
COMMENTS MADE 9/05/14 IN RELATION TO BUSHFIRE
HAZARD CONSTRAINTS FOR PROPOSED REZONING OF
LAND FOR NORTH SILVERDALE LANDOWNER GROUP

LGA: WOLLONDILLY SHIRE COUNCIL

PROJECT MANAGER: SITE PLUS PTY LTD

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1. INTRODUCTION

These comments have been made on the plan provided by Siteplus in May 2014 and shown in Figure 1, for the proposed rezoning, Silverdale Centre Land Owner Group.

These comments are based on consideration of the following legislation:

1. *Rural Fires Act 1997*;
2. *Environmental Planning and Assessment Act 1997*;
3. Building Code of Australia;
4. NSW Rural Fires Services, Planning for Bushfire Protection, 2006;
5. Australian Standard AS3959-2009 Construction of buildings in bushfire-prone areas.

2. CONSIDERATIONS

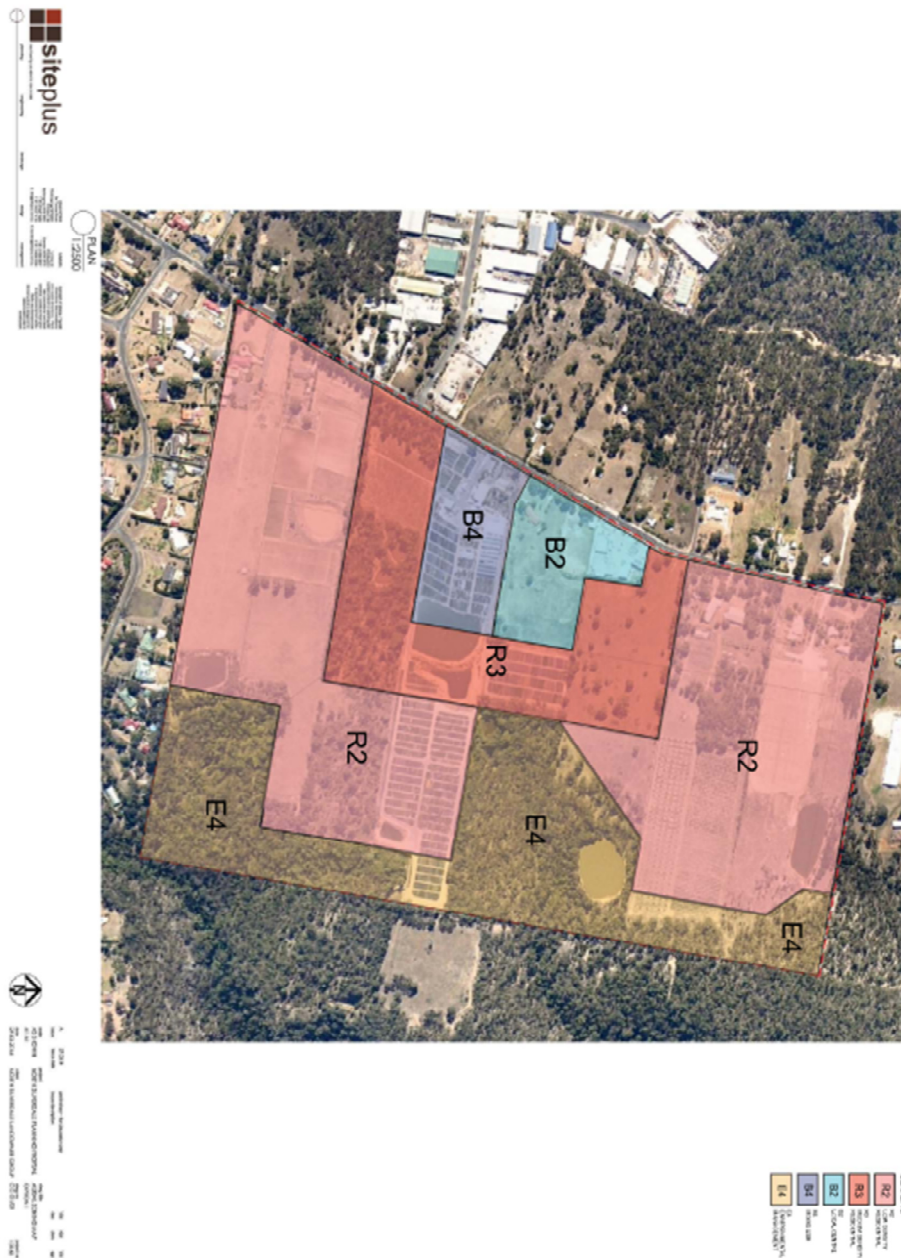
The Planning Principles for Rezoning to Residential Land in Bushfire Prone Areas are applied to the proposed development. These planning principles are listed on page 4 of the *Planning for Bushfire Protection Guidelines*, (NSW Rural Fire Service, 2006). This includes:

- a) **Access**; does the site have provision for a perimeter road with two way access which delineates the extent of the intended development?
- b) **Asset Protection Zones**; does the development have provision at the urban bushland interface for the establishment of adequate asset protection zones for future housing?
- c) **Minimum lot depths**; what will be the minimum residential lot depth to accommodate asset protection zones for lots on perimeter roads?
- d) **Perimeter exposed to hazard**; does the development minimise the area of developed land interfacing the hazard?
- e) **Inappropriate development in hazardous areas**; are there any site specific controls needed to address development or placement of combustible materials?
- f) **Inappropriate placement of combustible materials in asset protection zones**; are there any site specific controls needed to prevent the inappropriate placement of combustible materials in asset protection zones?

3. CURRENT PLAN OF PROPOSED ZONES

It is proposed to rezone the property into B2, B4, R3, R2 and E4 as shown on Figure 1. The identified area of bushfire hazard constraint is primarily located in the E4 proposed area and possibly some of the small remnants located in the R3 and R2. These areas are discussed in more details in the following section.

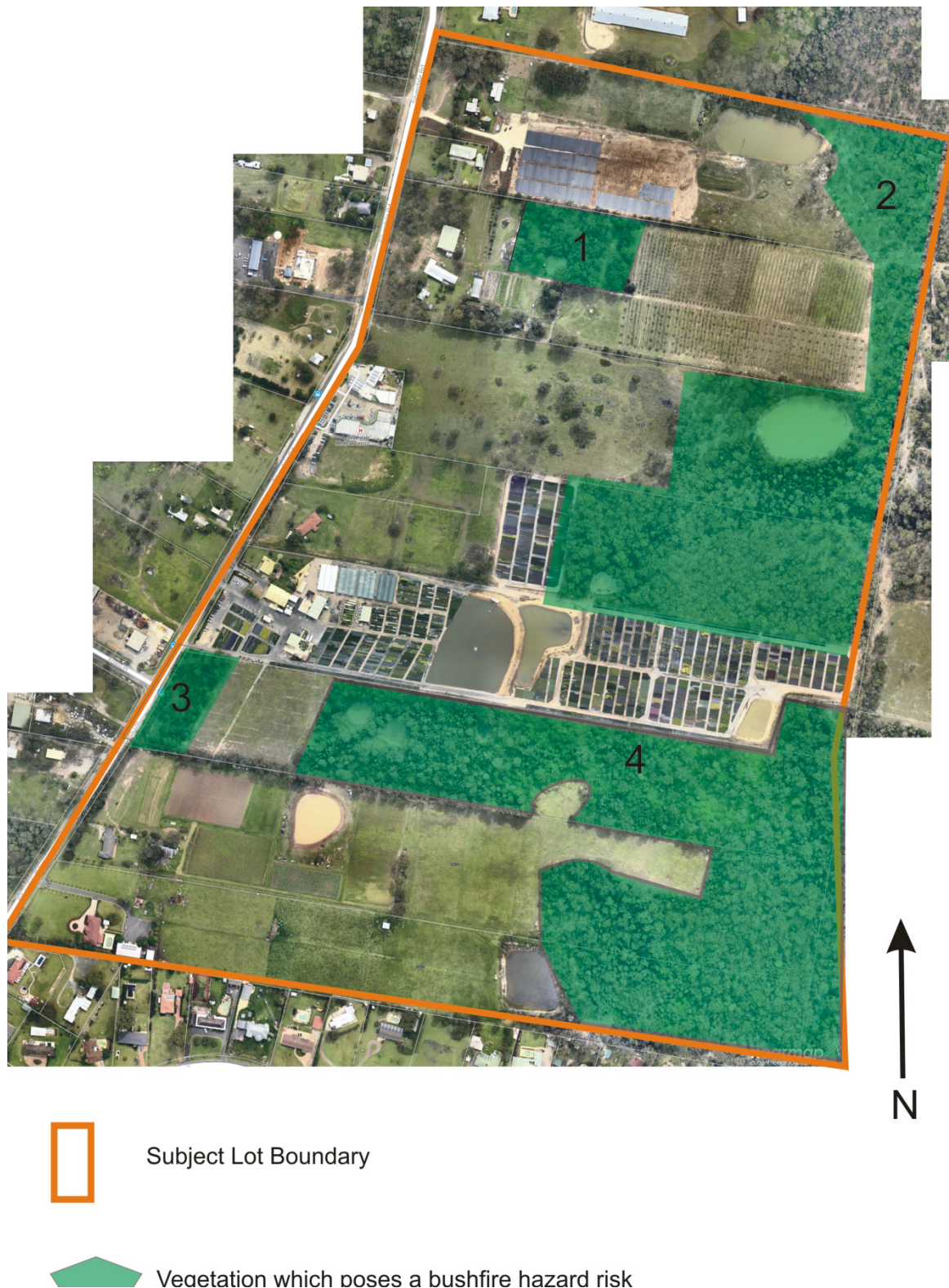
Figure 1 Proposed Zones



4. AREAS OF BUSHFIRE CONSTRAINTS

There are 4 main areas that pose a bushfire hazard constraint, these areas are shaded a light green in Figure 2 below

Figure 2 Areas of Vegetation that pose a bushfire hazard constraint



The following describes the APZ constraints of each area identified with vegetation that poses a bushfire hazard risk:

Area 1: Area 1 is located in the proposed R2 and is just over 1 hectare in size (10,515m²). This remnant is located entirely inside the proposal allowing the bushfire constraints to be managed as part of the proposal. If the area of vegetation was reduced to one hectare, the bushfire vegetation category would be considered “remnant”, and the APZ buffer required would be less.

Table One provides the summary of APZ required based on the remnant being less than 1 hectare in size:

Table One Area 1 and Area 3 indicative APZ ‘s

LANDFORM	MIN APZ DISTANCE FOR BAL 12.5	MIN APZ DISTANCE FOR BAL 19	MIN APZ DISTANCE FOR BAL 29
UPSLOPE OF VEG	23m	16m	11m
DOWNSLOPE OF VEG	29m	20m	14m

Figure 3 Aerial of Area 1



Area 2: Area 2 is located in the proposed E4 and is part of the larger adjoining remnant on the eastern boundary of the subject lot. The major constraint for Area 2 is that the adjoining eastern boundary has unmanaged bushfire prone vegetation that will require an APZ. To comply with the Bushfire Protection Criteria listed above it would be best practice to provide a road between the dwellings and the vegetation. This could be in the form of a fire trail.

Figure 4 shows the contours of the site and a gully can clearly be seen transecting the bottom portion of the area from east to west. The dwellings located above this gully (vegetation on the downslope) would require a bigger APZ depending on the slope. The RFS does not support any APZ over 18 degrees so this area would need a site visit to determine the details for placement of the APZ.

Table Two provides the summary of APZ required based on the vegetation as Forest and provides the range of downslopes:

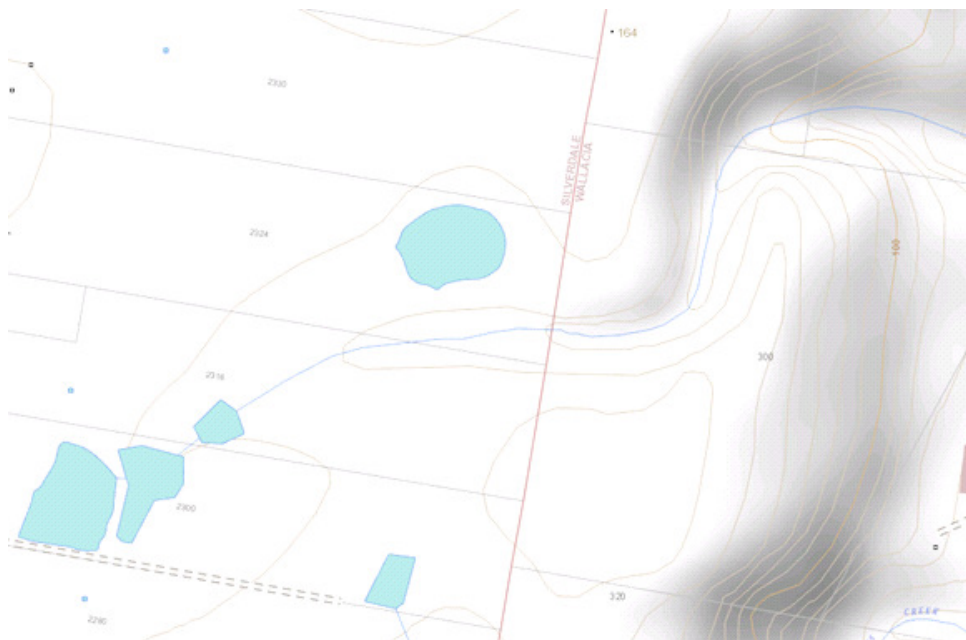
Table Two Area 2 and Area 4 indicative APZ 's

LANDFORM	MIN APZ DISTANCE FOR BAL 12.5	MIN APZ DISTANCE FOR BAL 19	MIN APZ DISTANCE FOR BAL 29
UPSLOPE OF VEG	48m	35m	25m
DOWNSLOPE OF VEG (0-5 DEGREES)	57m	43m	32m
DOWNSLOPE OF VEG (5-10 DEGREES)	69m	53	39
DOWNSLOPE OF VEG (10-15 DEGREES)	82m	64m	49m

Figure 4 Aerial of Area 2



Figure 5 Topography of Area 2



Area 3: Area 3 is a small remnant located alongside Silverdale road as show in Figure 6. This area is less than 1 hectare and would be considered “Remnant” by the RFS. Its APZ requirements are also identified in Table One.

Figure 6 Aerial of Area 3



Area 4: Area 4 is located in the proposed R3, R2 and E4 zones and is part of the larger adjoining remnant on the eastern boundary of the subject lot. An aerial is shown in Figure 7. The major constraint for Area 4 is that the adjoining eastern boundary has unmanaged bushfire prone vegetation that will require an APZ. To comply with the Bushfire Protection Criteria listed in the first section, it would be best practice to provide a road between the dwellings and the vegetation. This could be in the form of a fire trail.

Figure 8 shows the contours of the site and it can be seen that the topography of the area is steep due to the gullies. The dwellings located above the gullies (vegetation on the downslope would require a bigger APZ) depending on the slope. The RFS does not support any APZ over 18 degrees so this area would need a site visit to determine the details for placement of the APZ. Table 2 shows the options for minimum APZs based on the slope.

Figure 7 Aerial of Area 4



Figure 8 Topography of Area 4



5. BUSHFIRE HAZARD ASSESSMENT THAT WOULD BE REQUIRED AT NEXT STAGE

5.1 Methodology

A number of related factors determine the nature of the bushfire hazard. These are slope, vegetation type, and distance from hazard, access and the regions fire rating index. The Fire Rating Index is determined by the NSW RFS for fire areas and council areas across NSW and assumed for a 1 in 50 year event (Table A2.3, RFS 2006). Wollondilly LGA has an **FDI rating of 100** for a 1 in 50 year event.

5.2 Defendable space/Asset Protection Zone

The Asset Protection Zone (APZ) provides a defendable space between the asset and the hazard. This ensures minimal separation for safe fire-fighting, reduced radiant heat, reduced embers and smoke.

The primary purpose of the APZ assessment is to determine a compliant (APZ required by Acceptable Solutions within Table A2.4 AS 3959 2009) location for a building envelope on a proposed new lot. In this case, the setbacks for APZ's are shown, for the purposes of rezoning. These setbacks are based on the assumption that the woodland within Lot 1 DP 835288 is managed.

The building construction standard is based on the determination of the Bushfire Attack Level (BAL) in accordance with AS 3959-2009 'Construction of Buildings in Bushfire Prone Areas'. The BAL is based on known vegetation type (AS3959 – vegetation), effective slope and managed separation distance between the development and the bushfire hazard.

It is assumed that the highest bushfire attack level construction standard will be BAL 29, which is protection from ember attack and radiant heat greater than 19 kW/m² up to and including 29kW/m².

An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA) which is further described in Appendix II. The respective IPA and OPA widths for the required APZs would be detailed at the lot layout stage, and are not identified in this assessment.

To ensure an adequate APZ, this assessment will specify a setback area for some lots. This setback will consist of the areas identified as BAL 40 and Flame Zone. Habitable buildings are not permitted within the area nominated as having a bushfire setback but the remainder of the site can support habitable buildings.

5.3 Access

When a development application is lodged, the standards for development will need to consider a range of matters and these will include the matters addressed in the following sections. However, given the timeframe between when a rezoning occurs and actual development of the site, these standards may alter depending on the development which might have occurred on adjoining sites in the interim between rezoning and lodgement of a development application.

This information is provided as an indicative guide of the matters that will be considered when a development application is lodged.

The general standard of road construction proposed required for compliance with the PBP (RFS, 2006) Bushfire Protection Measures for internal roads are listed below. The standard expected for this development includes:

- sealed, all weather two wheel drive road
- internal perimeter road will provide for at least two traffic lanes (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions;
- roads are through roads;
- traffic management devices are to be constructed to facilitate access by emergency service vehicles;
- a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches;
- curves will have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress;
- the minimum distance between inner and outer curves is six metres;
- maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees;
- crossfall of the pavement is not more than 10 degrees;
- roads do not traverse through a wetland or other land potentially subject to periodic inundation.

The standard for the fire trails include:

- the width and design of the fire trails enables safe and ready access for firefighting vehicles, with a minimum carriageway of 4 metres, with an additional 1 metre strip of cleared area on both sides (6 metres total width),
- maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed;
- a minimum vertical clearance of 4 metres
- crossfall of the trail not more than 10 degrees;
- Capacity for passing by with reversing bays every 200m, 20 metres long by 3 metres wide;
- Maintained in a serviceable condition by the owner,
- Appropriate drainage and erosion controls;
- Where the trail joins a public road, access shall be controlled to prevent use by non-authorized persons with gates that are locked with a key system authorized by local RFS;
- Design which prevents weed infestation, soil erosion and other land degradation.

5.4 Inappropriate Development in Hazardous Areas

Site specific controls will be required to address the development or placement of combustible materials within the building setbacks that is part of the APZ for lots. This will be based on the Bushfire Protection Measures in Appendix 5 of PBP (RFS, 2006) which includes:

- 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.

5.5 Water Supply and Utility Services

Adequate supply of water is essential for firefighting purposes. In addition, gas and electricity should be located so as not to contribute to the risk of fire or impede the firefighting effort. Water, electricity and gas are to comply with section 4.1.3 of PBP (2006).

5.6 Building Construction

The Australian Standard AS3959-2009 Construction of building in bushfire prone areas provides the relevant construction requirements for buildings in bushfire prone land. The assessment will provide setbacks required for construction standard of BAL 29 or less.

6. SUMMARY

Broadly the measures requiring detailed comment when a development application is lodged will include:

- Establishment of setbacks and APZ's;
- Utilities (water, electricity and gas) are to comply with relevant bushfire standards;
- Landscaping is comply with relevant standards;
- Access is to comply with relevant standards.

7. REFERENCES

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

NSW Rural Fire Service (2006) *Planning for Bushfire Protection. A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.*

NSW Rural Fire Service Standards for asset protection zones. Can be accessed from www.rfs.nsw.gov.au

Standards Australia (2009) *AS3959, Construction of buildings in bushfire-prone areas.*

Appendix I Methodology and process used to determine APZ

The PBP (2006) provides a methodology to determine the Asset Protection Zone required for residential dwellings. In addition, the Australian standard AS3959-2009 determines the appropriate setback for construction level BAL 29.

The following process was taken to assess the APZ required for this zoning proposal.

Determine vegetation formations

The PBP (2006) requires the assessment to:

- (a) Determine vegetation formations:
- I. Identify vegetation within 140 metres in all directions;*
 - II. Consult Table A2.1 to determine the predominant vegetation type; and*
 - III. Select the predominant vegetation formation as described in Table A2.1.*

The vegetation formations classified in Table A2.1 of Planning for Bushfire Protection 2006 that could be included in Bushfire Prone Land area:

- Forest (wet and dry sclerophyll)
- Woodland
- Plantations (pine only)
- Forested wetlands
- Tall heaths
- Freshwater heaths
- Short heaths
- Alpine complex
- Semi-arid woodlands; and
- Rainforest.

However, Bushfire Prone Land does not include:

- a) Vegetation less than 1 ha, or a shape that provides a potential fire run to building of less than 50m is considered remnant vegetation, which is considered a low hazard. The same APZ and construction standards applied to rainforest are applied to remnant vegetation;
- b) The following are not considered in the assessment:
 - non-vegetated areas including roads, footpaths, cycleways, waterways buildings, rocky outcrops etc; and
 - reduced vegetation including maintained lawns, golf course fairways, playgrounds or sports fields, vineyards, orchards, cultivated ornamental gardens and commercial nurseries.

Determine effective slope

The effective slope represents the slope most likely to influence fire behavior. The effective slope between the proposed development site and forest, measured over 100m.

Determine appropriate fire weather

The Fire Rating Index is determined by the NSW RFS for fire areas and council areas across NSW and assumed for a 1 in 50 year event (Table A2.3, RFS 2006). Wollondilly LGA has an **FDI rating of 100** for a 1 in 50 year event.

Determine appropriate setback

The required Asset Protection Zone is calculated using Table 2.4.2 from the AS 3959 2009.