ATTACHMENT 4 – Bushfire Risk Assessment (Draft) and *Planning for Bushfire Protection 2006* Update

BUSHFIRE RISK ASSESSMENT

IMPORTANT NOTICE

Site inspections, and the results found herein, are carried out in accordance with the guidelines as set out in the document ***"Planning for Bushfire Protection 2001"*** and ***"Australian Standard 3959-1999".***

REPORT PREPARED IN RELATION TO:	**PROPOSED AGED CARE FACILITY.**
PROPERTY DESCRIPTION:	**LOT 155 & 188 DP 755537, CORONATION ROAD, MACKSVILLE.**
CLIENT:	**ANTHONY JOHN BROWNLEE (c/- Jack C Dalton Pty Ltd - Architects)**

General Description of the Land

This report refers to the proposed construction of a 3-tier, staged aged care facility. The development is proposed to be constructed on a 63 hectare rural property, and comprises:

- 70 bed high-care nursing home;
- 64 bed low-care hostel;
- 235 self-care villas; and
- external recreation facilities.

A concept master plan is attached on page 2 of this Report. The proposed development is categorised as a "**Special Protection Development**" for the purposes of the document "*Planning for Bushfire Protection – 2001*" (***PfBP-2001***).

The property is located to the immediate west of Macksville, on the mid north coast of NSW. Landuse to the south and west is primarily rural/ agricultural, to the north are existing rural-residential premises, while to the east is the Taylors Arm River between the subject property and the suburb of Kings Point, Macksville. A disused dwelling and outbuildings occupy the subject property, but will be removed during the development process.

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

A site assessment was carried out by me on Tuesday 19th October, and Thursday 21st October 2004 for the purpose of preparing a Bushfire Risk Report as required by *clause 46 of the Rural Fires Regulation 2002 – Application for bush fire safety authority.*

Vegetation Description

A vegetation assessment was carried out to include a distance of 140 metres from the property boundaries, in all directions. It is determined that the general vegetation description is summarised as follows:

North - The northern boundary is about 1.2km in length. For the majority of this length the property fronts a SEPP 14 coastal wetland. The structure in this wetland varies slightly from east to west. At the eastern extremity the swamp consists of Casuarina and Melaleuca from 2m-25m in height and <10% foliage cover; predominately mangroves with <70% foliage cover; and understorey consisting of bare earth/mud (under water at the time of inspection) and saltmarsh grasses. Further north of the swamp at this point is neighbouring rural and rural/residential properties surrounded by cleared farmland.

West of the 66KV power lines the swamp is dominated by Casuarina from 15m-20m in height, and about 30% foliage cover, along the southern edge of the wetland. Further north into the wetland the dominant trees are smaller (2m - 10m) and spread more sparse. Again the understorey consists of bare earth/mud and saltmarsh grasses.

Towards the western proximity of the northern boundary the Casuarinas give way to Melaleucas as the dominant species, with scattered Eucalypts throughout as the ground becomes drier. In the drier areas Lantana and grasses dominate the understorey.

The swamp is generally in the vicinity of 200m - 300m wide (N-S) along the northern boundary.
(refer to photo 1)

East - To the immediate east of the property is Coronation Road, then Taylors Arm River. East of the river is the "suburb" of Kings Point, Macksville.
(refer to photo 2 & 3)

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

South - For the full length of the southern boundary the property fronts existing established rural pastures. Scattered along the boundary fence are areas of scattered woodland, but pose no significance in relation to wildfire threat.
(refer to photo 4, 5 & 6)

West - From about 160m east of the south-western corner of the property is the eastern aspect of a pocket of bush. This bush is about 160m wide (E-W), and extends north to merge with the Melaleuca-dominant swamp. This bush consists of mature Eucalypts to about 30m in height, foliage cover varies between <10% to about 30%. The understorey consists of sapling Eucalypt regrowth.

This pocket of bush is separated at the western boundary by an existing fire break of about 10m-15m wide. West of the western boundary is predominately cleared farming land except for <Ha pockets of Eucalypts. The vegetation to the north west of the NW corner of the property appeared to be closed forest in nature along the watercourse (being on the southern aspect of a steep ridge), however access was not granted to this property.
(refer to photo 6 & 7)

Vegetation Classification

A vegetation assessment was carried out to include a distance of 140 metres from the property boundaries, in all directions, in accordance with A2.3.2 of the document ***PfBP-2001***. Photographs were taken to verify my assessment.

It is determined that the predominant vegetation type for each aspect is summarised as follows:

North - Tall heath / closed scrub (12)
East - non-vegetated
South - Grassland (25)
West - Woodland (6)

Vegetation Group

In accordance with the classifications in Figure A2.2 and Table A2.1 of the document ***PfBP-2001***, it is determined that the predominant

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

vegetation group affecting the subject building envelopes is summarised as follows:

North - Group 2
East - Group 3
South - Group 3
West - Group 2

Slope

A slope assessment was carried out to include a distance of 100 metres from the property boundaries, in all directions, in accordance with A2.3.3 of the document ***PfBP-2001***. Photographs were taken to verify my assessment.

Slope was determined using a clinometer.

The gradient that would most significantly influence fire behaviour varied and is summarised as follows:

North - >0° – 5° upslope
East - >0° – 5° downslope
South - >5° – 10° downslope
West - >5° upslope

BUSHFIRE ASSESSMENT MATTERS

(i) Appropriate Setbacks and Asset Protection Zones

In accordance with Clause 4.12.1, 4.12.3 and Table 4.2 of the document ***PfBP-2001*** it is determined that the minimum separation distances for the relative aspects are as follows:

TABLE 1

ASPECT	VEG. GROUP	SLOPE	LEVEL 1 CONSTRUCTION
North	2	0° – 5° upslope	40m APZ = 25m IPA+15m OPA
East	3	>0° – 5° downslope	Minimum 20m
South	3	>5° – 10° downslope	Minimum 20m
West	2	>5° upslope	30m APZ = 20m IPA+10m OPA

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

(ii) Water Supplies

The subject property is not serviced by a reticulated water supply. However the proponent is in consultation with the Nambucca Shire Council to have the Council's water supply extended to the site. Therefore, the internal hydrant system should comply with the relevant provisions of Section 6.4.3 of ***PfBP-2001***:

6.4.3 Water Supplies (i.e. where a mains supply is not *guaranteed*)
Maintaining a water supply for firefighting purposes provides protection in three ways:
- connection to hand-held hoses;
- connection to sprinkler systems; and
- water replenishment for firefighting tankers.

As a protective measure, connection to hand-held hoses, sprinkler systems and water replenishment to firefighting vehicles are considered to be an **active** measure (someone, generally, must be present to utilise the system). They must be considered as additional, rather than an alternative to other bushfire protection measures. The determination of a guaranteed water supply is one that can only be made by the water supply authority where mains water supply is available.

It is common during major fire events for the supply of mains water pressure to drop significantly, preventing adequate protection.

a) Urban Subdivisions

The water supply to the perimeter road should be delivered by a ring main system. Fire hydrants must be accessible and located such that a tanker can park within a distance serviceable by a 20m hose and the habitable building must be located such that a fire at the furthest extreme can be attacked by the tanker using a 60m hose and 10m jet of water. A clear unobstructed path between the hydrant and most distant point of the building cannot exceed 90m allowing for the tanker to be parked inline. Obstructions to the path will reduce the distances. Australian Standard 2419.1 – 1994 details the location of external fire hydrants. If the building is located such that the distances do not comply with AS 2419 for the location of hydrants, then a static supply of water (5000 litres minimum), or an additional hydrant must be supplied. In major bushfires there is a possibility that the mains water supply will fail due to excessive demand. The installation of a water supply independent of the mains system on properties along the hazard interface is recommended.

(iii) Public Road Access

Coronation Road links the subject site with Wilson Road to the north. The distance from the proposed property entry to Wilson Road is within about 200m. Wilson Road links with Macksville to the east via a new traffic bridge over Taylors Arm River.

Coronation Road is a 2-way rural road, bitumen sealed for a width of approximately 6m, and line marked at the intersection with Wilson Road. The northern end of Coronation Road has been re-aligned for the amended approach to Wilson's Bridge. Several hundred metres of the northern end of Coronation Road has been re-paved in line with these new road works.

Wilson Road is a major rural 2-way road, bitumen sealed for a width of approximately 8m, line marked for most of its length.

Wilson's Bridge is a new concrete traffic bridge with pedestrian access, 8 wide between concrete barricades, and line marked.

Joffre Street is a +10m wide typical urban street, bitumen sealed, line marked, kerb and guttered.

Given that it is not intended to initiate large-scale evacuation of such facilities during a bushfire emergency event*, it is determined that all public roads in the vicinity of the subject property are capable of handling any increased traffic flow in the event of a bushfire emergency impacting on the site.

* Please refer to the Bushfire Evacuation Plan appended to this Report.

(iv) Public Roads linking Fire Trails

For the proposal as it is in the concept master plan, the most effective form of required fire trail is determined to be in the form of a perimeter fire trail. The layout should be generally in accordance with the sketch on page [redacted] of this Report. Ideally the access to the perimeter trail to the north should link with the private access road west of the easement for transmission lines (45m wide). This will achieve to goals:

- ✓ avoid the need for firefighting vehicles to pass under the transmission lines; and
- ✓ keep the required fire trail out of the flood liable land.

Extracts from Chapter 4 of ***PfBP-2001***

c) Perimeter Road or Fire Trail

(i) Location:

The perimeter road or fire trail often lies between the Outer Protection Area and the boundary of the allotments.

It may form part of the Inner Protection Area. A perimeter road should be the preferred option where possible.

(ii) Purpose:

- provide firefighters with easier access to structures, allowing more efficient use of firefighting resources;
- provide a safe retreat for firefighters; and
- provide a clear control line from which to conduct hazard reduction or back burning operations.

(iii) Specifications:

- The perimeter road should have a minimum road reserve width of 20m. The gradient should not exceed 15°.
- If a perimeter fire trail is preferred to a perimeter road, the fire trail should:

– be located within a perimeter reserve a minimum of 6m wide (4m wide trail & 1m wide cleared area each side of the trail), with the reserve maintained in accordance with the specifications for an Inner Protection Area;

– the trail should be constructed in accordance with the design criteria established in section 4.3.2;
– the fire trail must be trafficable by firefighting vehicles under all weather conditions;
– the fire trail should link into the street network (if applicable) at regular intervals via an access track constructed in accordance with the design criteria established in section 4.3.2; and
– the fire trail should be maintained and in a serviceable and accessible condition at all times by the owner of the land.

4.3.2 Property Access Roads

a) Description:

• Provide access to individual dwellings or groups of dwellings on battleaxe blocks or in lower density developments. They should join directly to the through-road system. These are roads built on private property.

b) Design Criteria:

• A minimum trafficable width of 4m with an additional 1m wide strip on each side of the road kept clear of bushes and long grass.
• The road should have a passing bay about every 200m where possible, which should be 20m long by 3m wide, making a minimum trafficable width of 7m at the passing bay.
• The capacity of road surfaces and bridges should be sufficient to carry fully loaded firefighting vehicles (approximately 28 tonnes or 9 tonnes per axle).
• A minimum vertical clearance of 6m to any overhanging obstructions, including tree branches.
• Curves should have a minimum inner radius of 6m and be minimal in number to allow for rapid access and escape.
• The minimum distance between inner and outer curves should be 6m.
• Maximum grades should not exceed 15° and preferably not more than 10°.
• Roads should provide sufficient width to allow firefighting vehicle crews to work with firefighting equipment about the vehicle.
• Dwellings not sited within 200m of the road system should have an alternative access road providing emergency egress to the through road system; and
• Roads should be clearly sign-posted. Bridges should clearly indicate load rating.

4.3.3 Fire Trails

a) Description:

• Used as access for firefighters, fire control lines and for APZ maintenance.
• In rural residential subdivisions they should surround isolated dwellings or groups of dwellings and can form part of the Inner Protection Area around individual or groups of dwellings.
• In suburban subdivisions they may function as a perimeter road, around the hazard side of the Inner Protection Area, if they are connected to the internal road system at frequent intervals and it is not possible to construct a perimeter road.

b) Design Criteria:

• Where a fire trail forms part of the Inner Protection Area it must be constructed to the specifications outlined in section 4.2.2(c) of this document.
• A minimum trafficable width of 4m with an additional 1m wide strip on each side of the road kept clear of bushes and long grass.
• A maximum grade of 15°.
• A minimum clearance of 6m to any overhanging obstructions, including tree branches.
• The road should have the capacity for passing either by:
1. reversing bays using the access to properties to reverse fire tankers, which are 6m wide and 8m deep to any gates with an inner minimum radius of 6 m and outer minimum radius of 12m; and/or
2. a passing bay about every 200m, which is 20m long by 3m wide, making a minimum trafficable width of 7m at the passing bay.

[(1.) is the preferred option so as to minimise the environmental impacts of fire trails]

• Appropriate drainage and erosion controls;
• A fire trail system which is connected to the property access road and/or to the through road system at frequent intervals;
• Must be maintained in a serviceable condition by the owner of the land;

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

- Fire trails should not traverse through a wetlands or other land potentially subject to periodic inundation;
- Must be trafficable under all weather conditions; and
- Trail should be inspected annually by authorities.

At the time of subdivision, if fire trails are part of the development then the fire trails should be under council administration to ensure that maintenance occurs. From time to time this may not be possible in which case they can occur as easements and rights of way over private land.

(v) Access and egress during an Emergency Response

The entry to the proposed development is to be clearly identified with the name of the development's business.

The entry to the proposed development is to be set back from Coronation Road to enable Firefighting appliances to access the site without interfering with through traffic on Coronation Road.

The driveway access to the proposed development will comply with the relevant provisions of *Section 4.3 Access* of the document ***PfBP-2001*** (ie., 8m sealed width with shoulders either side to allow 2-way traffic to comfortably pass).

(vi) Bushfire Maintenance Plans and Fire Emergency Procedures

In relation to the Bushfire Maintenance Plan the following information is provided;

1 Contact person/department and details

Mr Jack C Dalton (aged care consultants)
3 Cooleen Street
BLAKEHURST NSW 2221
Phone 0419 250 259

2 Schedule and Description of Works for the construction of APZs and their continued maintenance

The construction of the perimeter fire trail, and the strategic planting of "fire resistant" plants/trees (attached as Appendix D) and maintenance in accordance with the guidelines in attached Appendix B - Bushfire Maintenance Plan will satisfy the requirements of the northern APZ.

The Concept Master Plan proposes sporting, recreation and leisure areas to the east of the facility (between the facility and Coronation Road). The normal ground maintenance of these facilities will satisfy the requirements for the eastern APZ.

The construction of the perimeter fire trail, and the strategic planting of "fire resistant" plants/trees (attached as Appendix D) and maintenance in accordance with the guidelines in attached Appendix B - Bushfire Maintenance Plan will satisfy the requirements of the southern APZ.

The construction of the perimeter fire trail, and the strategic planting of "fire resistant" plants/trees (attached as Appendix D) and maintenance in accordance with the guidelines in attached Appendix B - Bushfire Maintenance Plan will satisfy the requirements of the western APZ.

Within the Outer Protection Area any trees and shrubs should be maintained in such a manner that the vegetation is not continuous.
Fine fuel loadings within the OPA should be kept to a level where the fire intensity expected will not impact on adjacent developments. In the absence of any policy to the contrary, 8 tonnes per hectare of fuel is commonly used.
In grasslands, fuel height should be maintained below 10 centimetres.

It is more practical to determine the specifications of the IPA in terms of performance than in terms of a minimum fuel loading.
The performance of the Inner Protection Area must be such that:
- there is minimal fine fuel at ground level which could be set alight by a bushfire; and
- any vegetation in the Inner Protection Area does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous.

The presence of a few shrubs or trees in the Inner Protection Area is acceptable provided that they:
- do not touch or overhang the building;
- are well spread out and do not form a continuous canopy;
- are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- are located far enough away from the house so that they will not ignite the house by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas/quantities of garden mulch, stacked flammable building materials etc should not be permitted in the Inner Protection Area.

3 Management strategies, proposed schedule and description of works of any remnant bushland within the property boundary

There are no areas of remnant bushland on the subject site.

4 Details of access through any gate/fire trail system for remnant bushland areas

Signs are to be erected at the points where the internal road system links with the perimeter fire trail, as indicated on the attached sketch on page ? of this Report.

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

No gates are to be erected at any point across the perimeter fire trail.

A preliminary Bushfire Emergency Evacuation Plan has been prepared and attached (**Appendix C**). Those fire emergency procedures have been developed with limited consultation with the proponent. Full and final details can obviously only be provided once the proposed development is ready for operation. However, the Bushfire Emergency Evacuation Plan will continue to be developed in the meantime.

Should the NSW RFS require any further specific details, Mr Jack Dalton should be contacted in the first instance.

(vii) Building Construction Standards

Apart from a slight encroachment of the proposed self-care villas along the southern boundary, the separation distances as stated in **TABLE 1** (page [redacted]) have been met, providing for the buildings to meet Level 1 Construction as defined in "***AS3959 – Construction of Buildings in Bushfire-prone Areas***" (summary attached as Appendix A). Once the slight encroachment is rectified, and verified by way of an amended site plan, there will be no need for an increase over Level 1 Construction.

(viii) Sprinkler Systems and other Protection Measures

Not applicable.

(ix) The extent to which the Proposed Development Conforms With or Deviates From the Specifications set out in Chapter 4 (Bushfire Provisions – Development Stage) of "Planning for Bushfire Protection".

All of the relevant specifications of Chapter 4 of the document ***PfBP-2001*** have been complied with. A summary of the specifications and their compliance are listed below:

4.1 Introduction
Complies.

4.2 Asset Protection Zone
Apart from an amendment to the proposed setback to the southern boundary, the separation distances have been achieved:

TABLE 2

ASPECT	APZ or setbacks required

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

North	40m APZ = 25m IPA+15m OPA
East	Minimum 20m
South	Minimum 20m
West	30m APZ = 20m IPA+10m OPA

4.3 Access
Matters addressed and complies.

4.4 Design and staging of the development
Generally complies. Some recommendations in s.4.4 have not been met on the basis of creating a "community" feel about the development. Due to the significant protection measures built into the development, and the low wildfire risk to the property, the discrepancies are considered minor.

4.5 Siting of buildings in bushfire-prone areas
Matters addressed and complies.

4.6 Infill development
Not applicable.

4.7 Isolated rural development
Not applicable.

4.8 Rural residential development
Not applicable.

4.9 SEPP 15 – rural land sharing communities
Not applicable.

4.10 Change of use
The proposed development constitutes a change of use, but assessment was carried out as per "special protection purpose".

4.11 Developments in split zones
Not applicable.

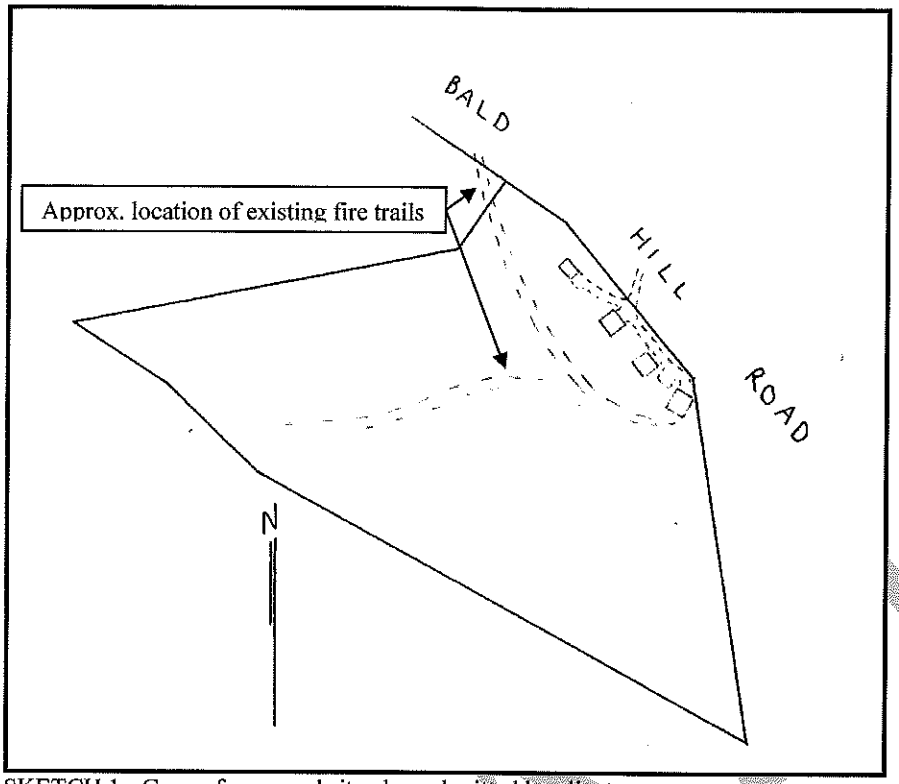
4.12 Special protection developments
The setback distances in Table 4.2 of ***PfBP-2001*** have been achieved.

ATTACHMENTS
Appendix A – Summary of construction standards AS3959

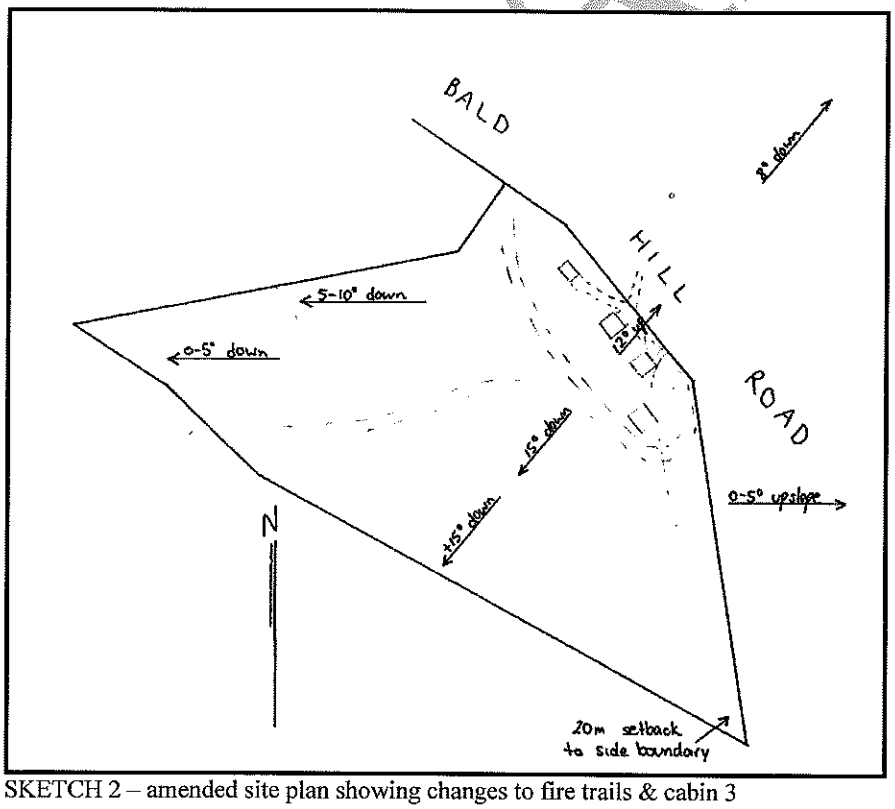
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Appendix B – Bushfire Maintenance Plan
Appendix C – Bushfire Evacuation Plan
Appendix D – Bushfire-resistant plants

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461



SKETCH 1 - Copy of proposed site plan submitted by client.



SKETCH 2 – amended site plan showing changes to fire trails & cabin 3

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking east along Joffre Street

Looking west across Taylors Arm River to subject property

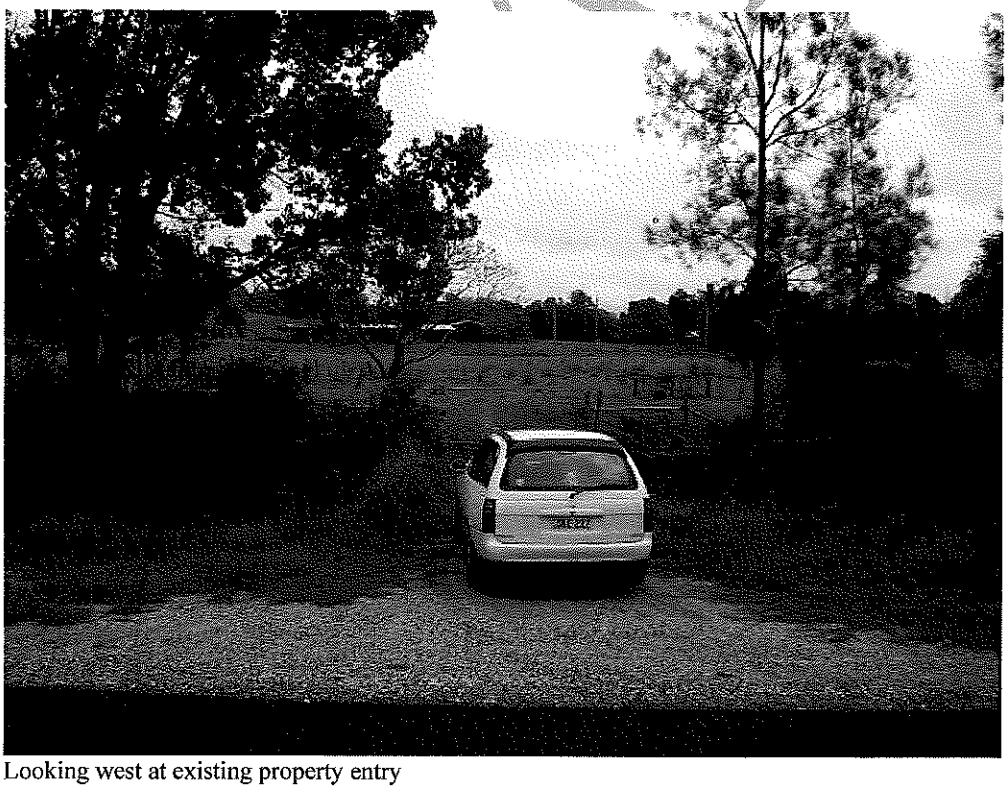
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west across Taylors Arm River to subject property

Looking east along Wilson Road Bridge

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking north from property entry, along Coronation Road, towards Wilson Road



Looking west at existing property entry

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking south from SE corner of subject property

Looking west from SE corner of subject property

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking north across eastern portion of property

Looking east at NE corner of property

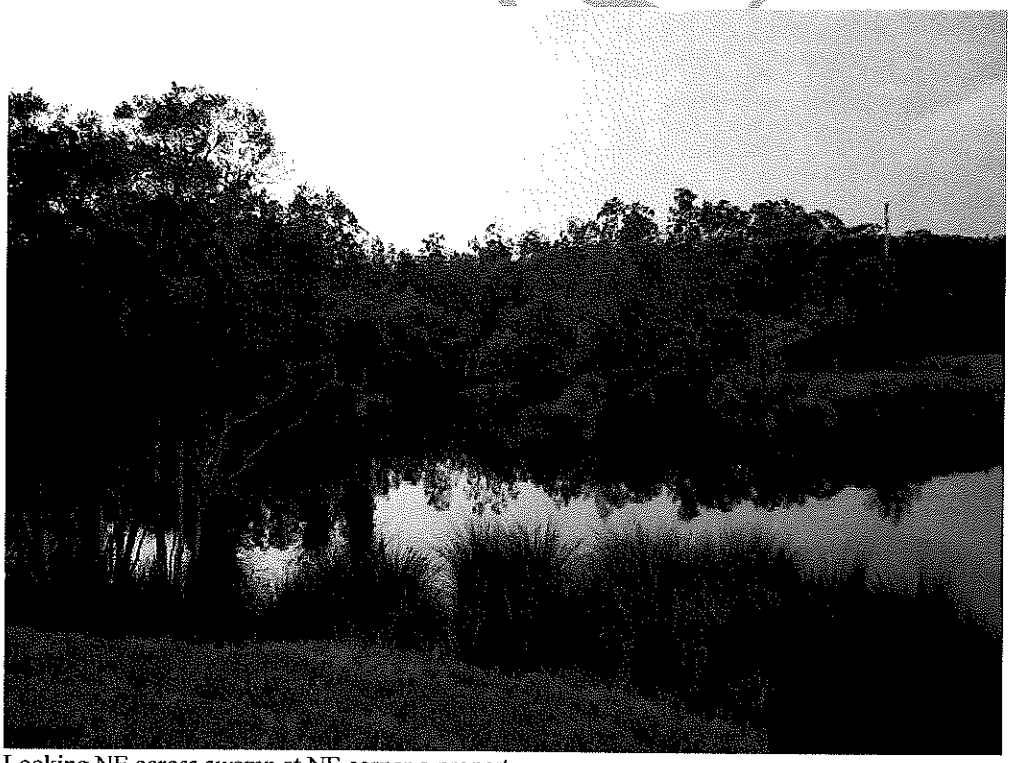
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking SW from NE corner of property

Looking north through swamp to neighbouring rural/residential properties

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west along edge of swamp from NE corner of property



Looking NE across swamp at NE corner o property

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Understorey of swamp at NE of property - bare earth, reeds, water

Edge of swamp at NE of property

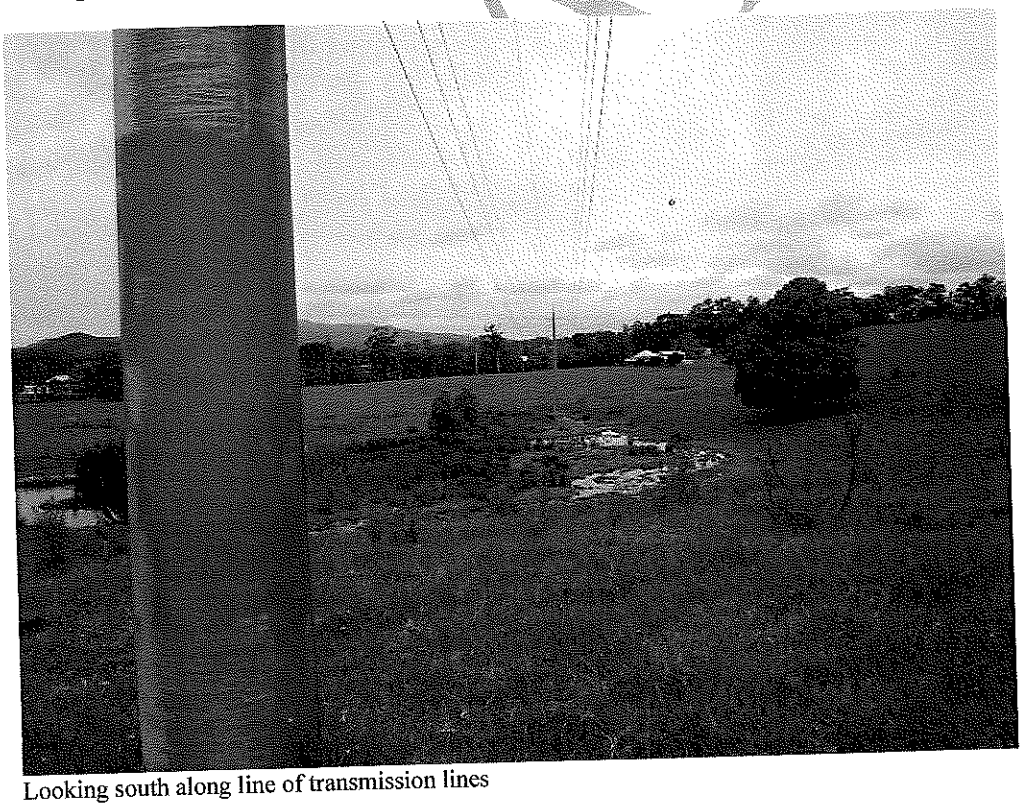
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west at point where transmission lines cross property

Looking north, along line of transmission lines, at neighbouring rural properties

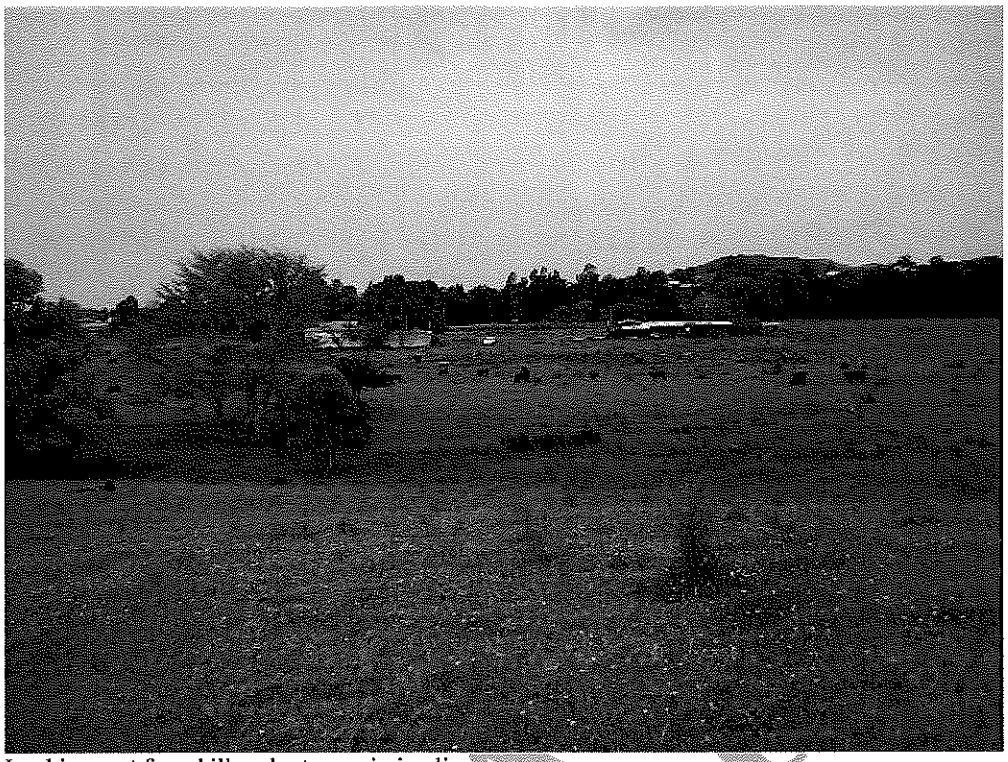
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking south along line of transmission lines



Looking south along line of transmission lines

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461



Looking east from hill under transmission lines

Looking north, along line of transmission lines, at neighbouring rural properties

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking into swamp to west of easement for transmission lines - notice lack of ground fuel

Looking into swamp to west of easement for transmission lines - small Casuarinas & low fuel load

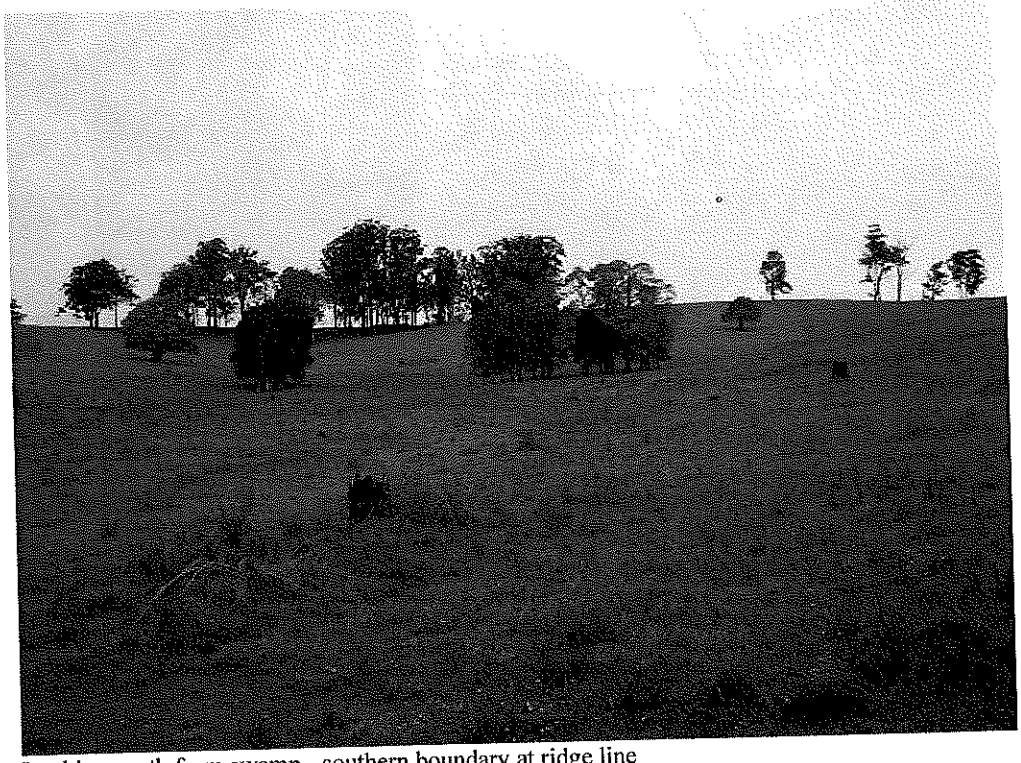
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking south from swamp - southern boundary at ridge line

Dam at edge of swamp

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west along edge of swamp



Looking south from swamp - southern boundary at ridge line

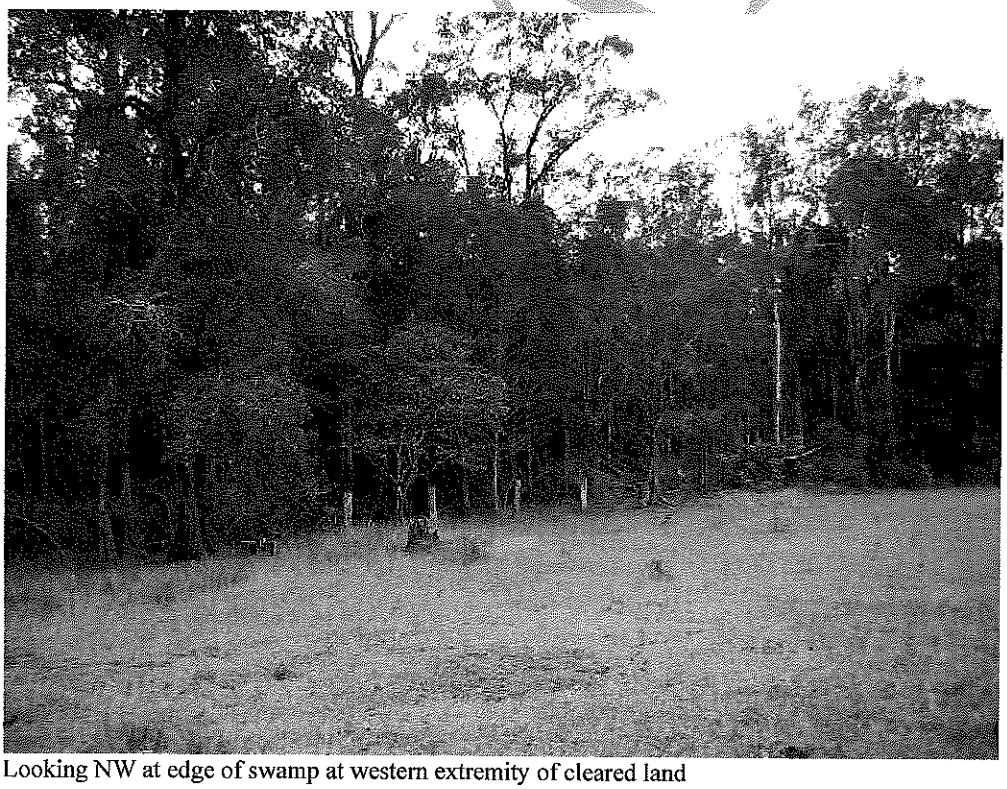
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking north into swamp towards west of property

Looking north into swamp towards west of property

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

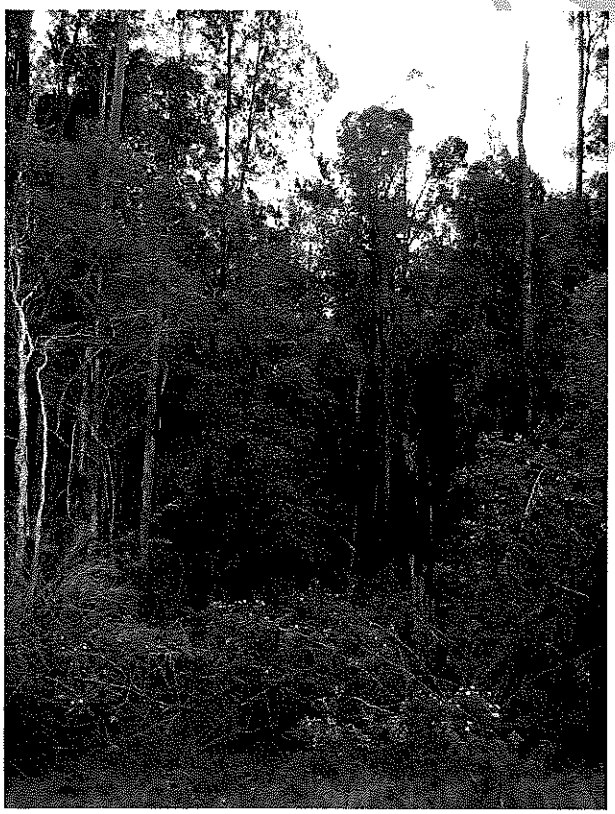
Looking east along edge of swamp at western extremity of cleared land



Looking NW at edge of swamp at western extremity of cleared land

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west at edge of swamp at western extremity of cleared land



Looking west at edge of swamp at western extremity of cleared land

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking west across swamp/woodland at neighbouring paddocks on adjacent ridge

Looking west across swamp/woodland at neighbouring paddocks on adjacent ridge

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking east across development site from western ridgeline

Looking SW from development site at extent of swamp/woodland vegetation within western boundary

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking north into woodland between development site and western boundary

Looking west at SW corner of property - pocket of woodland to north, farmland to east, south and west

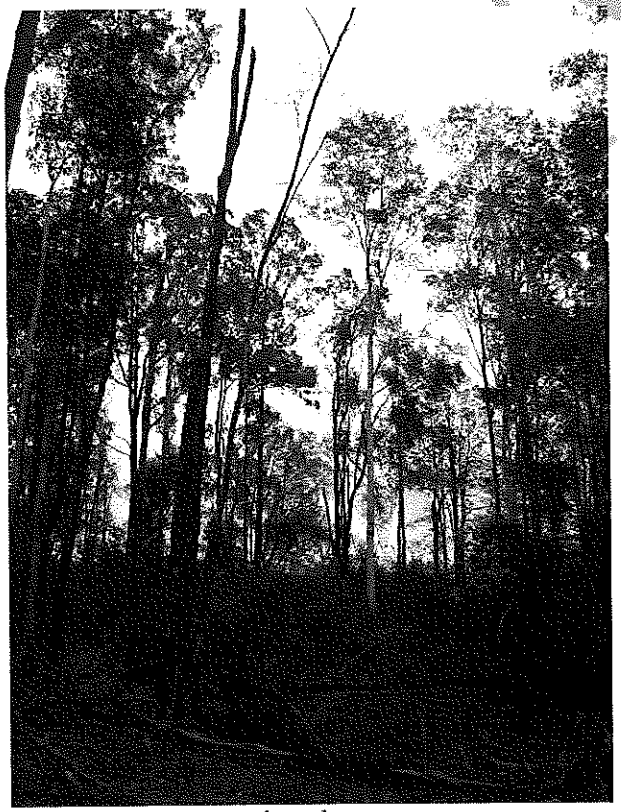
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking SW at SW corner of property

Looking SE at SW corner of property

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

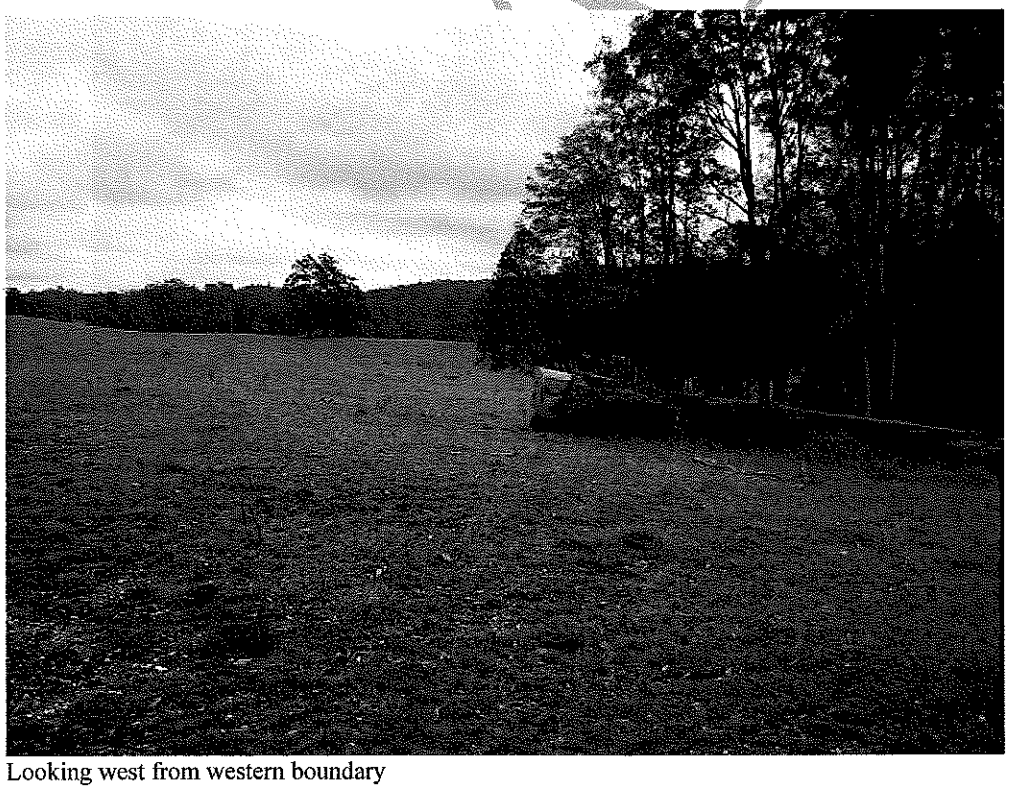
Looking north along western boundary



Looking west at western boundary

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

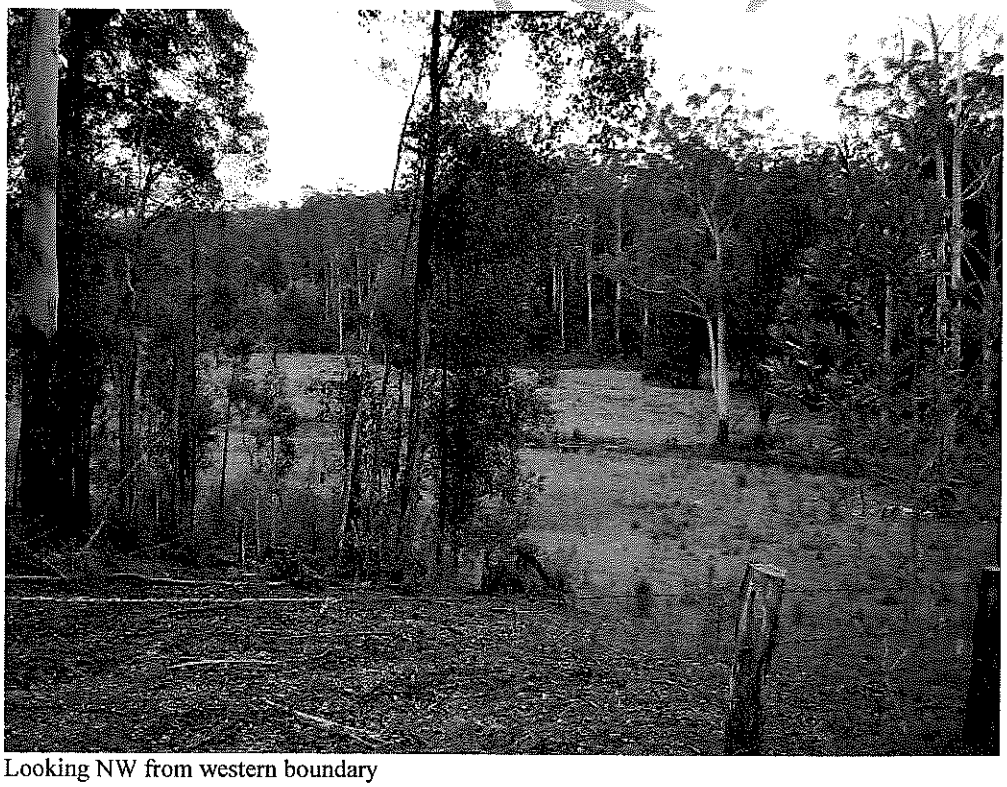
Looking west from western boundary



Looking west from western boundary

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

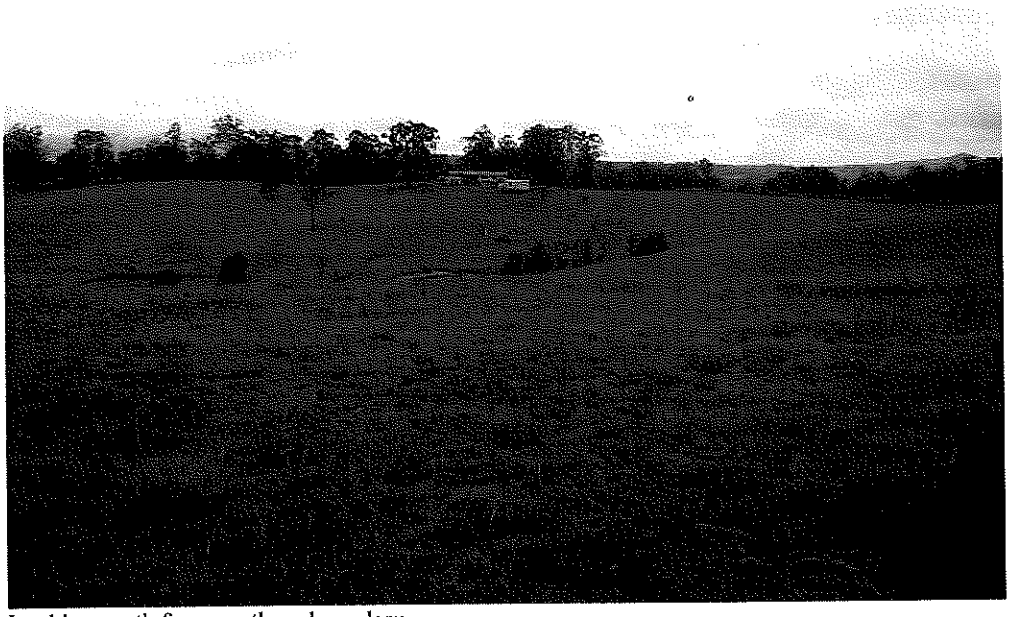
Looking NW from western boundary



Looking NW from western boundary

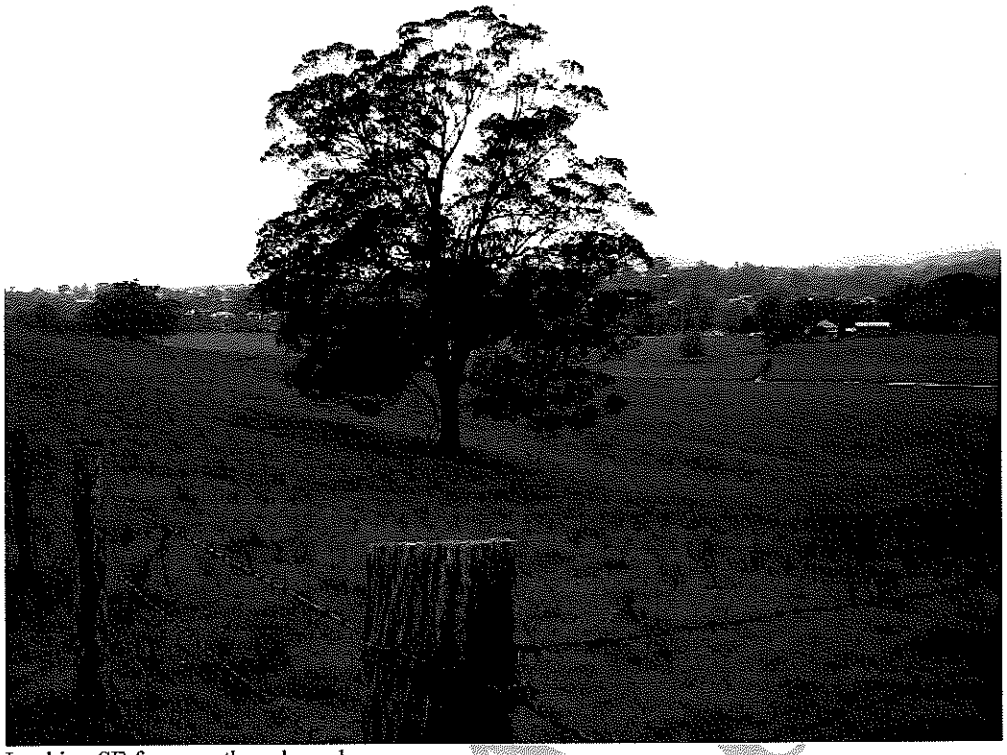
Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

Looking east from western boundary, through pocket of woodland above swamp, to development site



Looking south from southern boundary

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461



Looking SE from southern boundary

Steven Ellis, Bushfire Risk Assessor
Macksville, NSW
PH: 02 6568 3312
FAX: 02 6568 2461

AS 3959 Construction of Buildings in Bushfire Prone Areas

This is an abridged version of Australian Standard AS 3959-1999 Construction of Buildings in Bush Fire Prone Areas which provides some detail for developments proposed in high risk zones. Please do not use the abridged version alone. The full version is available from Standards Australia

Flooring

Level 1

Concrete slab on ground. Suspended floor concrete floor-framed floor, underside of bearer to be greater than 600mm above finished ground level. Under space where unenclosed all timber flooring, bearers and joists to be fire retardant treated timber.

Level 2

As per Level 1

Level 3

As per Level 1 except where framed floors have a greater clearance than 600mm above finished ground level and are not fully enclosed – all flooring components are to be fire retardant treated timber.

External Walls

Level 1

Masonry, concrete, pise, rammed earth, stabilised earth or; Framed walls have no restriction to cladding materials but must incorporated breather-type sarking having appropriate flammability index or an insulating material confirming to the appropriate Australian Standard.

Where combustible sheeting is less than 400mm from ground, cladding shall be protected with a non-combustible material for no less than 400mm.

Level 2

As per Level 1 except PVC claddings not permitted and all external timber wall cladding shall be fire retardant treated timber.

Level 3

As per Level 2

Windows

Level 1

All openable windows shall be fitted with screens.

Level 2

As per Level 1 and in addition – timber windows shall be fire retardant treated timber except where protected by non-combustible shutters. Lead light windows shall be protected by a shutter constructed of non-combustible material or toughened glass.

Level 3

As per Level 2 except windows are to be protected by non-combustible shutters or toughened glass.

External Doors

Level 1

Weather strips or draft excluders to be fitted. Tight fitting door screens to be fitted.

Level 2

As per Level 1 except aluminium mesh shall not be used. Leadlight glassing shall be protected by shutters constructed of non-combustible material or toughened glass.

Level 3

As per Level 2 except that timber doors shall be fire retardant treated or covered with non-combustible material on the exterior or doors shall be protected by shutters of non-combustible material or Doors shall be solid core having a thickness of not less than 35mm.

Roofs

Level 1

Timber shakes or shingles are not permitted. Tiled roofs shall be fully sarked. Sarking shall have a flammability index of no more than 5.

Sheeted roofs shall be fibre cement or metal and all gaps under corrugations or ribs where it meets the fascia/wall shall be sealed or protected by either (a) fully sarking roof or (b) corrosion resistant steel, bronze mess, profiled metal sheet, neoprene seal, compressed mineral wool or similar material.

The use of (b) cannot be used on roofs with valleys. Rib caps and ridge capping shall be sealed using either rib caps, ridge capping or as per prior clause.

Roof wall junctions shall be sealed by the use of fascias and eaves linings or with non-combustible materials.

Level 2

As per Level 1 except that all roofing shall be non-combustible and sarked.

Level 3

As per Level 2 except that no fibre-reinforced cement or aluminium sheet shall be used.

Roof-lights

Level 1

All roof-lights and associated shafts shall be sealed with a non-combustible sleeve or lining.

A roof-light can be constructed from thermoplastic sheet in a metal frame, but diffuser installed at ceiling level shall be wired or toughened glass in a metal frame.

Vented roof-lights shall have corrosion resistant steel or bronze mesh.

Level 2

As per Level 1 except roof-light glazing shall be wired glass.

Level 3

As per Level 2.

Eaves

Level 1
Eaves shall be enclosed with all fascia or gaps between rafters being sealed.

Level 2
As per Level 1 except all timber eaves lining and joining strips shall be fire retardant-treated timber.

Level 3
As per Level 2 except that aluminium shall not be used.

Fascias

Level 1
No special requirement.

Level 2
All material must be either non-combustible or fire-retardant treated timber.

Level 3
As per Level 2 except that no fibre-reinforced cement or aluminium sheet shall be used.

Gutters and Downpipes

Level 1
All leaf guards must have a flammability index no greater than 5 (AS1503.2).

Level 2
As per Level 1.

Level 3
As per Level 1.

Verandas and Decks

Level 1
Slab-reinforced concrete suspended slab floor, supported by posts or columns. Slab on ground. Sheeted or tongued and grooved solid flooring having:
*where clearance between under side of flooring to ground level is not greater than 400mm, all joints in the flooring shall be covered or sealed;
*decking timbers shall have no less than 5mm clearance;
*posts and columns shall be non-combustible, fire retardant for a minimum of 400mm above finished ground level or mounted on galvanised metal shoes with a clearance of not less than 75mm;
*the external perimeter beneath the decking shall not be enclosed nor have access restricted;
*decking timbers shall not connect with the remainder of the building unless measures are used to prevent the spread of fire into the building.

Level 2
As per Level 1 except spaced timber decking shall be fire retardant treated.

Level 3
As per Level 2 except all materials shall be non-combustible or where timber is used it all will be fire retardant treated including balustrades.

Source: **http://www.bushfire.nsw.gov.au/index.cfm?cid=118&the_start=7**

BUSHFIRE MANAGEMENT PLAN
"MINARKA BRINNY" AGED CARE FACILITY

PREPARING FOR BUSHFIRES AND MAINTENANCE
INTRODUCTION
Whether or not a structure survives a bushfire ultimately depends on the staff and residents. Planning provisions do not provide extensive protection from even severe bushfires but their benefits are hampered when they are not maintained. Some maintenance depends upon adjoining neighbours and some depends on fuel management in adjacent bush land areas by the State agencies or fire authorities, but general housekeeping and maintenance of the grounds by the land occupier is equally important and, in some cases, may even be more so.

It is too late to undertake general bushfire maintenance when a bushfire approaches – do it early and keep it up!

In ensuring that the structures and their occupants are prepared for bushfire events, three areas to be addressed are:

1. the management of vegetation in the structured surrounds, including any Asset Protection Zones;
2. the provision of adequate services including an independent water supply; and
3. personal safety and survival during the fire event.

Experience from Ash Wednesday and fires at Menai all suggest that structure losses are greatest in the area up to 180 metres from the bush interface. Distances of less than 100 metres are particularly vulnerable to radiant heat and ember attack. Hence it is within this distance that efforts should be made to prepare for the onslaught of major bushfire events.

VEGETATION MANAGEMENT
Asset Protection Zones have been incorporated as part of the development (refer to main Report - Bushfire Risk Assessment).

In general, it is expected that Asset Protection Zones will be maintained by the owner/occupier of the land including maintenance of the fire trail constructed as part of the development. It is accepted practice that after construction of the facility, gardens will be established and landscaping of the grounds will be undertaken. It is essential that efforts to reduce fuels on adjoining properties are therefore not negated by actions within the immediate curtilage of the facility.

It is more practical to determine the specifications of the IPA in terms of performance than in terms of a minimum fuel loading. The performance of the Inner Protection Area must be such that:

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

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

- do not touch or overhang buildings;
- are well spread out and do not form a continuous canopy;
- are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and

- are located far enough away from the buildings so that they will not ignite the structures by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas/quantities of garden mulch, stacked flammable building materials etc should not be permitted in the Inner Protection Area.

Within the Outer Protection Area any trees and shrubs should be maintained in such a manner that the vegetation is not continuous. Fine fuel loadings within the OPA should be kept to a level where the fire intensity expected will not impact on the development. In the absence of any policy to the contrary, 8 tonnes per hectare of fuel is commonly used. In grasslands, fuel height should be maintained below 10 centimetres.

Design Criteria

To produce a garden that does not contribute to the spread of bushfires, it is necessary to plan the layout of the garden beds and take an active decision to minimise certain features in favour of other features:

- maintain a clear area of low cut lawn adjacent to the structures;
- keep areas under fences, fence posts and gates and trees raked and cleared of fuel;
- plant trees and shrubs such that:
  - the branches will not overhang the roofs;
  - the tree canopy is not continuous; and
  - there is a windbreak in the direction from which fires are likely to approach.
- clear all gutters and roof gullies of leaves and keep them cleared;
- keep a low risk garden:
  - of densely foliated deciduous or fire resistant evergreen trees (see attached list - Appendix D);
  - with trees in clumps not continuous rows;
  - of short, green, well watered lawns where twigs and leaves are regularly raked;
  - containing smooth barked rather than rough barked trees; and
  - with minimum areas of mulch and well watered garden areas.

Selection Criteria

While the design of the garden is important, so too is the type of plant species selected. No plant is fireproof. Many plants however, have features that minimise the extent to which they contribute to the spread of bushfires. Beware of trees with dense crowns that hold dead foliage. Use smooth bark trees in preference to rough or ribbon bark trees that provide a fuel ladder into the crown. When choosing plants, be sure not to introduce weed species into an area. Fire events may provide the opportunity for weed species to spread and may contribute fuel to an area of otherwise lower fuel loads. Refer to Appendix D for a selection of "fire resistant plants", or contact local plant nurseries, suitable consultants or plant societies to determine appropriate species for this area.

Trees as Firebreaks

The use of trees as windbreaks is a common practice but trees also provide a more than useful firebreak, trapping embers and flying debris, which would otherwise reach the facility. The tree crown will rarely carry fire without a significant fuel loading on the ground. By reducing the wind speed, a row of trees also slows the rate of spread of a bushfire and dense foliage traps radiant heat, lowering bushfire intensity. Because of the effect of turbulence, a balance has to be struck between a high density of trees (that maximises the trapping of embers and radiant heat but also maximises turbulence) and

a lower density (that lets more embers and radiant heat pass through but minimises turbulence). A windbreak that allows 50–60% of the wind to pass through is ideal. To be effective a windbreak/firebreak must:

- be located on the side of the lot from which fire weather normally approaches
- be of sufficient length (generally 100 metres minimum length)
- be located at a distance of 1 to 3 times the height of fully grown trees but not within the IPA
- uses smooth barked eucalypts or deciduous trees
- make sure there are no breaks of sufficient size to allow winds to funnel through

Electricity Transmission Lines

Where possible electrical transmission lines should be underground.
Where overhead electrical transmission lines are installed:

- lines should be installed with short pole spacing, unless crossing gullies, gorges or riparian areas;
- no part of a tree should be closer to a power line than the distance set out in Appendix 4 of *PfBP-2001* (below). Regular inspection of lines is required to ensure they are not fouled by branches.

Voltage	Clearance at pole to nearest conductor in rest position	Clearance along middle 2/3 of span to nearest conductor in rest position
Insulated service wires	0.5m	0.5m
Up to 650V,	1.0m	1.0m **or** sag at 50° C plus 0.5m (whichever is greater)
>650V to 22kV	1.5m	1.5m **or** sag at 50° C plus 0.5m (whichever is greater)
>22kV up to 66kV	2.25m	2.25m **or** sag at 50°C plus 1.0m (whichever is greater)
>66kV up to 132kV	3.0m	3.0m **or** sag at 50°C plus 1.0m (whichever is greater)

Refer to *PfBP-2001* for full details

Taps and Pipes and Hoses

Taps and pipes should be 19mm diameter for adequate water flow. Taps should be located away from buildings to avoid heat if the building catches fire. Taps and fittings should be metal rather than plastic. Use rubber hoses rather than plastic and store inside while the fire front passes. Several hoses should be used to reach the areas to be protected.

PERSONAL SAFETY AND SURVIVAL

The survivability of a structure and its occupants is dependent upon the amount of preparation prior to the actual fire event. Preparation not only includes the maintenance of lawns and gardens but also the preparation of those who may be caught in a wild fire event. Bushfires are chaotic, noisy and frightening experiences and, unless extenuating circumstances apply, only those who are capable of working quickly before, during and after the firefront has passed should stay behind to effect protection measures.

As the Bushfire Approaches

a) Personal Protection.

Before you can confront an oncoming bushfire, it is important that you protect yourself from radiant heat. This can be assisted by wearing:

- cotton overalls or thicker long sleeved shirt and long pants of cotton or wool
- clothes which are loose fitting
- a strong pair of shoes or boots with woollen or cotton socks
- gloves, if your hands are not used to working with tools
- goggles, if the smoke is thick
- a "bandana" or large handkerchief to protect the airways from smoke and hot air;
- a wide-brimmed hat or hard hat if one is available; but
- leave your ears uncovered – they warn you of heat levels.

Do Not Wear Synthetics – Wear Wool, Cotton or Denim.

b) Protection of Children, Elderly and Pets

During the approach of a bushfire:

- keep children, elderly and pets inside structures;
- give them plenty of water to drink; and
- make sure you keep track of their movements.

c) Outside the Structures

- close windows and doors and any shutters and fit any screens
- block the downpipes and fill them with water where practical
- put doormats inside
- stow all combustible furniture and awnings
- wet down wood piles and areas of garden mulch.

d) Inside the Structures

- fill all sinks, baths and any buckets with water
- block any gaps under the doors with wet towels
- monitor the radio – keep a spare set of batteries
- turn off any gas.

e) The car

- park in a cleared area where practical, or sealed garage
- close all doors, windows and vents
- leave the keys in the ignition
- store woollen blankets inside

When the Bushfire is Close (consider your health)

- remain outside as long as possible patrolling the area for spot fires
- suppress any spot fires which start close to the house or in the guttering
- take refuge when the smoke starts to thicken
- take your hoses and fittings inside when you move inside
- activate any sprinkler system

As the Bushfire Passes Over

Remain calm and keep other occupants calm. Move to the side of the structure away from the main firefront. Carry out regular inspections, particularly of windows to determine if the have shattered and embers have entered any rooms.

After the Bushfire has Passed

Before passing through a closed doorway, feel the door – if it is hot do not open it as there may be a fire on the other side – leave it closed to stop the fire spreading and exit via another route. Check the structures for fires – the roof, roof spaces and any

underfloor areas. If the structure is on fire move onto burnt-out ground but keep clear of burning trees.

Evacuation

The decision to evacuate or stay in the event of a major bushfire is not an easy one to answer. Research from Ash Wednesday and other major fires show that where people are in attendance and well prepared then dwellings are more likely to survive a bushfire. Early evacuation is a serious consideration where:

- you are not confident that your structure is prepared to withstand a bushfire;
- you are worried about elderly residents;
- you suspect that you or other residents of the facility will be unable to cope with the stress of staying;
- it is safe to leave and you have a clear idea of where a safe refuge is to be found; and
- you know the destination to be safe.

Note: you must evacuate if directed to do so by the Police.

If you do decide or are directed to evacuate:

- DO IT EARLY
- close all doors and windows and consider leaving them unlocked – a firefighter may need access to your home
- know where you are going
- drive carefully

Note: during a major bushfire emergency, the chances of a firefighting appliance being available to protect every residence is very remote.

Reference source: "*Planning for Bushfire Protection 2001*"

Hazard Reduction and the Rural Fires Act

The *Rural Fires Act 1997* (RF Act) was enacted to establish the NSW Rural Fire Service and define its functions; to make provision for the prevention, mitigation and suppression of rural fires. Vegetation management may require hazard reduction techniques to reduce fuel loads and limit the paths available to the passage of a bushfire event. Techniques available for bushfire hazard reduction works include;

- Mechanical slashing; and
- Hazard reduction burns.

Hazard reduction burning is currently viewed as the most economically viable and effective method of reducing bushfire hazards for larger areas. However, a major environmental disadvantage of this method is its potential to produce large quantities of smoke and ash.

The *Protection of the Environment Operations (Control of Burning) Regulation 2000* clearly allows hazard reduction burning as permitted by the RF Act. Although section 133 of the *Protection of the Environment Operations Act, 1997* allows the EPA to ban hazard reduction burns on certain days, the legislation is intended not to reduce the amount of hazard reduction burning carried out, but to make sure it is scheduled to coincide with meteorological conditions favouring pollutant dispersion rather than accumulation. The EPA acknowledges that hazard reduction burning is an essential bushfire prevention measure. Consequently, it bans burning only when absolutely essential and in only those locations where smoke could affect major metropolitan areas.

Further information regarding hazard reduction burning can be found in *Guidelines to the Regulation of Open Burning in NSW*, produced by the NSW RFS in collaboration with the EPA.

Section 63 of the RF Act describes the requirement for all public authorities, landowners and occupiers to accept a duty to prevent the occurrence and to minimise the spread of bushfires within their property. The land manager is required to take steps necessary to achieve these ends and is liable for costs incurred. These steps include immediately extinguishing fires where practicable and or notifying the nearest appropriate officer (as defined in the Act) which will generally be a firefighting authority such as the RFS or NSW Fire Brigades. A local Bush Fire Risk Management Plan should set out the steps to be taken in managing the bushfire hazard on the property under s.63.

Section 66 of the RF Act provides for the management of bushfire hazards on private lands through the issuing of notices by local councils. These notices require the landowner or occupier to conduct bushfire hazard reduction works in a particular manner, under certain conditions and at a determined time as specified in the notice. A local authority must serve a notice under this section if required to do so by a Bush Fire Risk Management Plan applicable to the land. A person to whom a notice under section 66 of the RF Act has been issued has the right of objection to the notice (section 67). The grounds for objection are that the vegetation to be hazard reduced is required for one or more of the following purposes:

a) shelter, shade, windbreak or fodder purposes;
b) protection of threatened species, populations, communities or critical habitat under the *Threatened Species Conservation Act, 1995*;
c) it is not required by a bushfire risk management plan and does not constitute a risk; and
d) the proper needs for conservation

Section 68 allows a person who has objected to a notice, a right of appeal to the Commissioner of the NSW Rural Fire Service within 14 days of the determination of the council, or if the council has failed to confirm, vary or revoke the notice.

Section 70 of the RF Act, permits a local authority to undertake the bushfire hazard reduction works if the owner/occupier fails to carry out the work within the specified time and allows council to recover the cost of the works from the owner/occupier.

RADIANT HEAT BARRIERS

Radiant heat barriers act to absorb and/or deflect radiant energy from a bushfire source that would otherwise be absorbed by a building surface. The barrier should be located between the hazard and the buildings and is most effective when sited close to the building. The provision of a heat barrier in most situations can only provide limited protection from radiant heat to windows and generally should not be relied upon to reduce the need for setbacks or construction standards. Barriers may be best formed using masonry walls (steel or Colorbond fences should be limited to grassland situations if other types are considered inappropriate).

In many cases, these barriers may be incorporated into the building design as a courtyard or fenced off area for gardens, BBQ areas and the like. Areas within courtyards should be maintained free of fallen leaves or dried vegetation matter. A major limitation for heat barriers is that they are less effective for forest and woodland (Vegetation Groups 1 & 2) situations where flame heights can be anticipated to be larger than for grasslands, however they may be suitable in situations involving some coastal wetland vegetation (e.g. low wet heaths). They are particularly suitable for grassland and other Group 3 vegetation situations and in such situations may be used as fencelines for new urban developments adjacent to improved pasture or native grasslands. Heat barriers are unlikely to be effective against burning embers.

The installation of a fence would not be considered to provide suitable protection (as a heat barrier) if the neighbouring vegetation is a forest (of any slope) or where significant free standing vegetation is located

upslope of the dwelling. As such, they should be located within about 5m of the house and should be up to 2m high to cover most windows and doors on the side facing the bushfire hazard.

SERVICE SUPPLY
During major bushfire events, the protection and preparedness of the facility and its staff and occupants may be seriously jeopardised with the loss of basic services. As part of the development consent process for the construction of such a facility, it may be necessary to specify the provision of certain services. The provision of an adequate water supply and the installation of a sprinkler system are of particular importance.

Gas
Bottled gas shall be installed and maintained in accordance with AS1596 and the requirements of relevant authorities. Larger gas cylinders should be kept clear of all flammable materials. If gas cylinders need to be kept close to the buildings, the release valve must be directed away from the building and away from any hazardous materials such as firewood, so that it does not act as a catalyst to combustion.

Water Supplies (i.e. where a mains supply is not *guaranteed*)
Maintaining a water supply for firefighting purposes provides protection in three ways:
- connection to hand-held hoses;
- connection to sprinkler systems; and
- water replenishment for firefighting tankers.

As a protective measure, connection to hand-held hoses, sprinkler systems and water replenishment to firefighting vehicles are considered to be an '*active*' measure (someone, generally, must be present to utilise the system). They must be considered as additional, rather than an alternative to other bushfire protection measures. The determination of a guaranteed water supply is one that can only be made by the water supply authority where mains water supply is available.
It is common during major fire events for the supply of mains water pressure to drop significantly, preventing adequate protection.

a) Urban Subdivisions
The water supply to the perimeter road should be delivered by a ring main system. Fire hydrants must be accessible and located such that a tanker can park within a distance serviceable by a 20m hose and the habitable building must be located such that a fire at the furthest extreme can be attacked by the tanker using a 60m hose and 10m jet of water. A clear unobstructed path between the hydrant and most distant point of the building cannot exceed 90m allowing for the tanker to be parked inline. Obstructions to the path will reduce the distances. Australian Standard 2419.1 – 1994 details the location of external fire hydrants. If the building is located such that the distances do not comply with AS 2419 for the location of hydrants, then a static supply of water (5000 litres minimum), or an additional hydrant must be supplied. In major bushfires there is a possibility that the mains water supply will fail due to excessive demand. The installation of a water supply independent of the mains system on properties along the hazard interface is recommended.

b) Rural-Residential and Rural Developments
All rural-residential and rural developments in bushfire-prone areas must maintain a water supply reserve dedicated to firefighting purposes. The supply of water can be an amalgam of minimum quantities for each lot in the subdivision, or held individually on each lot. In planning a water supply for firefighting purposes, a number of factors must be taken into account:
- 10,000 litres will fill three tankers or provide sufficient water to protect a house using hoses.
- 22,000 litres should supply an average sprinkler system. However, manufacturer's advice should be sought to determine the volume of water required by the sprinkler system being installed to provide protection for a length of time.
- A suitable connection for RFS purposes must be made available. In general a 65mm Storz outlet with a Gate or Ball valve should be provided (contact local RFS to confirm local requirements).
- Underground tanks with an access hole of 200mm will allow tankers to refill direct from the tank.
- Raised tanks should have their stands protected.

Pumps
Water should be gravity fed or supplied by a diesel or petrol powered pump that is not dependent on mains electrical supply (that may be cut off to protect firefighters during fire operations). It is generally considered that 3kW (5hp) pumps are adequate for protection of a single dwelling using one or two short hose lines.

Sprinkler Systems
The NSW Rural Fire Service does not currently advocate the inclusion of sprinkler systems in construction standards due to the limited research available to substantiate the effectiveness of these systems as protection during a severe bushfire event. Concerns exist relating to:
- the construction materials used in sprinkler systems;
- the maintenance of systems;
- water consumption rates;

- water pressure levels;
- spray dispersal; and
- automation.

Sprinklers can be a valuable additional bushfire protection measure, but are not an alternative to passive fire protection measures. Where installed:

- roof mounted sprinklers must direct their spray at the roof above the gutter and at the sides of the house. In the high winds that nearly always accompany bushfires, roof mounted sprinklers may have most of their spray blown away unless they are directed and located properly;
- sprays directed at or from the ridge of the roof are largely carried away by even moderate winds;
- sprays must overlap around the roof;
- use metal pipes, buried in the ground to 300mm minimum;
- ground sprinklers should be fixed metal risers;
- butterfly sprays are all metal, easy to operate and trouble free;
- twin-jet impact-drive sprinklers are preferred for ground-based sprinklers.

In areas subject to frequent bushfires or having a regular history of bushfire activity, the use of sprinkler systems as an additional protection measure is appropriate. Sprinkler systems are then likely to be more effective in these circumstances from a cost/benefit of use basis when effectively installed and regularly maintained.

BUSHFIRE EVACUATION PLAN

INTRODUCTION

This plan is for "AGED CARE FACILITY" and has been designed to assist the clients/guests and owner to protect life and property in the event of a bushfire.

Our aim is to have preplanning for an evacuation of the premises where there is a need to relocate a group of people from one place to another to enhance the protection of those people.

Name of Premises:	MACKSVILLE AGED CARE FACILITY		
Street No & Name:	CORONATION ROAD	Suburb:	MACKSVILLE
Post Code:	2447	Council Name:	NAMBUCCA SHIRE
Contact person:	Mr Jack C Dalton (0419 250 259)		
Date of Plan:	OCTOBER 2004	Date of Review:	
Type of facility:	3-Tier Aged Care Facility (high-care, low-care, self-care)		

BACKGROUND INFORMATION ON PREMISES

Number of employees:	75	Number of residents:	369
Number of residents with 'special needs':	134		
Number of buildings:	235 villas, 8 x 8-bed low-care units, 70 bed high-care facility	This is a sub-plan under:	

ROLES & RESPONSIBILITIES

	Building / Area of Responsibility	Contact Phone Number	Mobile Phone Number
PERSON MAKING BOOKING/RENTAL			
CHIEF FIRE WARDEN			
Deputy Fire Warden			
Area 1 Fire Warden			
Area 2 Fire Warden			
Area 3 Fire Warden			

EVACUATION 'TRIGGER'

(a) WHEN REQUIRED BY POLICE, NSW FIRE BRIGADES OR NSW RURAL FIRE SERVICE

NOTE:

THIS FACILITY IS DESIGNED AND INTENDED TO BE SELF-SUFFICIENT. THE LOGISTICS OF RELOCATING SUCH A LARGE NUMBER OF RESIDENTS MAKES EVACUATION UNDESIRABLE. MASS EVACUATION SHOULD BE AVOIDED AT ALL COSTS.

EVACUATION SHOULD ONLY OCCUR FOR MEDICAL EMERGENCY CASES.

DESIGNATED ASSEMBLY POINTS

Building	Designated Assembly Point
Self-care villas	(a) Village Centre (b) recreation/picnic area
Low-care units	(a) Village Centre (b) recreation/picnic area
High-care facility	not evacuated

TRANSPORT DETAILS

Contingency plans are to be put in place with the local bus companies for the necessary transport.

The aged care facility will eventually have its own bus for the transportation of its residents.

EVACUATION LOCATION

Venues identified as a 'Safe-refuge' are;

Venue 1

Name of venue (primary): THE PRIMARY EVACUATION POINT ALLOCATED BY THE LOCAL EMERGENCY SERVICES FOR A PARTICULAR BUSHFIRE EVENT

Address of venue:

Nearest cross-street:

Map Reference:

Venue 2

Name of venue (secondary): Macksville Indoor Sports Stadium

Address of venue: Park Street, Macksville

Nearest cross-street: Boundary Street

Map Reference:

Venue 3

Name of venue (secondary):

Address of venue:

Nearest cross-street:

Map Reference:

Notes:

THE SECONDARY EVACUATION POINT IS IN CLOSE PROXIMITY TO THE MACKSVILLE HEALTH CAMPUS (hospital)

CONTACT DETAILS

ALWAYS DAL "000" IN THE EVENT OF AN EMERGENCY

Name of Organisation	Name of Contact	Phone Number
NSW Rural Fire Service	FIRE CONTROL OFFICER	02 6568 2536
NSW Fire Brigade	CAPTAIN	02 6568 1561
NSW Police Service	O.I.C.	02 6568 1044
Department of Community Services	Freecall	1800 656 463
NAMBUCCA Council	GENERAL MANAGER	02 6568 2555
State Emergency Service	LOCAL CONTROLLER	02 6568 1136
NSW Ambulance Service	DUTY OFFICER	131233
Local Hospital	ADMIN.	02 6568 1366

SECURITY DETAILS

Is security required: YES ☐ NO ☐

ADDITIONAL SECURITY IS NOT REQUIRED AS THE FACILITY WILL BE STAFFED 24HOURS A DAY. NORMAL SECURITY ARRANGEMENTS WILL PREVAIL.

EVACUATION PROCEDURES

In the event of a bush fire in the surrounding area, occupants of the premise shall follow the procedure outlined below;

PRE-EMPTIVE ACTIONS

- REVIEW THIS BUSHFIRE EVACUATION PLAN
- CONTACT THE NSW RFS FIRE CONTROL CENTRE ON 0265682536 AND ADVISE THEM OF THE NUMBER OF SELF-CARE AND INFIRM RESIDENTS.
- ENSURE BACK-UP COMMUNICATION IS AVAILABLE IN THE EVENT OF A POWER FAILURE.
- ATTEND TO THE RESIDENTS AT MOST RISK BECAUSE OF AGE, HEALTH OR MOBILITY, AS THEY WILL HAVE SPECIAL NEEDS.
- REMAIN CALM AND ENSURE EVERYONE UNDER YOUR CONTROL IS AWARE OF WHAT IS UNFOLDING
- KEEP DOORS AND WINDOWS CLOSED
- REVIEW THIS BUSHFIRE EVACUATION PLAN !
-
-
-
-
-
-
-

EVACUATION PROCEDURES

In the event of a bush fire threatening and a decision to evacuate has been made, occupants of the premises shall follow the procedure outlined below;

AT THE TIME OF EVACUATION

- CLOSE ALL WINDOWS AND DOORS
- ENSURE ALL PEOPLE IN YOUR CARE ARE ACCOUNTED FOR
- ENSURE ALL PEOPLE IN YOUR CARE ARE AWARE THAT EVACUATION IS IMINENT
- ENSURE PEOPLE IN YOUR CARE ARE AWARE OF THE SAFE REFUGE AREA
- SECURE PERSONAL EFFECTS
- NOTIFY THE NSW RFS FIRE CONTROL CENTRE ON 0265682536 THAT SPECIFIC VILLAS/UNITS ARE BEING EVACUATED
- EVACUATE TO A SAFE REFUGE AREA AS PER THIS PLAN
-
-
-
-
-

ATTACHMENTS

Attachment 1: Site Layout Plan

Attachment 2: List of all residents

Attachment 3: Residents' family contact details

ATTACHMENT 1 – SITE LAYOUT PLAN

insert site plan here

SITE PLAN

ATTACHMENT 2: List of all RESIDENTS

RESIDENT LISTING

Name of Premises:

Address of Premises:

Name of Person	Building	Priority 1,2 or 3	Assembly Point	Safe Refuge	On Return
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒
			❒	❒	❒

ATTACHMENT 3: RESIDENTS' FAMILY CONTACT DETAILS

RESIDENT LISTING

Name of Premises:

Address of Premises:

Name of Person	Building	Contact Name	Contact Phone	Mobile	Other

Fire Resistant Tree Selection for Fire-Prone Areas

Flammability

All plants will burn, but some are more tolerant of fire than others.
Severe fires cause more damage. Low to moderate fires scorch or burn plants. High-intensity fires incinerate plants. Young plants are more susceptible to damage than mature plants.
Features of plants that provide protection from fire include:

* high salt content of leaves
* high moisture content of leaves
* low volatile oil content of leaves
* thick bark protecting conductive tissues & dormant buds
* seeds enclosed in woody capsules
* dense crown
* lowest branches out of reach of ground fires.

Plants that retain or accumulate dead leaves and twigs will burn, especially if this material is continuous from the ground to the crown. Trimmed cypress hedges, for example, are an extreme fire hazard.
Volatile oils in leaves of eucalypts, callistemons and melaleucas burst into flames on heating and increase fire intensity.
Thick bark will protect trees, but may be a fire hazard if it is loose, fibrous or stringy. These types of bark easily ignite and encourage fire to spread through the crown of the trees. Wind can carry burning bark, especially loose, flaky or ribbon bark, away to start new fires – a process called "spotting".

Ability to regenerate

Many plants can regrow or regenerate after a fire. Native plants have evolved with fire and most will regenerate well. They have survival mechanisms such as dormant buds, thick bark and thick, woody capsules to protect seeds, or they store seed in the soil. Introduced plants have few survival mechanisms, but burn less readily than most natives.

Eucalypts can re-shoot from dormant buds beneath their bark. Casuarinas and some acacias re-shoot from roots. Some eucalypts, acacias, tee-trees, banksias, hakeas and callistemon regenerate from seed. Seed of many acacias is stored in the soil and germinates after fire. Larger acacias are more tolerant of fire than smaller ones.
If crowns and trunks of native species such as eucalypts, acacias and casuarinas are killed by fire, the tree will often re-shoot from the stump when felled.
Introduced deciduous trees, such as poplars and willows, re-shoot from roots, and oaks re-shoot from stumps when the fire-killed crown and trunk is felled. Most pines will not recover if more than half their foliage is burnt, although Canary Island pine, Ponderosa pine, Aleppo pine and Redwood are more fire-tolerant than this.

After the Fire

Ground cover and prunings from fodder trees may provide supplementary stockfeed when pastures are burnt. Saltbush, most casuarinas, several species of eucalypt and acacia, poplars and willows are all fodder trees.
Fire-damaged shelterbelts will still protect stock from wind and sun, so retain them until new shelterbelts are established.
Fire-tolerant plants may provide a valuable refuge and source of food after a fire for wildlife such as small marsupials, nectar-

feeding birds, bees and other insects.

THE MORE FIRE RESISTANT NATIVE TREES AND SHRUBS INCLUDE:

NATIVE SPECIES

- Acacia Cyclops
- Acacia glandulicarpa
- Acacia howittii
- Acacia iteaphylla
- Acacia melanoxylon
- Acacia pravissima
- Acacia prominens
- Acacia terminalis
- Acacia vestita
- Acmena smithii
- Agonis juniperina
- Angophora costata
- Triplex sop.
- Brachychiton populneus
- Casuarina cristata
- Casuarina cunninghamiana
- Eucalyptus maculata
- Ficus macrophylla
- Hakea salicifolia
- Hakea suaveolens
- Heterodendrum oleifolium
- Lagunaria patersonii
- Melaleuca lanceolata
- Melia azedarach
- Myoporum insulare
- Pittosporum undulatum
- Tristania conferta West Australian Coastal Wattle
- Hairy Pod Wattle
- Sticky Wattle
- Gawler Range Wattle
- Blackwood
- Ovens Wattle
- Golden Rain Wattle
- Cedar Wattle
- Hairy Wattle
- Lilly Pilly
- Juniper Myrtle
- Apple Jack
- Saltbush
- Kurrajong
- Belah
- River She-Oak
- Spotted Gum
- Moreton Bay Fig
- Willow Hakea
- Sweet Hakea
- Cattlebush
- Pyramid Tree
- Moonah
- White Cedar
- Boobialla
- Sweet Pittosporum
- Brush Box

INTRODUCED PLANTS

- Acer campestre
- Acer negundo
- Acer platanoides C
- Acer pseudoplatanus C
- Aesculus hippocastanum C
- Alnus jorullensis
- Calodendrum capense
- Castanea sativa C
- Celtis occidentalis
- Ceratonia siliqua
- Cercis siliquastrum
- Coprosma repens
- Cornus capitala C
- Corynocarpus leavigatus
- Elaeagnus angustifolia
- Fagus sylvatica C
- Fraxinus spp. X
- Griselinia littoralis
- Ilex aquifolium
- Laurus nobilis
- Liridendron tulipifera C
- Olea europaea
- Photinia serrulata C
- Pittosporum eugenioides
- Platanus orientalis
- Populus spp.
- Prunus laurocerasus
- Prunus lusitancia
- Quercus canariensis
- Quercus ilex
- Quercus robur
- Salix babylonica
- Schinus molle
- Sorbus aucuparia C
- Tamarix aphylla
- Tilia vulgaris C
- Common Maple
- Box-Elder maple
- Norway Maple
- Sycmore
- Harse Chestnut
- Evergreen Alder
- Cape Chestnut
- Sweet Chestnut
- Hackberry
- Carob
- Juduas Tree
- Mirror Bush
- Evergreen Dogwood
- New Zealand Laurel
- Russian Olive
- Common Beech
- Ash
- New Zealand Broadleaf
- Holly
- Laurel
- Tulip Tree
- Olive
- Red-leaf Photinia
- Chinese Hawthorn
- Tarata
- Plane
- Poplar
- Cherry Laurel
- Portugal Laurel
- Algerian Oak
- Turkey Oak
- Holm Oak
- English Oak
- Weeping Willow
- Pepper-Tree
- Rowan
- Athel
- Linden
- Elms

GROUND COVERS

- Ajuga reptans
- Atriplex spp.
- Carpobrotus spp.
- Coprosma 'kirkii'
- Delosperma 'alba'
- Drosanthemum floribundum
- Gazania spp.
- Hedera spp.
- Helixthemum spp. C
- Kennedia spp.
- Kochia spp.
- Lampranthus multiradiatus
- Myoporum parvifolium
- Portulacaria spp.
- Pelargonium spp.
- Rhadgodia spp.
- Rosmarinus officinalis prostatus
- Rosemary (prostrate form)
- Santolina spp.
- Verbena peruviana
- Vinca spp.
- Bugle
- Saltbush
- Pigface
- Gazanias
- Clinging types of ivy
- Sunroses
- Coral Peas
- Bluebushes
- Noonflower
- Creeping Myoporum
- Jade Plants
- Pelargoniums
- Stonecrops

- Periwinkles

C = Prefers cool climate
X = Extensively naturalised: might be declared noxious weed in some areas.