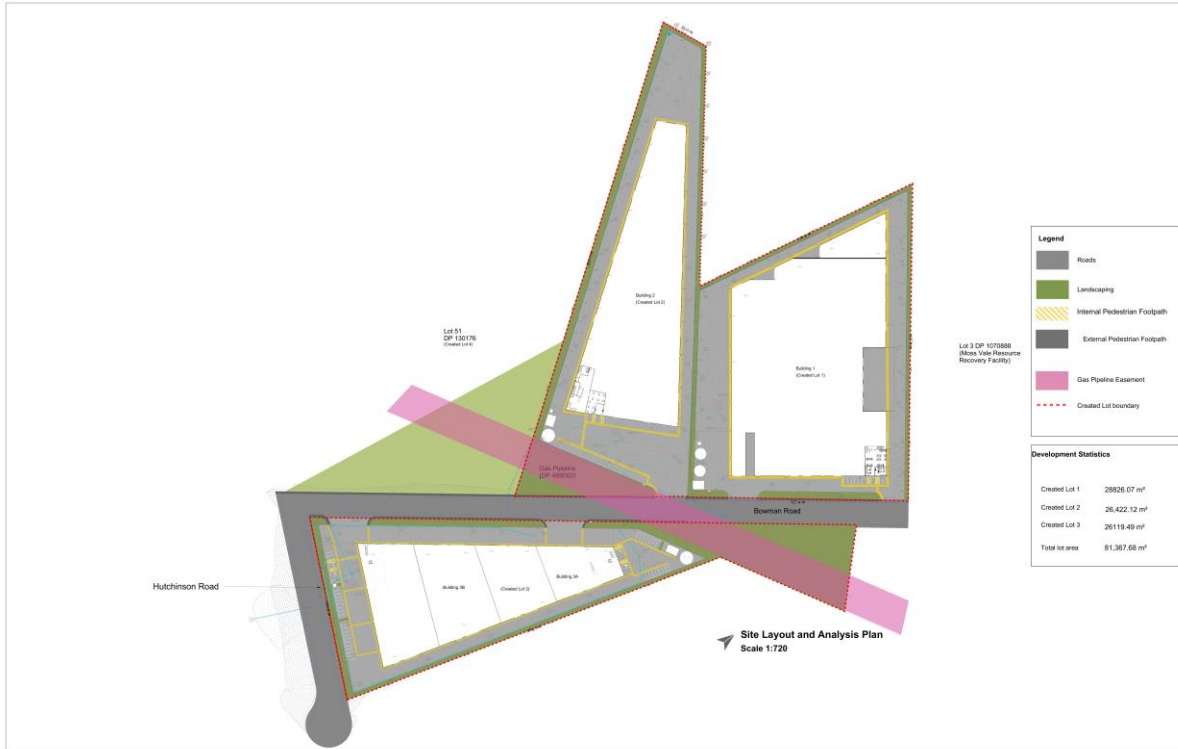


Figure 3 Close up view of site





Figure 4 Proposed Plans- overall Architectural Site Plan



<b>Date</b>	<b>Plan Number</b>	<b>Site Layout And Analysis Plan</b>	<b>Jackson Environment and Planning Pty Ltd</b> Strategy   Infrastructure   Compliance   Procurement A: Suite 102, Level 1, 25-29 Berry St, North Sydney NSW 2060 E: <a href="mailto:info@jacksonenvironment.com.au">info@jacksonenvironment.com.au</a> T: 02 8054 1849 W: <a href="http://www.jacksonenvironment.com.au">http://www.jacksonenvironment.com.au</a>		<b>Client</b> SAAS Aus Pty Ltd <b>Project</b> Industrial Subdivision and General Industry Development <b>Title</b> Site Layout and Analysis Plan <b>Scale</b> 1:720 <b>Source</b> Jackson Environment and Planning Pty Ltd	5 4 3 2 1
6-7-2023	1	2 Bowman Road, Moss Vale (Part of lot 51, DP 130176, Lot 2, DP1070888)				

## 2 PLANNING LAYERS

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

Table 1 Planning Layers

MAP	FIGURE	DESCRIPTION
Bushfire Prone Land Map	5	The site is mapped as “Vegetation Buffer 100 m” and not bushfire prone.
LEP Zone Map	6	The site is zoned as “IN1 General Industrial”, “RU2 – Rural Landscape”, and “IN2 – Light Industrial”.
Vegetation Mapping	7	The surrounding vegetation is mapped as “Southern Highlands Shale Woodland” (Tozer et al., 2010).
Biodiversity Values Map	Appendix ii	As of 8/09/22, there is land identified within the site as having high biodiversity value under the Biodiversity Offsets Scheme under the Biodiversity Conservation Act 2016. This does not include the development or APZ footprints.

Figure 5 Bushfire Prone Map

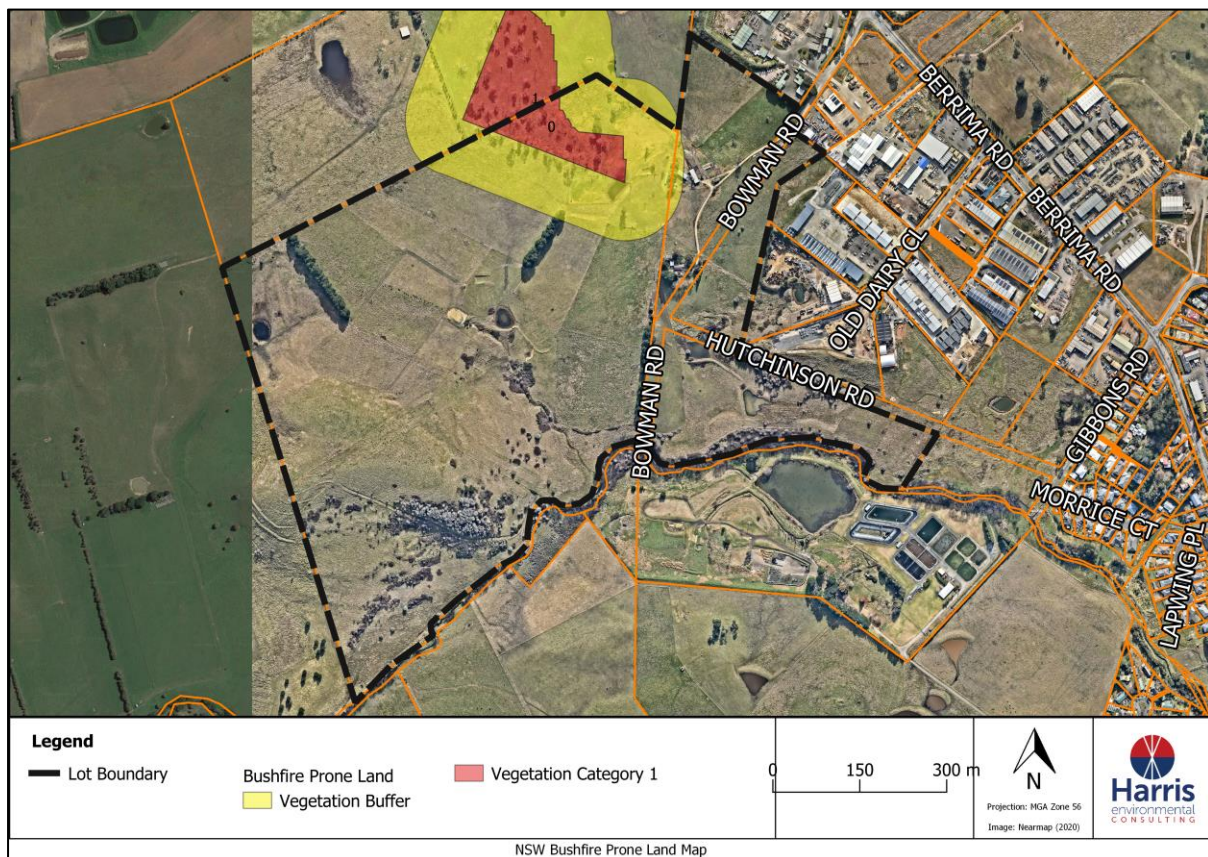


Figure 6 LEP Zone Map

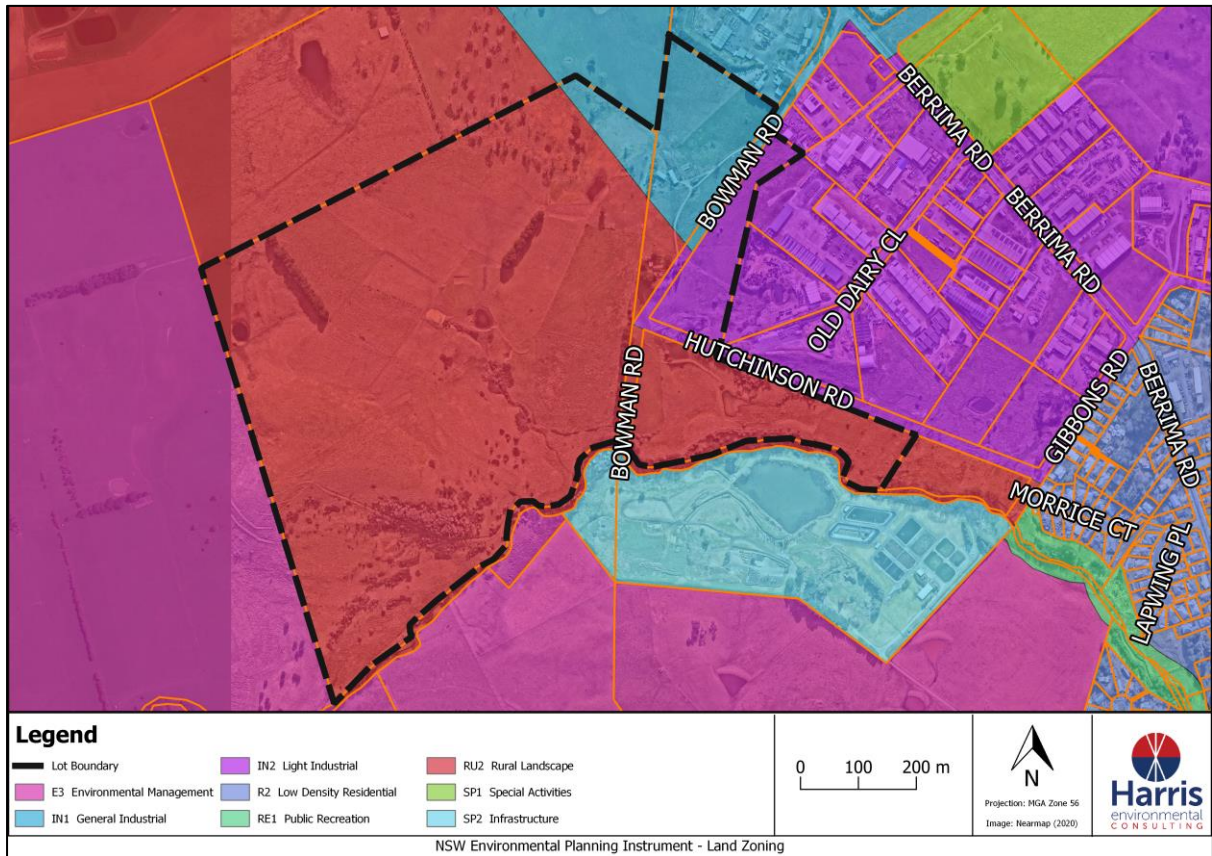
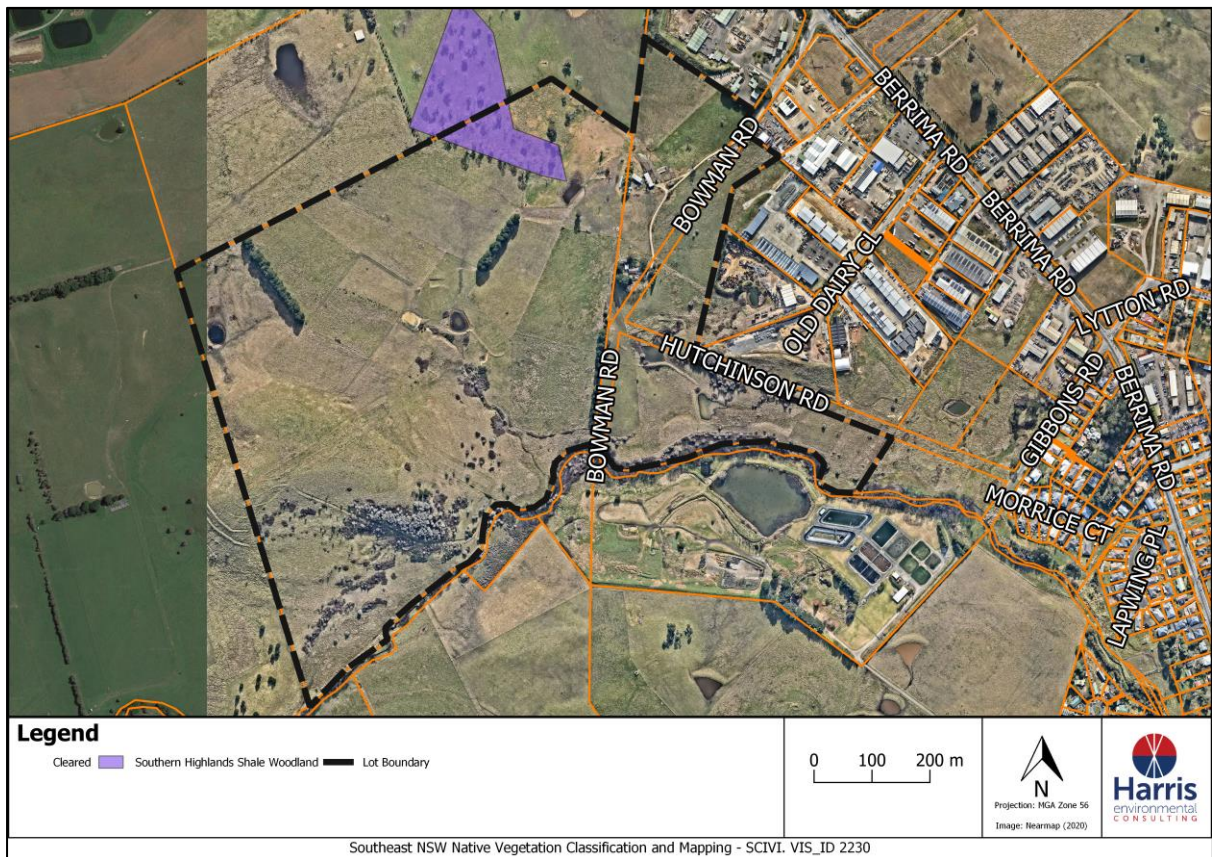


Figure 7 Vegetation Mapping



### 3 SITE DESCRIPTION

#### 3.1 Slope and Aspect of the Site within 100m

The slope that would most significantly influence fire behaviour was determined over a distance of 100 m out from the proposed residence. This assessment was made using 2 m contour interval.

The Australian Standard AS3959 - 2018 and PBP 2019 identify 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.

As can be seen in Figure 8, the site is located on land that downslopes towards the south exposing the proposed development to a 5- 10 degree downslope bushfire hazard. It is noted that slope affects the speed of fire and for every 10 degrees of downslope, the rate of spread is doubled. The rate of spread is one of the important variable inputs used in calculating the BAL.

Figure 8 Slope



### 3.2 Vegetation Formation Within 140m of Proposed Development

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

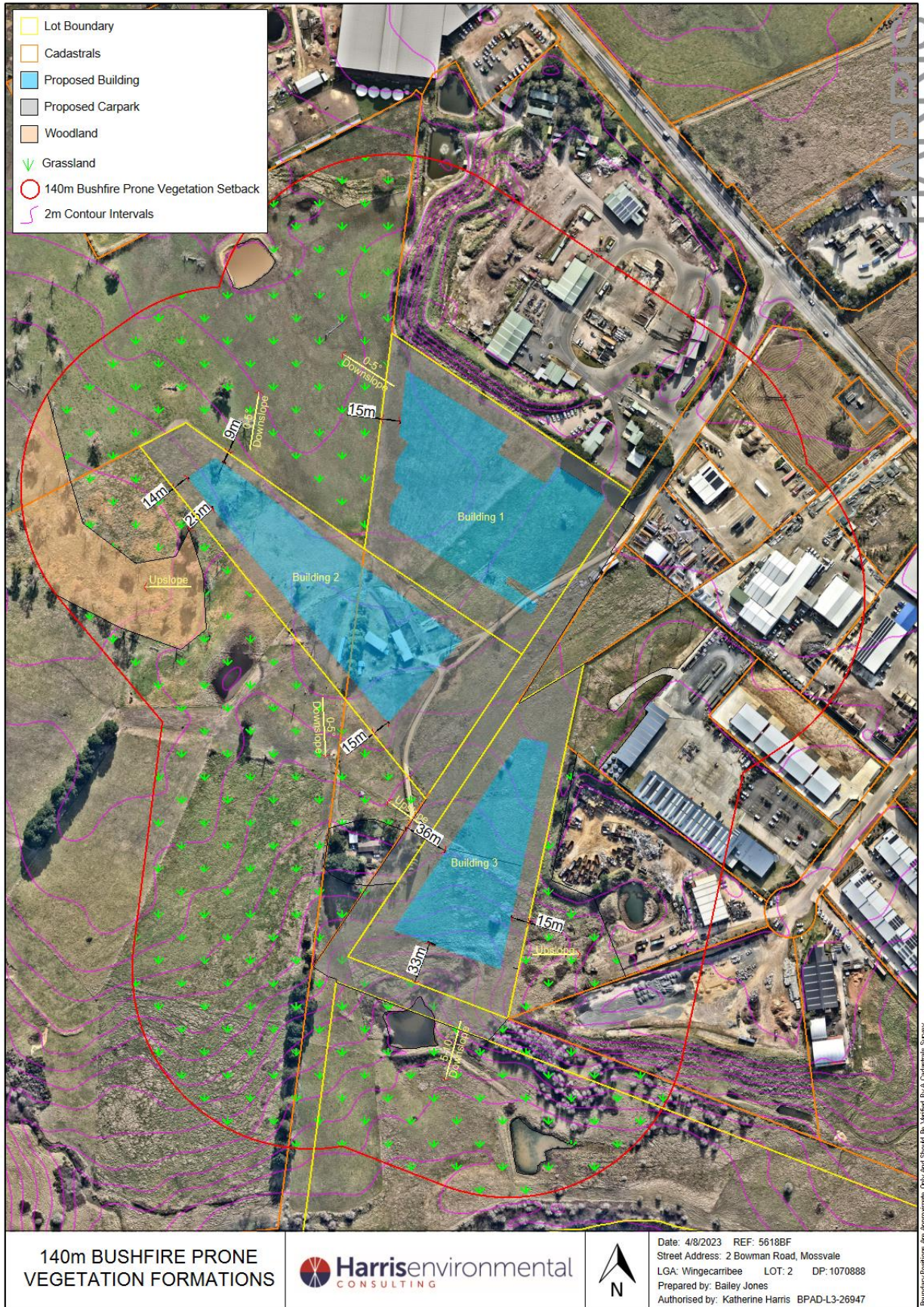
The bushfire threat is determined from vegetation formations are described below and summarised in Table 2. Details regarding the threat and the required mitigation measures are provided in Section 4 *Bushfire Threat Assessment* of this report.

On all elevations the vegetation has been classified as 'Grassland' in accordance with the *Planning for Bush Fire Protection 2019*. The Grassland Fuel load poses a grassfire risk. Grass fires are very hot and can start quickly and spread rapidly. The vegetation to the west of Building 2 has been mapped as "Southern Highlands Shale Woodland" and has been classified as "Woodland". It is noted that the Southern Highlands Shale Woodland is a variable community in terms of structure and composition. In this case the formation exists as disturbed and fragmented remnant composed of sparsely spaced individual trees (more than 5 m). The understory consists of Grasslands and no shrubs and there is little fuel continuity in terms of vertical fuel ladders. The bushfire behaviour of woodland fires is one of the variables included in the simplified methodology used to determine the BAL. Photo 1-4 show the surrounding vegetation.

**Table 2** Predominate Vegetation Classification

		Vegetation Formation	Effective Slope	Distance between façade and hazard
Building 1	West	Grassland	0-5° Downslope	15 m
	North, South and East	Managed	-	-
Building 2	North	Grassland	0-5° Downslope	9 m
	West	Grassland	Upslope	13 m
		Woodland	Upslope	25 m
	South	Grassland	0-5° Downslope	15 m
Building 3	East	Grassland	Upslope	15 m
	West	Grassland	Upslope	36 m
	South	Grassland	5-10° Downslope	33 m
	East	Managed Grassland	-	-

Figure 9 Bushfire Prone Vegetation within 140 metres



*Photo 1: View of Grassland on south west*



*Photo 2: View of Grassland on south east*



*Photo 3: View of Grassland on west*



*Photo 4: View of Grassland on east*





## 4 BUSHFIRE THREAT ASSESSMENT

### 4.1. Asset Protection Zones (APZ)

Table A1.12.5 *Planning for Bush Fire Protection 2019* has been used to determine the width of the required APZ for the proposed development using the vegetation and slope data identified.

Table 3 and Figure 10 below shows the APZ and BAL Determination for the proposed development.

APZ's should be established from the commencement of building works and maintained for perpetuity for the following dimensions:

Building 1:

- 15 m across northern, western and southern elevations;
- To the property boundary on the eastern elevation.

Building 2:

- 9m on the north and east;
- 12 m on the south and west.

Building 3:

- 22 m across the north and west;
- 28 m on the south;
- To the boundary on the east.

**Table 3 APZ and BAL Determination**

		Vegetation Formation	Effective Slope	Distance between façade and hazard	BAL 40 required APZ	BAL 29 required APZ	BAL 12.5 required APZ	BAL Required
<b>Building 1</b>	<b>West</b>	Grassland	0-5° Downslope	15 m		12 -< 17 m		<b>BAL 29</b>
<b>Building 2</b>	<b>North</b>	Grassland	0-5° Downslope	9 m	9 -< 12 m			<b>BAL 40</b>
	<b>West</b>	Grassland	Upslope	12 m		10 -< 15 m		<b>BAL 29</b>
	<b>South</b>	Grassland	0-5° Downslope	12 m		12 -< 17 m		<b>BAL 29</b>
<b>Building 3A</b>	<b>West</b>	Grassland	Upslope	22 m			22 -< 50 m	<b>BAL 12.5</b>
	<b>East</b>	Grassland	Upslope	15 m		15 -< 22 m		<b>BAL 19</b>
	<b>South</b>	Grassland	5-10° Downslope	28 m			28 -< 50 m	<b>BAL 12.5</b>

Figure 10 Asset Protection Zones



Figure 11 Facades and BALs



## 4.2. Relevant Construction Standard

The Australian Standard AS3959 – 2018 *and/or NASH Standard Steel Framed Construction in Bushfire Areas* (2014) are the enabling standards that address the performance requirements of both parts 2.3.4 and Part GF5.1 of the Building Code of Australia for the Construction of 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 proposed development can be constructed to the following BALs as specified by AS3959 - 2018 Construction for Buildings in Bushfire Prone Areas, PBP 2019 and/or *NASH Standard Steel Framed Construction in Bushfire Areas* (2014).

- **Building 1:**
  - **BAL 29:** floor, roof, northern southern and western facades
  - **BAL 19:** eastern facades
- **Building 2:**
  - **BAL 40:** floor, roof, north east and north western facades
  - **BAL 29:** south east and south west facades
- **Building 3:**
  - **BAL 19:** roof, floor, eastern and southern facades;
  - **BAL 12.5:** northern and western facades.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC.

- Clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall:
  - be non-combustible; or
  - comply with AS/NZS 4200.1,
- Be installed on the outside of the frame and have a flammability index of not more than 5 as determined by AS 1530.2; and clause 5.2 and 6.2 of AS 3959 is replaced by clause 7.2 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL.
- Clause 5.7 and 6.7 of AS 3959 is replaced by clause 7.7 of AS 3959, except that any wall enclosing the subfloor space need only comply with the wall requirements for the respective BAL.
- Fascias and bargeboards, in BAL-40, shall comply with:
  - clause 8.4.1(b) of AS 3959; or
  - clause 8.6.6 of AS 3959.

### 4.3. Emergency Management

The owners are advised to obtain the *NSW Rural Fire Service – "Guidelines for the Preparation of Bush Fire Evacuation Plans" & 'Bush Fire Survival Plan'* In the event of an emergency, the owners should ensure they are familiar with the RFS Bush Fire Alert Levels and use their Bush Fire Survival Plan.

### 4.4. Adequate Water and Utility Services

A reticulated water supply shall comply with the following:

- Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005;
- Hydrants are not located within any road carriageway;
- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
- Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.

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

Electrical transmission lines, if above ground, will be managed under specifications issued by Energy Australia.

#### 4.5. Safe Operational Access

The *Planning for Bushfire Protection 2019* requires safe operational access to structures and water supply for emergency services while residents are seeking to evacuate from an area.

The site is located on Bowman Road. This is a two-wheel drive, all-weather road. Road surfaces and bridges are sufficient to carry fully loaded firefighting vehicles. This development relies on the extension of Bowman Road to provide through access to the existing road network.

The existing access from the no through road Bowman Road provides an adequate turning area for a fire tanker that requires an inner minimum turning radius of 6m and outer minimum radius of 12m, shown by Figure 11. The access is required to comply with the PBP- Property Access Table 7.4a. This includes:

- A minimum carriageway width of four metres;
- Curves a minimum inner radius of six metres;
- The minimum distance between inner and outer curves is six metres;
- The cross fall is not more than 10 degrees;
- Maximum grades for sealed roads do not exceed 15 degrees (28 per cent) and not more than 10 degrees (18 percent) for unsealed roads;
- The internal road surfaces and bridges have a capacity to carry fully loaded firefighting vehicles (23 tonnes) and provide signage that clearly indicates the bridge capacity; and
- There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.

## 5 LANDSCAPING

An APZ is required to be established and should be maintained for perpetuity.

When landscaping, vegetation should be located greater than 2 m from any part of the roofline of a dwelling or the shed. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 m from an exposed window or door. Trees should have lower limbs removed up to a height of 2 m above the ground.

Appendix 4 (*PBP 2019*) provides guidelines for landscaping and Bushfire Provisions within the APZ. To incorporate bushfire protection measures into future development, the owner is advised to consider the following:

- 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.
- The property should be developed to incorporate suitable impervious area surrounding the house, including courtyards, paths, and driveways.

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.

## 6 SUMMARY

- The proposed development can be constructed to the following BALs as specified by AS3959 - 2018 Construction for Buildings in Bushfire Prone Areas, PBP 2019 and/or *NASH Standard Steel Framed Construction in Bushfire Areas (2014)*.
  - **Building 1:**
    - **BAL 29:** floor, roof, northern southern and western facades
    - **BAL 19:** eastern facades
  - **Building 2:**
    - **BAL 40:** floor, roof, north east and north western facades
    - **BAL 29:** south east and south west facades
  - **Building 3:**
    - **BAL 19:** roof, floor, eastern and southern facades;
    - **BAL 12.5:** northern and western facades.
- APZ's should be established from the commencement of building works and maintained for perpetuity for the following dimensions:
  - **Building 1:**
    - 15 m across northern, western and southern elevations;
    - To the property boundary on the eastern elevation.
  - **Building 2:**
    - 9m on the north and east;
    - 12 m on the south and west.
  - **Building 3:**
    - 22 m across the north and west;
    - 28 m on the south;
    - To the boundary on the east.
- The site is located on Bowman Road. This is a two-wheel drive, all-weather road. Road surfaces and bridges are sufficient to carry fully loaded firefighting vehicles.
- The existing access from the no through road Bowman Road provides an adequate turning area for a fire tanker that requires an inner minimum turning radius of 6m and outer minimum radius of 12m. The access is required to comply with the PBP- Property Access Table 7.4a. This includes:
  - A minimum carriageway width of four metres;
  - Curves a minimum inner radius of six metres;
  - The minimum distance between inner and outer curves is six metres;
  - The cross fall is not more than 10 degrees;
  - Maximum grades for sealed roads do not exceed 15 degrees (28 per cent) and not more than 10 degrees (18 percent) for unsealed roads;
  - The internal road surfaces and bridges have a capacity to carry fully loaded firefighting vehicles (23 tonnes) and provide signage that clearly indicates the bridge capacity; and
  - There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.
- A reticulated water supply:
  - Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005;



- Hydrants are not located within any road carriageway;
- Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.
- Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
- Any bottled gas will 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.
- Electrical transmission lines, if above ground, will be managed in accordance with specifications issued by Energy Australia.

## 7 REFERENCES

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

National Association of Steel-Framed Housing (2014) *NASH Standard Steel Framed Construction in Bushfire Areas*

NSW Department of Environment, Climate Change and Water (2010) Southeast NSW Native Vegetation Classification and Mapping - SCIVI VIS\_ID 2230 20030101. Bioregional Assessment Source Dataset. Viewed 18 June 2018, <http://data.bioregionalassessments.gov.au/dataset/0f1aeb33-1b49-4839-88fa-8b635cf9d3ab>.

NSW Department of Planning and Environment. Planning Portal. Accessed at: <https://www.planningportal.nsw.gov.au/>

NSW Office of Environment and Heritage (2020). Biodiversity Value Map. Accessed at: <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 and 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 strata;
- 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; and
- 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

