

Bushfire Risk Assessment



To Accompany
**7 Lot Rural Subdivision
&
Boundary Adjustment
Application**

TO

NSW Department of Planning,

Lot 14 DP 750222
and
Lot B DP 33573
Parish of Narrabarba
County of Auckland

**Lot 14 Ivor Jones
Drive,
WONBOYN LAKE**



Prepared By
Maree Staight



Surveying & Valuations
PO Box 639
Eden NSW 2551

for

**Picnic Point Pty Ltd,
Owner**

1. Introduction

We have been instructed on behalf of Picnic Point Pty Ltd, owner of the subject property, to undertake a Bushfire Risk Assessment, to accompany an application for subdivision to the NSW Department of Planning.

This proposal involves a 7 Lot rural subdivision of Lot 14 in Deposited Plan No. 750222 Parish of Narrabarba, forming a contiguous land parcel of 131 hectares or thereabouts (Appendix 1).

It also includes a boundary adjustment of Lot B DP 33573. This property is to be utilised to extend Ivor Jones Drive to the subject property, creating practical access, and also contains an existing dwelling house.

This will include an application to NSW Rural Fire Service for Bushfire Safety Authority under Section 100B of the *Rural Fires Act 1997*.

The report concludes that the subject property is not sterilised by the bushfire threat, and activities in relation to the development of the land, provided appropriate precautions are taken.

2. Property Description and Location

2.1 Property Address

The subject land is irregular in shape and is bounded to the east and west by the Wonboyn River and adjoins freehold land to the north and south. The land is known as

Lot 14 Ivor Jones Drive,
Wonboyn Lake NSW 2551, and

“Silvertops”
Lot B Ivor Jones Drive
Wonboyn Lake NSW 2551

2.2 Area

Each proposed lot comprises an irregular shaped parcel of land, with access to be obtained directly from an extension to Ivor Jones Drive. The proposed lot areas are as follows:

Lot 1	3.91 hectares
Lot 2	3.95 hectares
Lot 3	3.22 hectares
Lot 4	4.07 hectares
Lot 5	2.83 hectares
Lot 6	3.54 hectares
Lot 7	109.48 hectares (residue)

Lot B	6.0 hectares (total increase of approximately 0.5 hectares)
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Photographs of the proposed new allotments have been included within Appendix 6.

2.3 Location and Neighbourhood

The subject property is situated to the north of the Wonboyn Lake Village, adjoining the Wonboyn River, approximately 3 kilometres from the General Store. The land is irregular in shape and could be described as undulating with dense natural vegetation across the site. The land obtains access directly from Ivor Jones Drive, a Council maintained public road at the southeastern corner of the property.

The site is bounded by freehold land to the north and south, which are predominantly utilised as rural lifestyle properties and occupied on a holiday basis. Some of these properties are improved with dwellings and buildings associated with the rural retreat lifestyle, although Lot 11 (to the north), remains vacant.

The adjacent properties are in a similar, natural state to the subject site, with those that are improved having cleared areas around the dwellings.

2.4 Topography

The topography of this land is generally undulating, with an overall slope to the north and a low ridge running through the centre of the southern end of the property. From this boundary, the land slopes to the east and west, on the respective sides of the ridgeline. Generally, the site has an average slope of no more than 10°.

The land contains sandy soil and could be described as typical for coastal country, being dunal in origin without defined features. The land is generally uncleared and in a natural vegetated and regrowth state, with some recent under scrubbing works being undertaken in the proposed new allotments and cleared lines along the electricity easements.



Figure 1; Location Map, Far South Coast NSW.

2.5 Utilities

The location of the property, places it outside the area for supply of reticulated services such as water and sewerage, as provided by Bega Valley Shire Council. As such, these services will be required to be provided for onsite and connected to any future dwellings erected following this subdivision.

Electricity is available to the property, and will be required to be connected as part of the subdivision, in accordance with Country Energy guidelines. It is intended that two separate connections will be made, given the size of the property, to reduce connection costs. The domestic supply to all lots will be underground, however part of the main extensions within the residue lot may continue overhead from the transmission lines to the lot boundaries.

Telephone is also available for connection to the property, and will also be connected as part of the subdivision process.

As discussed, there is no water reticulation available to the land. Each lot will establish its own collection and storage system for domestic use. Fire protection water reserves will be supplied as part of the onsite storage.

Sewer is also not available to this area. The lots are intended as single residential dwelling parcels only. All domestic effluent will be contained and disposed of on each lot using appropriate OSM measures located within an approved effluent dispersal envelope.

2.6 Access

The current access to the property is not practically obtainable to the subject land, with legal access obtained from a series of unmade Crown Roads. An alternative legal and practical access is to be created as part of the subdivision, from the south eastern corner of the land via an easement across adjoining land to the south. Access to the new allotments is proposed to be from Ivor Jones Drive, via the creation of a Right of Carriageway. This Right of Carriageway will be extended through the subdivision, and will also provide access to adjoining Lot 11 (to the north). The right of carriageway will connect to the existing track within the electricity easement, allowing for a "looped" fire access for fire fighting purposes.

3. Planning for Bushfire Protection

3.1 Vegetation

The subject land is vegetated across the site, with natural species including melaleucas, eucalypts etc in the top layers, and smaller grasses and trees in the shrub layer.

The Bega Valley Shire Bushfire Prone Land Map (below) shows the subject property to contain Vegetation 1 category across the entire site.

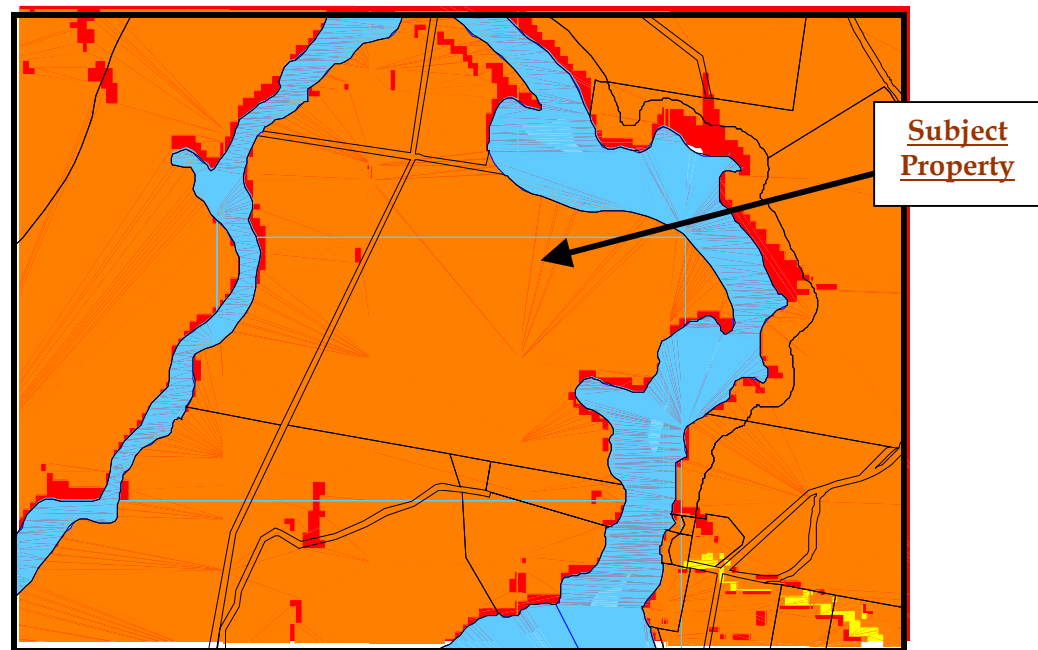
All adjoining properties also contain Vegetation 1 Category as the dominant class.

An aerial photograph of the site and adjoining properties has also been included as Appendix 5 to this report.

3.2 Bushfire Threat Assessment

This bushfire assessment follows the methodology described in *Planning for Bushfire Protection 2006*.

The Bega Valley Bushfire Prone Land Map, which has been prepared in accordance with Section 146 of the Environmental Planning and Assessment Act 1979, shows the subject land to lie predominantly within Vegetation Category 1.



- Vegetation 1 Category
- Vegetation 2 Category
- Vegetation Buffer

(Bega Valley Shire Bushfire Prone Land Map)

As discussed, the Category 1 Vegetation is shown to lie over the whole of the site, being naturally vegetated and having not being cleared or maintained for some years.

The lands adjoining each of the boundaries (north, south and across the Wonboyn River on the eastern and western boundaries) are considered to comprise vegetation varying from a dry sclerophyll forest to open woodland type vegetation. From Table A2.4 of *Planning for Bushfire Protection 2006*, the required Asset Protection Zone for each of the hazardous vegetation types have been adopted, according to the various slopes of each hazard to the building envelopes (3.3).

Hazardous vegetation has been individually assessed for a distance of 100 metres from the site, with slope assessed to a distance of 140 metres from the proposed building envelopes, allowing for a more accurate assessment of the appropriate threat to each of the future dwellings, in accordance with *Planning for Bushfire Protection 2006*.

Vegetation has been assessed using David Keith's "*Ocean Shores to Desert Dunes*," and have been identified individually according to aspect, for a distance of 100 metres from the property boundaries.

3.3 Asset Protection Zones

Using the Asset Protection Zone Calculator on the NSW Rural Fire Service website (www.rfs.nsw.gov.au) in conjunction with *Planning for Bushfire Protection 2006*, APZ's have been determined for each of the sites and have been assessed in accordance with the recommendations of that Calculator, (Appendix 2).

This vegetation has been assessed using David Keith's "*Ocean Shores to Desert Dunes*," and has been identified as a South East Dry Sclerophyll Forest, containing forest type vegetation and eucalypts identified as being common in the immediate area, and having an estimated fuel load of 25 tonnes per hectare.

The recommended Asset Protection Zones included within this report are assessed based on a minimum Construction Level 3, for any future dwellings. As such, the bushfire attack assessor (3.4) has been utilised in order to determine the minimum separation distance (Asset Protection Zone) required in order to comply with a lesser Construction standard (Level 1).

It should be noted that Asset Protection Zones are measured in accordance with *Planning for Bushfire Protection Guidelines 2006*, and are measured from the building line to the hazard, along the horizontal plane.

In summary, the following Asset Protection Zones should be maintained as a minimum, around any future dwellings erected as a result of this application, in accordance with *Planning for Bushfire Protection 2006*, in order to achieve a Level 3 Construction standard (which would require additional standards to be included in the dwelling construction, in accordance with AS 3959 - 1999).

It should be noted that where a boundary fronts the Wonboyn River, there is not considered to be a bushfire threat from outside the subject property, from that aspect. As such the foreshore has been assessed as forest type vegetation, for a distance of 75 metres from the nominated building envelopes.

It should also be noted that Lot B has also been assessed as part of this application, and details of the dwelling are also included further within this report (3.5.2).

Lot 1

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	6° downslope	27 metres (15m IPA and 12m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
West	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)

Lot 2

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	3° upslope	17 metres (9m IPA and 8m OPA)
West	Dry Sclerophyll Forest	3° upslope	17 metres (9m IPA and 8m OPA)

Lot 3

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
West	Dry Sclerophyll Forest	6° upslope	14 metres (8m IPA and 6m OPA)

Lot 4

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
West	Dry Sclerophyll Forest	3° upslope	17 metres (9m IPA and 8m OPA)

Lot 5

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
East	Dry Sclerophyll Forest	6° down-slope	27 metres (15m IPA and 12m OPA)
South	Dry Sclerophyll Forest	3° upslope	17 metres (9m IPA and 8m OPA)
West	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)

Lot 6

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
East	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
South	Dry Sclerophyll Forest	3° upslope	17 metres (9m IPA and 8m OPA)
West	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)

Lot 7 - Residue

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
West	Dry Sclerophyll Forest	3° up-slope	17 metres (9m IPA and 8m OPA)

Lot B

	Prominent Vegetation Type	Average Slope (Within 140m of bdy)	Recommended APZ
North	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
East	Dry Sclerophyll Forest	3° downslope	23 metres (13m IPA and 10m OPA)
South	Dry Sclerophyll Forest	0° - Level	20 metres (11m IPA and 9m OPA)
West	Dry Sclerophyll Forest	3° up-slope	17 metres (9m IPA and 8m OPA)

3.4 Determination of Category of Bushfire Attack

Appendix 2 of *Planning for Bushfire Protection 2006*, identifies the Bega Valley as having a Fire Danger Index (FDI) rating of 100.

Under this rating, Asset Protection Zones have been assessed, using the Bushfire Attack Assessor and the APZ Calculator Tools from the NSW Rural Fire Service website, and have been attached to this report (Appendix 3).

Despite the above, it is recommended that in order to achieve a Level 1 Construction Standard on any future dwellings in the subdivision, that asset protection zones are established and maintained in accordance with the nominated separation distances on the attached Bushfire Attack Assessment Report.

It should also be noted that a Level 1 Construction Standard is the lowest possible standard for buildings in a bushfire prone area. It is not possible to have a nil standard for any future dwellings in this subdivision.

3.5 Additional Bushfire Protection

3.5.1 Construction standards

Due to the fact that the proposed allotments are capable of providing for the required Asset Protection Zones for each of the proposed building envelopes (Lots 1 – 7) it is not considered necessary to provide any additional construction standards on future dwellings built within the nominated building envelopes.

It should be noted however, that the recommended Asset Protection Zones have been calculated on a recommended Construction Level 3, in accordance with AS 3959-1999 (Appendix 4). This is based on a heat flux ratio of no more than 29kW/m², which is considered achievable on the subject properties, within the nominated building envelopes.

The NSW Rural Fire Service Bushfire Attack Assessor demonstrates that a Construction Level 1 can be nominated as a minimum standard on all faces of the future buildings, provided that the greater separation distances are complied with.

3.5.2 Existing Dwelling

As previously discussed, there is an existing dwelling located within Lot B, positioned in the north eastern corner of the land, close to the existing boundary.

As such, it is proposed to undertake a boundary adjustment which will see the boundary swung to the north, in order that additional protection can be available to the dwelling, for both privacy and bushfire protection.

This dwelling was an original homestead on the property. The current owner undertook significant extensions to the dwelling and renovated both the internal and external parts of the building, approximately 15 years ago.

Discussions with the current owner and the builder who undertook the renovations have revealed that the dwelling is constructed of blue board with a weathertex finish and has a colorbond roof.

Other improvements undertaken to the property at the time include the installation of four (4) fire hose reels on steel posts at strategically selected locations at each corner of the dwelling, all of which are powered by a 5hp petrol pump, connected to a 90,000L water tank, which was approved by the Wonboyn Rural Fire Brigade at the time. A key for the lock on the front gate has also been made available to the local Rural Fire Brigade for their use.

Given the above, it is considered that the property (Lot B) is capable of complying with *Planning for Bushfire Protection* with regards to setbacks and Asset Protection Zones, especially with the increased area to the north.

As such, it is recommended that the existing building be upgraded to comply with a Construction Level 1, provided that the greater separation distances are complied with. It is believed that very little work will need to be undertaken to achieve this, and that the boundary adjustment will be of benefit to the dwelling allowing for the greater separation distances to be achieved.

3.5.3 Electricity

Any new dwelling to be erected on the site, as well as any new lines put in place during connection to the subdivision, should, where possible, provide electrical supply lines underground.

It is noted that all electricity supply within the new allotments is to be underground, with only the extension from the HV powerline running north – south through the property, to be overhead, as indicated on the attached proposal plan.

Where overhead electrical transmission lines are installed the following is recommended:

- Lines should be installed with short pole spacing in the vicinity of the new allotments, unless crossing gullies, gorges or riparian areas; and
- No part of a tree should be closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

3.5.4 Water Supply

As there is no guaranteed water supply to any of the subject lots, it is recommended that any future dwellings on any of the lots subject to this report, should supply the following dedicated water for fire fighting purposes:

- A minimum 10,000 litres of dedicated water per lot, in the form of a water tank or part of a larger water tank;
- Water tank to be of a non combustible type construction (metal or concrete, no pvc or plastics);
- To be located in close vicinity to the dwelling it is providing protection for;
- Each tank is to be fitted with a 65 mm Storz outlet with a gate or ball valve;
- Raised tanks should have their stands protected;
- An independent diesel or petrol powered pump (approximately 5hp) to be provided for the tank, which is not reliant on mains electrical supply.
- If the location of a water tank is to be on the hazardous side of the buildings, adequate shielding should be provided for the protection of fire fighters and equipment.

3.5.5 Gas

There is currently no reticulated gas supply to the Wonboyn Village area, and as such, if gas is to be supplied to the site, any bottles must be fixed in accordance with Planning for Bushfire Protection, specifically:

- Gas bottles to be installed and maintained in accordance with AS 1596 and the requirements of relevant authorities.
- All connections to and from gas cylinders and any piping is to be metal.
- All fixed gas cylinders are to be kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation
- If gas cylinders need to be kept close to the building, the release valves are to be directed away from the building and are to be at least 2 metres from any combustible material

3.5.6 Landscaping

It is recommended that any vegetation to be placed onsite as part of the erection of any future dwellings, should be designed in accordance with *Planning for Bushfire Protection 2006*, and in particular, should not create a fire path directly to the building, nor contain species that will add to the overall bushfire threat to the building.

3.5.7 Access

In accordance with Section 4.3.2 of Planning for Bushfire Protection Guidelines, access roads into dwellings should adopt the following design criteria:

- Be constructed to 2WD all weather access standards, with a capacity of road surfaces sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes).
- Bridge access to also be constructed to carry 15 tonne fire fighting vehicles, and have load rating clearly shown (if applicable).
- Have a minimum trafficable width of 4 metres, with an addition 1 metre wide strip being kept clear of bushes, branches and long grasses.
- A minimum vertical clearance of 6 metres to any overhanging obstructions
- Have passing bays every 200 metres (with a length of 20 metres and width of 2 metres).
- Maximum grades should not exceed 15°.

It is noted that the design plans prepared by SEEC Morse McVey, for the proposed new road, comply and exceed these minimum requirements.

3.5.8 Threatened Species

It has been noted that a threatened species assessment has been undertaken by Lesryk Environmental Consultants, as part of the subdivision process. This assessment found that there are threatened flora and fauna species onsite, and some of those are located within the proposed new allotments. These include Yellow-bellied Gliders, bats and owls; Melaleuca scrub, Coastal Saltmarsh and Swamp Paperbark Scrub.

The report concludes that the identified flora and fauna of concern would not be adversely affected as a result of the subdivision, provided the ecological recommendations are complied with.

As such, any hollow bearing trees located within the identified Asset Protection Zones should be left, where possible, and any other specific recommendations of that report should be complied with. This request is not considered to adversely impact on the effectiveness or objectives of the Asset Protection Zones.

3.5.9 Aboriginal Heritage

It has been established as part of the subdivision process, that the Wonboyn Lake area is known to contain items of Aboriginal Heritage, particularly within close vicinity to Foreshores and prominent ridgelines.

It is possible that the establishment of Asset Protection Zones may lie over the location of these items, and as such, care must be taken during any works onsite.

It is therefore recommended that any comments/requirements from the Eden Local Aboriginal Land Council be noted and complied with during the implementation of the recommendations of this assessment.

4.0 Village Protection Plan

It is noted that there is currently a Wonboyn Village Protection Plan in place, which has been endorsed by the Ratepayers Association, NSW Rural Fire Service and Bega Valley Shire Council.

While only sections of this plan have been provided to this office, it is believed that the subject property lies within the "Outer Zone," which is considered to be a "fuel reduced zone" and recommends the average Total Fine Fuel loads should not exceed 15 tonnes/hectare in the shrub layer of this zone.

The recommendations within this report are therefore considered to be consistent with the requirements of the Protection Plan, and will allow for easier compliance with that plan, now being smaller, more manageable allotments as a result of the subdivision, and providing a safer and superior access to the property, for fire fighting purposes.

Furthermore, there is not considered to be any additional requirements for the proposed new allotments, in order to comply with this plan.

Note: If there are any inconsistencies between this assessment and the Wonboyn Village Protection plan, then that plan should prevail, for the extent of the inconsistency.

5.0 Bushfire Maintenance Plan

It is recommended that:

- Asset Protection Zones are put in place as discussed (3.4).
- All buildings should be designed and constructed to a minimum Construction Level 3, in accordance with AS 3959-1999, unless the greater separation distances are complied with.
- The existing dwelling meet the minimum construction standard (Construction Level 1), provided that all increased setbacks are complied with, as outlined in the Bushfire Attack Assessor.
- Any electricity supply connections put in place for the proposed subdivision and any future dwellings should be in accordance with Planning for Bushfire Protection Guidelines (3.5.3).
- All future dwellings should make provisions for onsite water supply dedicated for fire fighting purposes (3.5.4).
- Any gas bottles to be installed onsite should be installed in accordance with the recommendations in this report (3.5.5).
- Landscaping should be placed in accordance with the aims of Planning for Bushfire Protection 2006, and the recommendations of this report (3.5.6).
- Access roads should be constructed in accordance with the recommendation (3.5.7).
- Clearing for asset protection zones should be sympathetic to the recommendations of the Threatened Species Assessment (3.5.8).
- Any comments/recommendations regarding Aboriginal Heritage items be complied with (3.5.9).
- Objectives of the Wonboyn Lake Village Protection Plan be complied with (4.0).

Assessment conducted by

Maree Staight
RW Surveying & Valuations

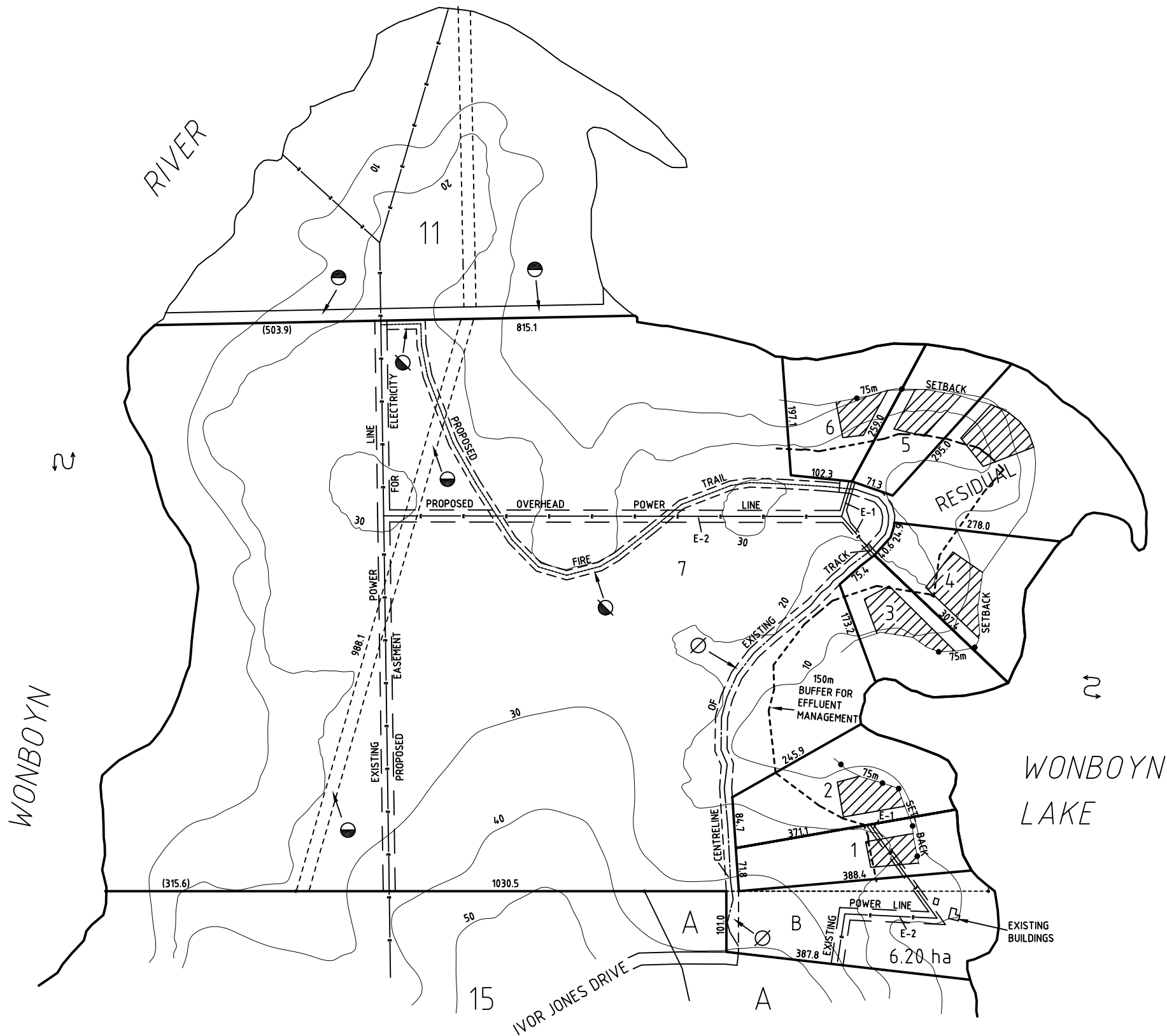
6.0 Qualifications

1. *That this assessment is an expert opinion on the facts before you, and that it is given in good faith.*
2. *That the report relates only to the land described, and is not to be relied upon for any other property.*
3. *That the report has been prepared for the purpose of accompanying an application for subdivision to the Department of Planning and the NSW Rural Fire Service, and should not accompany any other applications for any other purpose.*

4. *That the Asset Protection Zones identified in this report have been recommended for a single dwelling house only, in the area identified as "Proposed Building Envelopes" on the Proposal Plan included as an addendum to this report, and should not be relied upon for developments of multi unit housing or Special Protection Purposes as described in Chapter 4 of Planning for Bushfire Protection 2006.*
5. *It should be borne in mind that the measures contained and recommended in this report cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behaviour of fires, and the difficulty in assessing extreme weather conditions.*

APPENDICES

1. Proposal Plan
2. Asset Protection Zone Calculator (Lots 1 – 7 and Lot B)
3. Bushfire Attack Assessor (Lots 1 – 7 and Lot B)
4. AS 3959 – 1999 Summary
5. Aerial Photograph
6. Photographs



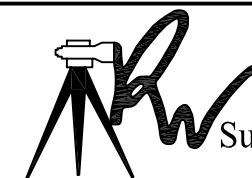
SCHEDULE OF AREAS	
LOT No.	AREA
1	3.28 ha
2	4.58 ha
3	3.22 ha
4	4.07 ha
5	2.83 ha
6	3.54 ha
7	107.8 ha

- DENOTES STAKE PLACED
-  PROPOSED BUILDING ENVELOPE

- E-2 PROPOSED EASEMENT FOR ELECTRICITY 20 WIDE
E-1 PROPOSED UNDERGROUND POWER LINE AND
EASEMENT FOR ELECTRICITY 10 WIDE
- PROPOSED RIGHT OF CARRIAGEWAY 20m WIDE
● PROPOSED RIGHT OF CARRIAGEWAY 15m WIDE
- RESERVED ROAD 20.115m WIDE
● PUBLIC ROAD 20.115m WIDE & VAR.

PLAN OF PROPOSED TORRENS TITLE
SUBDIVISION OF PORTION 14 PLUS
BOUNDARY ADJUSTMENT OF LOT B IN
DP 33573 AT PICNIC POINT,
WONBOYN LAKE

FOR PICNIC POINT PTY LTD OWNER



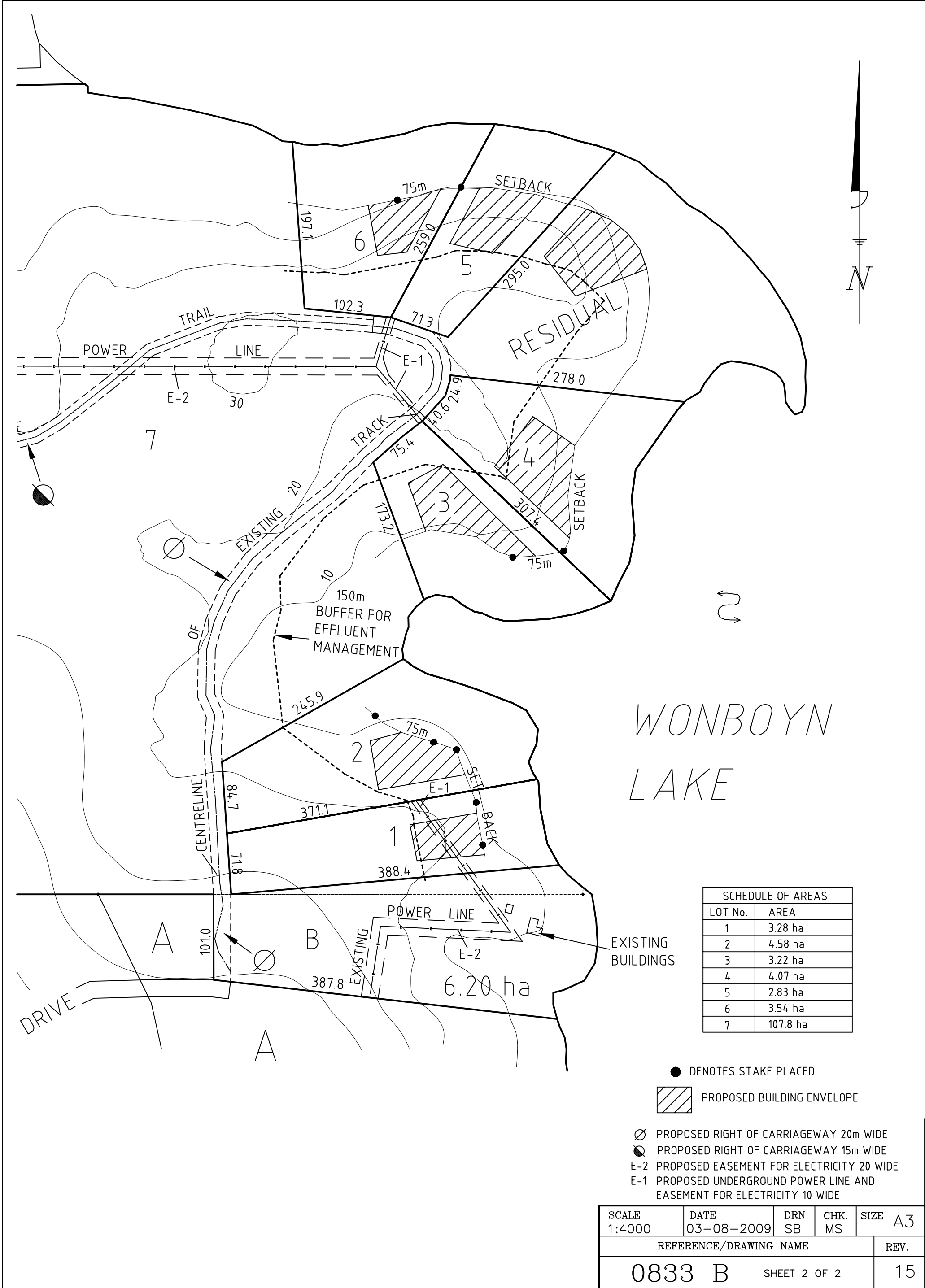
Surveying & Valuations

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LEVEL DATUM
CONTOUR INFORMATION
PREPARED FROM KIAH 1:25000
TOPOGRAPHIC MAP

SCALE 1:8000	DATE 03-08-2009	DRN. SB	CHK. MS	SIZE A3
REFERENCE/DRAWING NAME				REV.
0833 B				15

SHEET 1 OF 2



APPENDIX 2
ASSET PROTECTION ZONE CALCULATOR



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 1, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **6** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **64** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **9.13** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **27** (IPA=15m, OPA=12m)

Rate of Fire Spread (km/h): **3.63** (Noble et al., 1980)

Fire Intensity (kW/m): **46899**

Transmissivity: **0.828** (Fuss and Hammins, 2002)

Flame Length (m): **26.6** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 1, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **63** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.66** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **23** (IPA=13m, OPA=10m)

Rate of Fire Spread (km/h): **2.95** (Noble et al., 1980)

Fire Intensity (kW/m): **38129**

Transmissivity: **0.836** (Fuss and Hammins, 2002)

Flame Length (m): **22.19** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 1, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **0** (level)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **62** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.21** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **20** (IPA=11m, OPA=9m)

Rate of Fire Spread (km/h): **2.4** (Noble et al., 1980)

Fire Intensity (kW/m): **31000**

Transmissivity: **0.844** (Fuss and Hammins, 2002)

Flame Length (m): **18.6** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 1, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **0** (level)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **62** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.21** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **20** (IPA=11m, OPA=9m)

Rate of Fire Spread (km/h): **2.4** (Noble et al., 1980)

Fire Intensity (kW/m): **31000**

Transmissivity: **0.844** (Fuss and Hammins, 2002)

Flame Length (m): **18.6** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 2, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **63** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.66** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **23** (IPA=13m, OPA=10m)

Rate of Fire Spread (km/h): **2.95** (Noble et al., 1980)

Fire Intensity (kW/m): **38129**

Transmissivity: **0.836** (Fuss and Hammins, 2002)

Flame Length (m): **22.19** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 2, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **63** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.66** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **23** (IPA=13m, OPA=10m)

Rate of Fire Spread (km/h): **2.95** (Noble et al., 1980)

Fire Intensity (kW/m): **38129**

Transmissivity: **0.836** (Fuss and Hammins, 2002)

Flame Length (m): **22.19** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 2, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (upslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **65** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **6.22** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **17** (IPA=9m, OPA=8m)

Rate of Fire Spread (km/h): **1.95** (Noble et al., 1980)

Fire Intensity (kW/m): **25204**

Transmissivity: **0.851** (Fuss and Hammins, 2002)

Flame Length (m): **15.68** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 2, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (upslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **65** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **6.22** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **17** (IPA=9m, OPA=8m)

Rate of Fire Spread (km/h): **1.95** (Noble et al., 1980)

Fire Intensity (kW/m): **25204**

Transmissivity: **0.851** (Fuss and Hammins, 2002)

Flame Length (m): **15.68** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 3, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **0** (level)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **62** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.21** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **20** (IPA=11m, OPA=9m)

Rate of Fire Spread (km/h): **2.4** (Noble et al., 1980)

Fire Intensity (kW/m): **31000**

Transmissivity: **0.844** (Fuss and Hammins, 2002)

Flame Length (m): **18.6** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 3, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **3** (downslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **63** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.66** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **23** (IPA=13m, OPA=10m)

Rate of Fire Spread (km/h): **2.95** (Noble et al., 1980)

Fire Intensity (kW/m): **38129**

Transmissivity: **0.836** (Fuss and Hammins, 2002)

Flame Length (m): **22.19** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 3, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **0** (level)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **62** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **8.21** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **20** (IPA=11m, OPA=9m)

Rate of Fire Spread (km/h): **2.4** (Noble et al., 1980)

Fire Intensity (kW/m): **31000**

Transmissivity: **0.844** (Fuss and Hammins, 2002)

Flame Length (m): **18.6** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**



ASSET PROTECTION ZONE MODELLING REPORT

For Site Located At: **Lot 3, Ivor Jones Drive, Wonboyn Lake**

Created By: **RFS APZ Calculator**

1. User's Inputs

Development Purposes: **Residential Subdivision**

Local Government Area: **Bega Valley**

In Alpine Areas: **No**

Vegetation: **Forests**

Effective Slope (degree): **6** (upslope)

2. Program's Settings

Flame Width (m) : **100**

Flame Angle (degree): **68** (determined by the built-in algorithm)

Flame Temperature (K) : **1090**

Flame Emissivity: **0.95**

Surface Available Fuel Load (t/ha): **20**

Overall Fuel Load (t/ha): **25**

Fire Danger Index: **100** (Fire Weather Area: Far South Coast)

Relative Humidity (%): **25**

Ambient Temperature (K): **308**

Heat of Combustion (kJ/kg): **18600**

Elevation of Receiver (m): **4.67** (determined by the built-in algorithm)

3. Program Outputs

Asset Protection Zone (m): **14** (IPA=8m, OPA=6m)

Rate of Fire Spread (km/h): **1.59** (Noble et al., 1980)

Fire Intensity (kW/m): **20491**

Transmissivity: **0.857** (Fuss and Hammins, 2002)

Flame Length (m): **13.31** (RFS PBP, 2001)

Expected Radiant Heat Exposure (kW/m²): **29**

Assessment Date: **21/2/2008**

Modelled By: **Maree Staight**