
BUSH FIRE ASSESSMENT REPORT

Lot 2 DP 445771

183 Coopers Lane West, Main Arm

Proposed Dual Occupancy (s4.14)

Prepared for: Wayne Weisse

Prepared by: Peter Thornton

BPAD-L3 Accredited Practitioner

Date: 14 October 2019

Ref: 19/300

BCA Check Pty Ltd
t/as Bushfire Certifiers
4/57 Ballina Street Lennox Head NSW 2478 Australia
(PO Box 375 LENNOX HEAD NSW 2478)

ABN 95104451210
T: 02 66877461
F: 02 66876295
E: bcacheck@bigpond.com



Peter Thornton MFireSafeEng
BPAD-L3 Accredited Practitioner No. 14867
Building Surveyor MAIBS



Revision	Date	Description	Prepared	Authorised
-	24.08.2019	NSW RFS Brief	Peter Thornton	Peter Thornton
A	14.10.2019	Final report	Peter Thornton	Peter Thornton

Table of Contents

1.0 EXECUTIVE SUMMARY	4
2.0 INTRODUCTION	7
2.1 GENERAL.....	7
2.2 SIGNIFICANT ENVIRONMENTAL FEATURES	8
2.3 REPORT DETAILS.....	9
3.0 PROPOSED DEVELOPMENT	9
4.0 BUSHFIRE THREAT ASSESSMENT – ASSET PROTECTION ZONES & CONSTRUCTION STANDARDS.....	10
5.0 WATER AND UTILITY SERVICES	16
5.1 WATER SERVICES.....	16
5.2 ELECTRICITY SERVICES.....	17
5.3 GAS SERVICES	18
6.0 ACCESS.....	18
7.0 LANDSCAPING	23
8.0 CONCLUSION	23
APPENDIX A: Site and access plans.....	25
APPENDIX B: Access s4.1.3(2) PBP2006.....	28
APPENDIX C: Turning Head Requirements	31
APPENDIX D: Standards for Asset Protection Zones (RFS 2005)	33
APPENDIX E: NSW Rural Fire Service correspondence dated 9 May 2019.....	46

1.0 EXECUTIVE SUMMARY

This bushfire assessment report has been prepared to assess the proposed conversion of an existing structure to a Class 1a dwelling to create a dual occupancy at Lot 2 DP 445771, 183 Coopers Lane West, Main Arm against the requirements of s4.14 of the *Environmental Planning and Assessment Act 1979* and Planning for Bushfire Protection, 2006.

The report establishes that the proposed change of use is capable of complying with the residential infill requirements of Planning for Bushfire Protection 2006. In this regard s4.3.5 PBP2006 states:

The expectation of building or altering a house is recognized even though the ability to provide for APZ's or access requirements now required for residential development may not be possible.

The report establishes with the intent of 'infill' development and demonstrates a better bushfire outcome will be created than if the development did not proceed given the existing development does not have any specific bushfire protection measures. In this regard the recommendations will allow for –

- The inclusion of APZs around the existing dwelling and the proposed dual occupancy;
- An accessible static water supply for both buildings and a fire fighter pump and hose;
- Ember upgrade for the existing dwelling and BAL 29 upgraded construction for the dual occupancy;
- A turning bay adjacent to the water supply for the proposed dual occupancy;
- Three passing bays to be included on the existing property access road with the easement re-aligned over the carriage way and nominated passing bays;
- Emergency evacuation planning.

The following table is provided as a summary of the recommendations and method of assessment for each consideration relating to Planning for Bushfire Protection 2006.

MEASURE	RECOMMENDATION	METHOD OF ASSESSMENT
Construction Standards	Dual Occ - BAL 29 AS 3959-2009 + Appx. 3 ADD PBP 2006. Existing Dwelling – Ember protection upgrade.	Acceptable/Performance Solution Upgrade Measure
APZ Required	See recommendations	Acceptable/Performance Solution Upgrade measure
Water Supply	Dual Occ – 10 000 litre non-combustible tank. Existing Dwelling – 20 000 litre non-combustible tank	Acceptable Solution Upgrade Measure
Electricity Supply	New electricity supply in accordance with s4.1.3 PBP2006	Acceptable Solution
Gas Supply	Gas supply to comply with PBP2006.	Acceptable Solution
Landscape	Landscaping is to comply with Appendix 5 of PBP2006	Acceptable Solution
Access	See recommendation	Upgrade Measure

It is recommended that development consent be granted subject to the following conditions.

1. The proposed dual occupancy is to be constructed to BAL 29 AS 3959-2009 + Appendix 3 Addendum PBP 2006. The existing dwelling is to be provided with ember protection by screening openable windows, draft excluders to external hinge doors and screen any external vents.
2. At the commencement of works and in perpetuity the dual occupancy requires an APZ for a distance of 52 metres to the north, northwest and west or to the property boundary whichever the lesser, 21m to the south and extended to include the concrete water supply tank and turning area, 27m to the east, and 42m to the northeast as shown on the APZ plan prepared by Chris Lonergan Amendment B dated 18/7/2019 (see **attached** Appendix A).

The APZ is to be managed and maintained as an Inner Protection Area (IPA) to prevent the spread of a fire towards the building in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005) (**attached** Appendix D). It is noted the 6 iron bark trees identified on plans are permitted to remain within the asset protection zone. It is also recommended permanent markers be provided on site identifying the extent of the APZ but in particular to the west, northwest and north of the second dwelling to further assist in ensuring these areas are managed in perpetuity.

3. At the commencement of works and in perpetuity the existing dwelling requires an APZ for a distance of 40 metres to the north and northeast, 21m to the east and west, and 10m to the south and southwest as shown on the APZ plan prepared by Chris Lonergan Amendment B dated 18/7/2019 (see **attached** Appendix A). The APZ is to be managed and maintained as an Inner Protection Area (IPA) to prevent the spread of a fire towards the building in accordance with the requirements of Standards for Asset Protection Zones (RFS 2005) (**attached** Appendix D).
4. Landscaping within the recommended APZs is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
5. A 10 000 litre water supply and RFS connection to a non-combustible water tank is to provide coverage of the proposed dual occupancy dwelling including other conditions detailed in Section 6.1 of this report. A 20 000 litre static water supply is to be provided to the existing dwelling.
6. A turning head is to be provided adjacent to the dual occupancy complying with Figure 3.5 Draft PBP2018 (see **attached** Appendix C). A passing bay complying with s4.1.3(2) PBP2006 is to be provided from the internal property access road within the subject property (see **attached** Appendix B) and adjacent to the concrete tank identified for static fire-fighting supply for the proposed dual occupancy building.
7. The right-of-way is to be re-aligned over the existing property access road within the subject property, Lot 1 DP 445771 and Lot 7 DP 591828 and is to include the proposed/existing passing bays (on the aforementioned properties) as identified on the survey plan prepared by Heath & McPhail Surveying Pty Ltd, Drawing No. HM18147-2, Issue B dated 14th October 2019 (see **attached** Appendix A). The road widening opportunity within the existing easement in the vicinity of chainage 120 as identified in the survey plan is not to extend beyond the communications cable located 3-4m above ground level.
8. New electricity and gas supplies are to comply with section 4.1.3 of Planning for Bushfire Protection 2006.
9. It is recommended that the property owner and occupants familiarise themselves with the relevant bushfire preparation and survival information located on the NSW Rural Fire Service website. This website should be accessed periodically to ensure the property owner and occupants are aware of the latest information. The RFS website is www.rfs.nsw.gov.au.

2.0 INTRODUCTION

2.1 GENERAL

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed conversion of an existing structure to a Class 1a dwelling to create a dual occupancy at Lot 2 DP 445771, 183 Coopers Lane West, Main Arm in order for Council to make determination of the proposed development pursuant to the requirements of s4.14 of the *Environmental Planning and Assessment Act 1979*.

The report prepared by this office dated 27th March 2019 primarily was provided as a response to Byron Shire Council's email to Chris Lonergan, which in part requested –

A Level 3 accredited Bushfire Consultant is to be engaged to find an 'alternate solution' to enable a reduction in the extent of the APZ so that it is fully within the property boundaries and does not require removal of the 6 Iron Bark trees. Depending on the outcome of the Bushfire Report, an ecological report may need to be provided. However, at this point this is not requested. It is recommended that the Bushfire Consultant liaise with Council's Ecologist.

The report was referred to the NSW RFS for advice and was concurred with. The report was considered as additional information to the existing development application currently being assessed by Byron Shire Council.

Whilst on site it was observed that the slope analysis in the initial bushfire report prepared by the Chris Lonergan as part of the statement of environmental effects and reflected in the NSW RFS advice dated 22nd November 2019 did not reflect the slope most likely to influence the bushfire behaviour having regard to radiant heat received by the proposed dual occupancy (2nd dwelling). The NSW RFS advice dated 9th May 2019 rectified the asset protection zones for compliance with PBP2006 (see **attached** Appendix E).

The internal access was also raised by Byron Shire Council as an issue to be addressed which was not part of the BCA Check Pty Ltd's initial scope of reporting. This item was being addressed by the consultant Town Planner Chris Lonergan however the owners have now requested this office to liaise with NSW RFS and provide any subsequent reporting. A bushfire design brief dated 24th August 2019 was prepared for NSW RFS in relation to this final report. A subsequent on-site meeting was undertaken on 24th September 2019 with Alan Bawden (NSW RFS), Angela Daly (NSW RFS), Chris Larkin (Byron Shire Council), Ivan Holland (Byron Shire Council) and Peter Thornton (BCA Check Pty Ltd) to assess the access and discuss other bushfire protection measures.

The NSW RFS concurred with the brief in an email response on the 26th September 2019 with the following request –

With respect to the attached draft bush fire brief and as discussed yesterday, the NSW RFS requires the ROW survey plan to be updated to reflect the agreed property access outcomes.

The plan shall include:

*Road widening opportunities within the ROW at approx. 120 metre chainage, adjacent to the road width constriction generated by an overhead wiring telecommunication pole;
Road widening opportunity within the ROW between the 300 and 400 metre chainage
Re-alignment of the ROW to the constructed road alignment within lot 1 and 2 DP 445771, including a minimum 6 metre ROW width to accommodate proposed passing bays at 640, 850 and 1050 metre chainage.*

Proposed turning head within lot 2 to provide access to the proposed firefighting water supply.

This report is now to be considered as a holistic bushfire assessment report for the development application rather than addressing part of the Bushfire Protection Measures. The report addresses the NSW RFS access request and is considered to be consistent with all discussions during the consultation phase of this assessment.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2006 to reduce the risk of ignition of the building in a bushfire event. It is noted however that bushfire is a natural phenomenon and there can never be any guarantee that a building or occupants will not be adversely affected by bushfire.

2.2 SIGNIFICANT ENVIRONMENTAL FEATURES

An assessment is to be undertaken, if applicable, with regard to:

- State Environmental Planning Policy No. 44 (Koala Habitat Protection)
- Biodiversity Conservation Act 2016 (NSW)
- Local Land Services Act 2013 (NSW)
- Land Management (Native Vegetation) Code 2017 (NSW)
- National Parks and Wildlife Act 1974 (NSW)
- Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)

This report is not to be considered as having assessed the above legislation. In this regard this report should be read in conjunction with the Statement of Environmental Effects submitted with the development application.

4.0 BUSHFIRE THREAT ASSESSMENT – ASSET PROTECTION ZONES & CONSTRUCTION STANDARDS

Reference is made to NSW Rural Fire Service Correspondence dated 22 November 2018, Ref. D18/6791, relating to the proposed use of the existing building as a dual occupancy dwelling. Item 2 of the RFS correspondence relates to the asset protection zone to the west of the building states:

At the commencement of building works and in perpetuity, the property around the 2nd dwelling (detached) shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones':

- *north for a distance of 40 metres as an asset protection zone;*
- *south for a distance of 20 metres as an asset protection zone;*
- *east for a distance of 20 metres or to the property boundary as an asset protection zone; and*
- *west for a distance of 50 metres as an asset protection zone (APZ).*

(Note: in forested areas a portion of the APZ may be maintained as an outer protection zone as specified in Table A2.7 of 'Planning for Bush Fire Protection 2006'.)

A site inspection was undertaken by this office and determined the hazard as forest vegetation with the slope analysis in each direction as outlined in Table 1 below. In this regard an analysis of the 'effective slope' based on bushfire behaviour was specifically undertaken. As outlined in Planning for Bushfire Protection 2006 the effective slope 'is the slope within the hazard which most significantly affects fire behaviour of the site having regard to the vegetation class found'. As detailed in our previous correspondence to Council dated 22nd March 2019, accepted by NSW Rural Fire Service following consultation, the gully and landform to the west and northwest had been taken into account in the assessment of effective slope together with the varying slopes throughout these areas.

The slope directly into the gully, the orientation of the gully and the relationship to the asset (dwelling) was specifically assessed in relation to effective slope and forecast bushfire behaviour. A qualification of fire behaviour and in particular acceleration and deceleration of rate of spread in forest fires through slope transitions was utilised to determine the slope that will most influence the bushfire behaviour. Further, the varying slopes to the northwest in relation to the ratio of a 100m fire front and fire runs was also considered. This has been demonstrated in the aforementioned correspondence, consultations and concurred with by NSW RFS, including a site inspection.

The inspection identified varying slopes (in the context of the receiver) to the west and northwest to the gully which ranged from approximately 10 degrees to 30+ degrees (dropping directly into the gully over a short distance). It was considered both extremes would not be the most likely slope to influence the bushfire behaviour.

The location of the very steep slopes dropping into the gully were over a very short distance, further from the APZ interface, and within the zone where the acceleration phase of the slope transition from the steep upslope to the west/northwest of the gully would occur. The approximate 10 degrees side-slope further to the north, northwest whilst occurring in part of the fire front interface was considered, as was the narrow area of steeper slopes to the northwest. The range of slopes were considered to both underestimate and overestimate the forecast fire behaviour based on a 100m wide fire front.

There was a narrow section of approximately 23 degree downslope which made up approximately a 15-20m width of the fire front at the hazard interface over a short fire run from a slope transition perspective. This slope was located between two minor gullies feeding the main gully with slopes either side not directed to the receiver. Modelling this slope with a 20m fire front with the recommended 52m APZ would emit approximately 22kW/m². In this regard the assessment determined the 52m APZ derived from the 15-20 degree range pursuant to Table 2.4.3 AS 3959-2009 would create a setback which would be more in line with the bushfire behaviour over varying downslopes and side-slopes, notwithstanding tangential fire fronts, flanking fires and slope transitions and the associated acceleration phases. It is noted this takes into account a conservative 100m wide fire front.

Further consideration was given to the desktop review undertaken which identified the 10m contours using Department of Lands Six Viewer. The 10m contours which are permitted by Planning for Bushfire Protection 2006 A2.3(b) to be used to determine slope, identified the slope to the northwest in particular being in the general range of 15-20 degrees downslope.

The assessment not only complies with Planning for Bushfire Protection 2006 but has included a number of redundancies in the assessment such as the use of higher fuel loadings than required by Draft Planning for Bushfire Protection 2018, and a 100m fire front parallel to the receiver rather than a tangential fire front.

It is also noted, using the 10m contours as permitted by Planning for Bushfire Protection 2006 also arrives at a slope analysis at just under 20 degrees as shown in Figure 2.

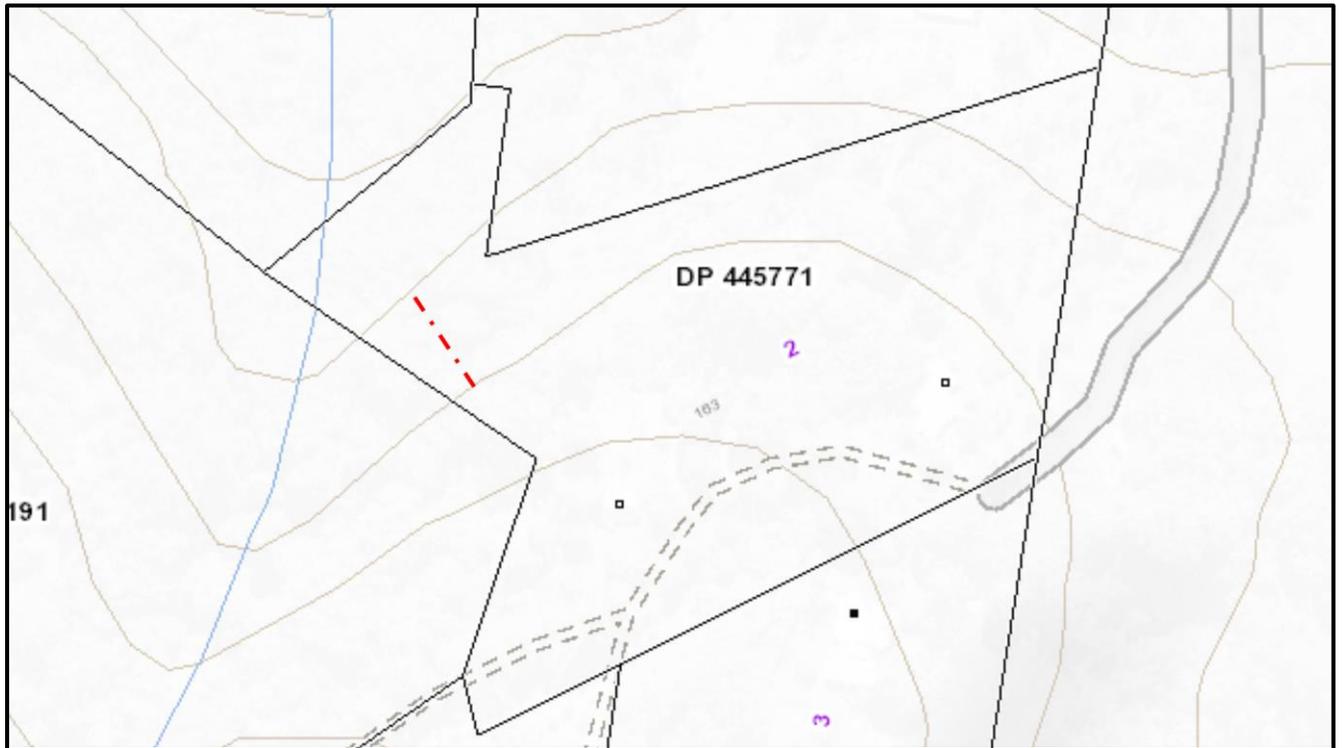


Figure 2: 10m contours to the northwest is approximately 34.5% (19 degrees) gradient.

Using Method 2 AS 3959-2009 on the steeper slopes at the APZ/hazard interface with a rate of spread over a slope exceeding 20 degrees having a 100m parallel fire front would not be reflective of the conditions on site and forecast fire behaviour. In this regard a qualification and a degree of quantification was undertaken in conjunction with discussions with NSW RFS to determine an acceptable slope analysis to establish the asset protection zones to meet the RFS criteria for a maximum radiant heat flux to the receiver of 29kW/m².

In this regard the asset protection zones required to achieve a BAL 29 rating pursuant AS 3959-2009 will not be consistent with the APZ distances outlined in the NSW RFS correspondence and in fact are increased to the northwest.

Table 1: Summary Bushfire Threat Assessment, APZs & Construction Standards					
ASPECT	SLOPE	VEG. CLASS	APZ Available	APZ REQUIRED	CONSTRUCTION AS 3959-2009
North/NW/ West	15-20° d/s*	Forest	West – 40m	52m (or to property boundary whichever is the lesser).	BAL 29
Northeast	10-15° d/s	Forest	42m	42m	BAL 29
South, Southwest	upslope	Forest	21m	21m	BAL 29
East	0-5° d/s	Forest	27m	27m	BAL 29

d/s* = downslope as qualified

As shown in the attached survey plan, the proposed dual occupancy dwelling is located 40.1 metres from the closest boundary point to the west, meaning the required 52 metre asset protection zone in this direction cannot be achieved within the subject property boundary.



Figure 3: Aerial map showing existing building to be used as a secondary dwelling.
Note – cadastre boundary overlay is not accurate. d/s* = as qualified.

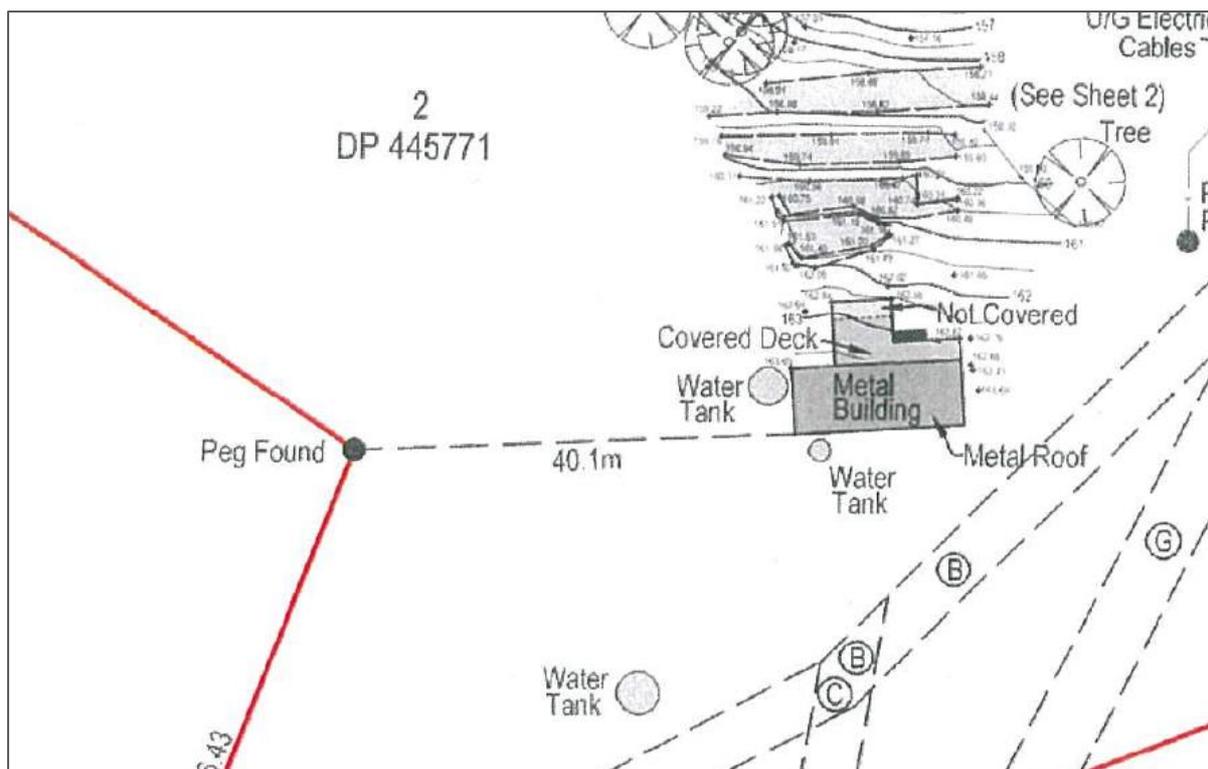


Figure 4: Part survey plan showing 40.1m distance from building to closest boundary point.

It is noted the 40m distance from the dwelling is measured to a single point of the boundary which then angles away to the northwest where the downslope occurs and the 52m is required. To the southwest the terrain is upslope requiring a 21m APZ which can be achieved. Therefore, the 52m APZ is only required to the west, northwest and north of the existing building. In turn, a fire front from the west at the distance of 40m will have a fire front which would diminish to less than 1m at the APZ/bushfire hazard interface due to the angle of the boundary. This is not reflective of a 100m wide fire front which is the Method 1 AS 3959-2009 input establishing the 52m APZ.

It is therefore considered meritorious to apply Method 2 AS 3959-2009 calculation to adjust the fire front accordingly. As shown in the attachment the Method 2 modelling using a conservative 10m wide fire front at a distance of 40m establishes a radiant heat output of 15.63kW/m² with a flame length of 58.22m. Whilst it is noted the flame length is approximately 58m, consideration has been given to the definition in Draft PBP2018 which defines flame zone as applicable when radiant heat levels exceed 40kW/m rather than relating to flame length. In turn, the secondary dwelling will not be within the flame zone.

As a further redundancy, the likely bushfire behaviour from this direction has also been considered. As shown in Figure 5 the topography to the west has a downslope for a short distance to the point where it feeds into a gully and the terrain continues upslope.

In many cases a bushfire will traverse the gully given it will become the predominant downslope and have the most fuel availability. Should the bushfire traverse from the west/northwest the fire would have a lower rate of spread traversing from the west side of the gully and would take a reasonable distance and time to accelerate through the slope transition of the east side of the gully to reach full intensity.

The fire run on the east side of the gully to the subject property boundary is approximately 50m which is not considered sufficient distance for the rate of spread to transition to 100% intensity for a 20 degree downslope forest fire. These aspects provide further reasonable redundancy to the modelling.

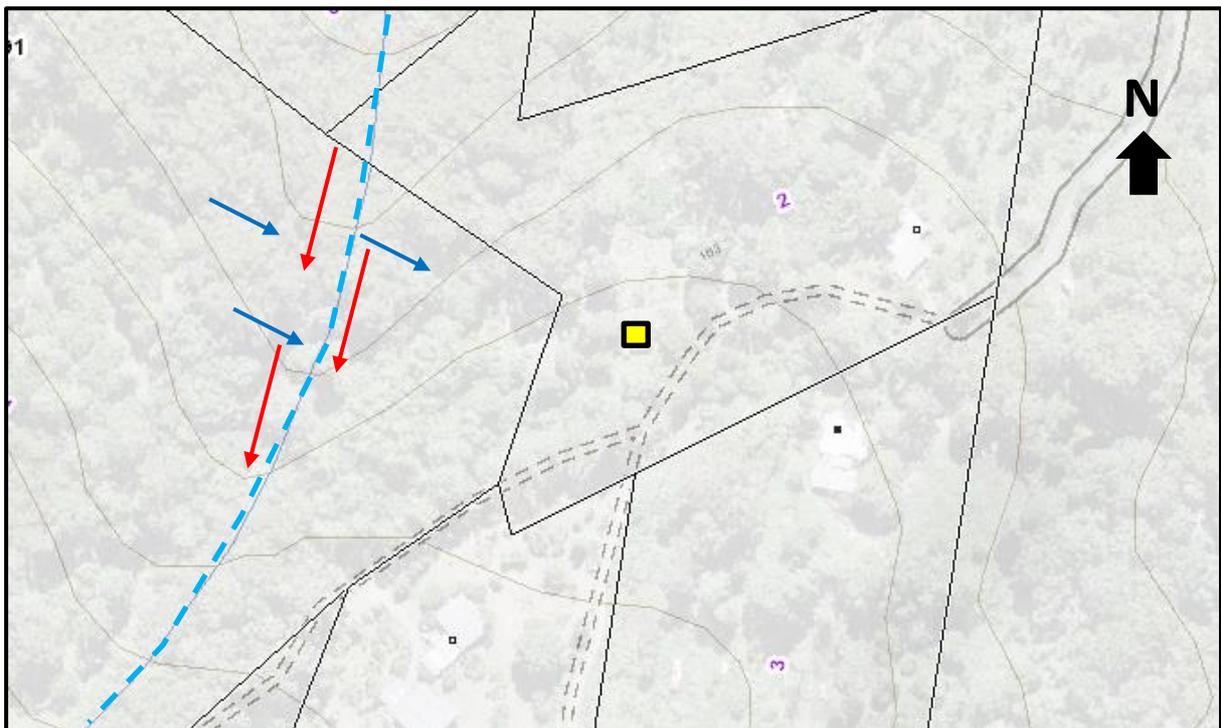


Figure 5: Red arrows - likely location of bushfire following the gully. Blue arrows – rate of spread from upslope to short fire run of the eastern downslope.

Having regard to the particular site circumstances, the existing building will achieve compliant asset protection zone widths to allow the building to be upgraded to BAL 29 plus the Addendum to Appendix 3 PBP2006. Based on this assessment the proposal to convert the existing structure to a secondary dwelling has merit as infill development.

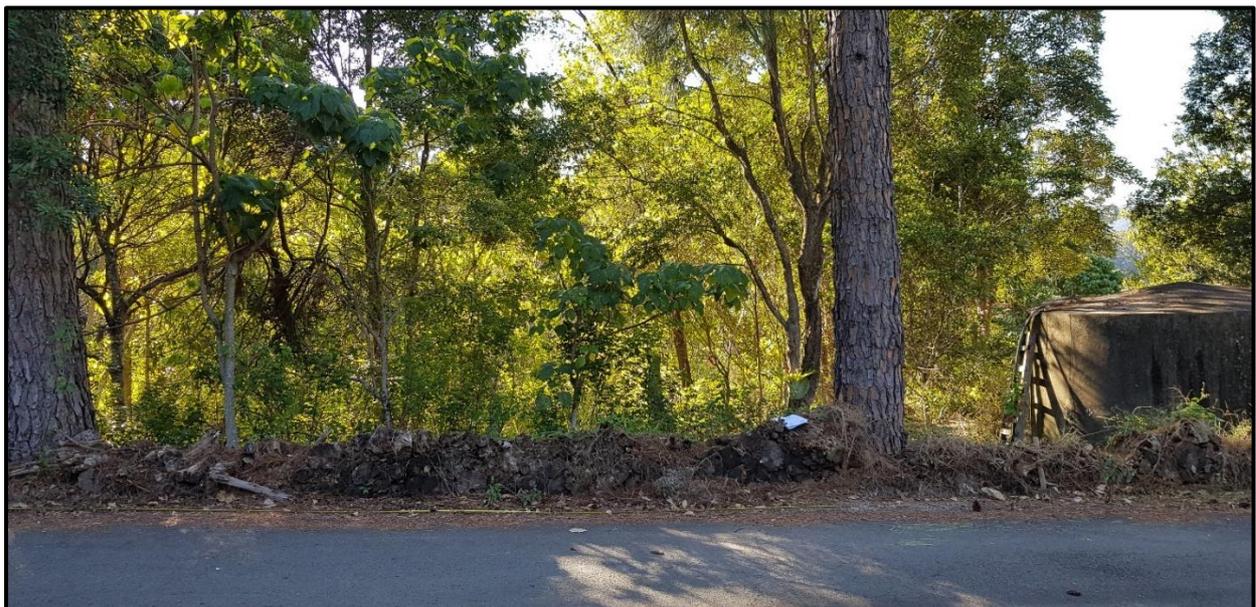
As outlined in our correspondence to Byron Shire Council dated 6th June 2019, the six existing Ironbark trees to the northwest of the proposed dual occupancy as identified in the attached asset protection zone plan prepared by Chris Lonergan Amendment B dated 18/7/2019 (see Figure 6) will not require removal.

A SWS - Stored Water Supply sign is to be attached to the front gate or in that proximity.

If an underground tank is proposed the same requirements apply however an access hole of a minimum 200mm diameter and the hardstand area within 4m of the water tank should be provided. If the water is to be piped from the storage supplies to an outlet then the pipes need to be metal pipes below ground and designed by a hydraulic consultant to ensure protection and adequacy for suction.

A minimum 5hp or 3kW petrol or diesel powered portable pump shall be made available to the water supply for both dwellings with a 19mm (internal diameter) or 25mm (internal diameter) for use in preparation to a bushfire event if it is safe to do so or if early evacuation is not required.

The existing concrete tank to the southwest of the dwelling is considered satisfactory for the static supply for fire-fighting purposes. The required turning head as outlined in Section 7 of this report is to be located adjacent to the supply.



Existing concrete water tank for the dual occupancy with a proposed turning head adjacent.

5.2 ELECTRICITY SERVICES

New electrical transmission lines if required are to comply with s4.1.3 Planning for Bushfire Protection, 2006.

5.3 GAS SERVICES

The following aspects will require consideration should a gas service be considered:

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 with metal piping used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the building is not used.

6.0 ACCESS

It is acknowledged that the access utilized by a number of properties with existing dwellings is via an existing property access road that is not wholly within the right-of-way as shown on the linen plans for these properties. The existing carriageway has been utilized for a significant number of years as is currently the case.

The existing carriageway does not fully comply with the acceptable solution of Section 4.1.3(2) of Planning for Bushfire Protection 2006, most notably passing bays with a total width of 6m are not provided every 200m and there is only one access/egress road accessing existing dwellings greater than 200m from the public road system.

The location of the existing carriageway is identified in the plan (Figure 7) prepared by Heath and McPhaill Surveying Pty Ltd.

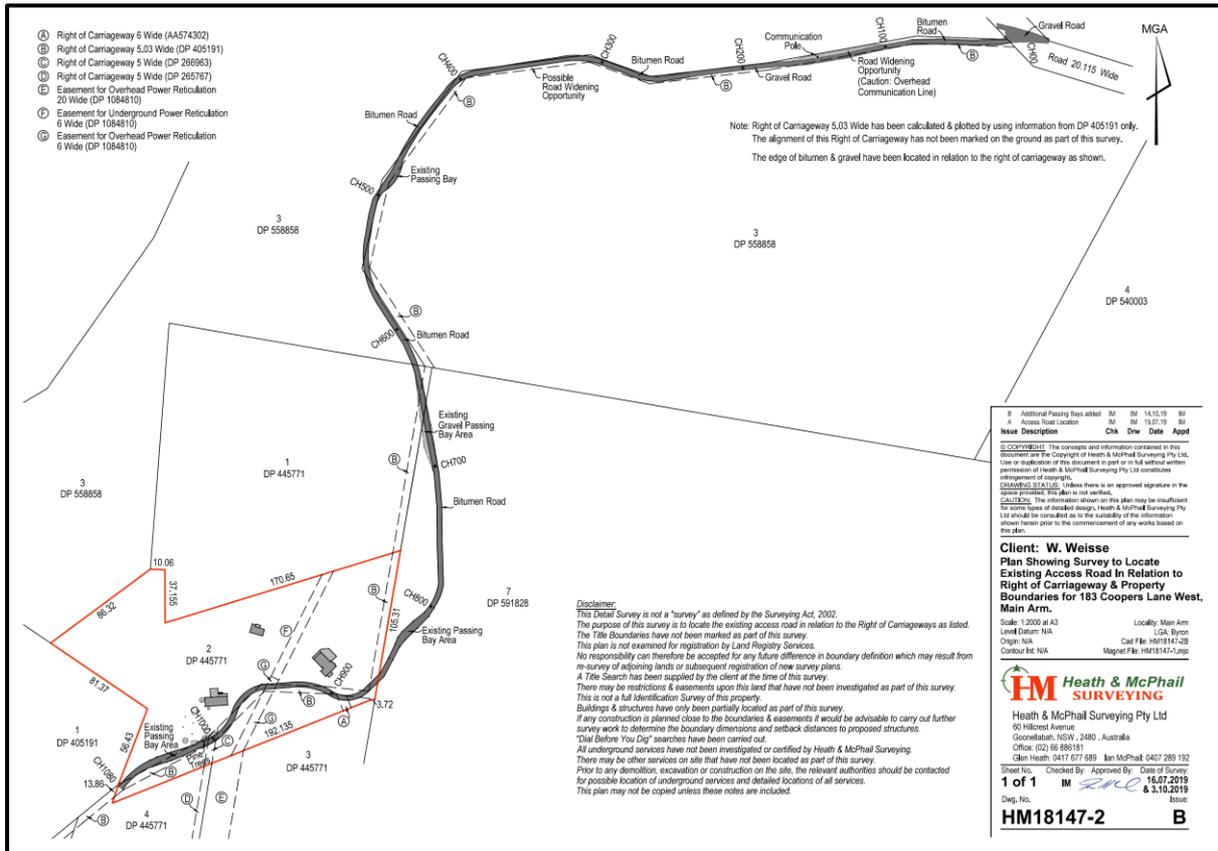


Figure 7: Location of the existing property access road and proposed/existing passing bays over Lot 1, 2 and 7 and some widening in the existing easement within Lot 3.

The proposed development is classified as infill development as agreed by NSW RFS in their email correspondence to this office dated 2nd August 2019. The existing property access will be in use whether this application is approved or not. An assessment found the access, whilst not compliant, to be in a reasonable condition in that it will be predominantly sealed with an unobstructed width of 4m along the majority of the road with some areas available for passing as shown in the following photographs and identified in Figure 7.

For infill development it is acknowledged that existing circumstances may not allow for full compliance with Planning for Bushfire Protection 2006, however a better outcome being provided than if the development did not proceed is a key objective of PBP2006 in order to support an application. In this regard the recommendations in this report will provide a better bushfire outcome not only for the subject property but for fire-fighters and other properties further west being accessed via the existing property access road.

A site inspection with NSW RFS was undertaken on 24th September 2019 where recommendations were made to ensure a better outcome for the property from a bushfire perspective for infill development.



Photo 1 - Sealed road having a 4m unobstructed width in the majority of areas.



Photo 2 – Existing sealed internal property access road.



Photo 3 - Existing sealed passing bays are currently in use.
Sealed internal property access road.



Photo 4 - Sealed internal property access road.



Photo 5 - Sealed internal property access road.

The development has been assessed against s4.3.2 of Planning for Bushfire Protection 2006 'Special Objectives for infill' as follows:

Ensure that the bush fire risk to adjoining lands is not increased

A recommendation for a condition of consent has been provided requiring an asset protection zone around the existing dwelling and the proposed dual occupancy dwelling, it being noted that the 6 ironbark trees required by Council for retention can remain within the recommended APZ. This recommendation together with a more bushfire resilient building will, by implementing asset protection zones decrease the overall fuel loadings within the subject property and therefore reduce the bushfire risk to adjoining properties than if the development did not proceed.

Provide a minimum defensible space

The recommended asset protection zones will provide a defensible space around the subject dual occupancy and the existing approved dwelling.

Provide better bush fire protection, on a re-development site, than the existing situation. This should not result in new works being exposed to greater risk than an existing building.

The following have been recommended and will provide for a better bushfire outcome than if the development did not proceed, it being noted the existing dwelling on property has no specific bushfire protection measures.

- A recommendation for a condition of consent has been provided requiring the have an asset protection zone around the existing dwelling and the proposed dual occupancy.
- A 10 000L water supply is proposed for the proposed dual occupancy and a 20 000L water supply is recommended as an upgrade measure for the existing dwelling.
- The proposed dual occupancy (2nd dwelling) is to have a turning head complying with Figure 3.5 Draft PBP2018 (see attached Appendix C) adjacent to the water supply (concrete tank) for the proposed second dwelling. This will also provide NSW RFS a suitable turn around area in general when using the existing carriage way to attend to other properties. The existing dwelling will not have a turning head but will have a hardstand area adjacent to the water supply and the existing carriageway which will allow a fire-fighting appliance to access the water supply and to reverse back out onto the existing carriage way creating a better outcome for the existing dwelling.
- A fire-fighting pump and hose will be recommended for the proposed dual occupancy and the existing dwelling to allow occupants to prepare for a bushfire event if it is safe to do so.
- Evacuation planning will be a recommendation providing triggers for early and safe evacuation prior to a bushfire event or on days where the fire danger index is high.
- The proposed dual occupancy will be constructed to meet the requirements of BAL 29 AS 3959-2009 + Addendum to Appendix 3 PBP2006 whilst the existing dwelling will be recommended for upgrading to improve resilience against ember attack.
- A passing bay will be recommended for the existing carriage located within the subject property, Lot 1 DP 445771 and Lot 7 DP 591828 and the easement re-aligned over the existing carriage way within these lots only and detailing the passing bays within these lots. This will create a better outcome for the residents using the carriageway not only in a bushfire event but in day to day use.

Ensure that the footprint of the proposed building does not extend towards the hazard beyond existing building lines on neighbouring land.

This objective generally relates to an urban environment however it is noted there are many dwellings accessed by the existing property access road that do not have specific bushfire protection measures and are closer to the hazard than the subject dual occupancy once the asset protection zone has been implemented.

Not result in an increased bush fire management and maintenance responsibility on adjoining land owners unless they have agreed to the development.

There will be no increased responsibilities on adjoining land owners than currently exist to protect the existing dwelling. Asset protection zones will be located wholly within the subject property.

Ensure building design and construction enhance the chances of occupant and building survival.

The proposed dual occupancy dwelling will be upgraded to comply with the requirements of BAL 29 AS 3959-2009 + Addendum to Appendix 3 PBP2006 whilst the existing dwelling will be recommended for upgrading to improve resilience against ember attack.

7.0 LANDSCAPING

The majority of buildings adversely impacted upon in a bushfire event happen through ember attack and in this regard combustible material surrounding the building e.g. landscaping can play a significant part during the event. Adequate management of landscaping is critical to the survivability of an asset and for occupant safety during a bushfire.

It is recommended that landscaping is undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained for the life of the development.

8.0 CONCLUSION

This assessment demonstrates that the proposed development will be compliant with the intent of *Planning for Bushfire Protection 2006* for infill development based on the recommendations contained in Section 1 of this report, and other considerations contained within the report.

DISCLAIMER

This consultation report was prepared for the purposes and exclusive use of the stated client for inclusion with a development application, and is to be referred to NSW RFS pursuant to s4.14 of the Environmental Planning and Assessment Act 1979. The report relates to the proposed change of use of an existing structure to a dual occupancy dwelling on the subject property, and is not to be used for any other purpose or by any other person or Corporation. BCA Check Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause. This report is not intended for or to be used where aluminium composite panels are proposed. The report is not to be construed as an assessment of the building materials or compliance with the recommended bushfire attack level/s.

As identified in Planning for Bushfire Protection 2006 and the Building Code of Australia the report provides recommendations to reduce the risk of ignition and does not guarantee the complete protection of the building in the event of bush fire or that the building will not be adversely impacted upon.

Reporting has been based on relevant Council and Rural Fire Service Guidelines however recommendations or suggestions given in this report are based on our site investigation at the time of reporting. In some cases site conditions may change dramatically within a few years due to rapid vegetation re-growth and invading weed species.

REFERENCES

NSW Rural Fire Service and Planning NSW (2006), *Planning for bushfire protection, A guide for councils planners fire authorities developers and homeowners*. Rural Fire Service NSW Australia.

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

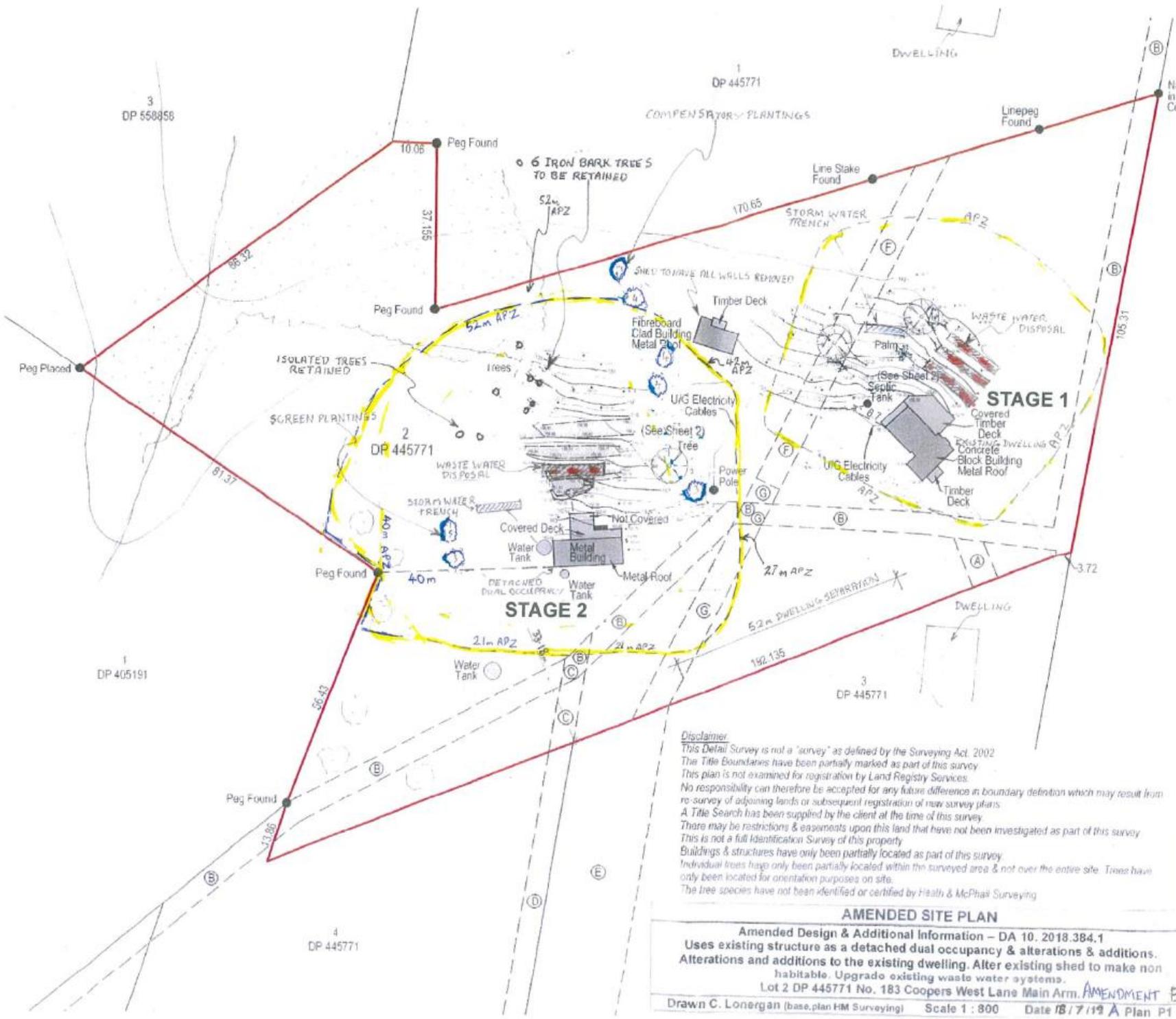
LEGISLATION

Environmental Planning and Assessment Act 1979 and Regulations 2000. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Act 1997. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

Rural Fires Regulation. *New South Wales*. Parliamentary Counsel's Office, NSW Government Information Service.

APPENDIX A: Site and access plans



- (A) Right of Carriageway 6 Wide (AA574302)
- (B) Right of Carriageway 5.03 Wide (DP 405191)
- (C) Right of Carriageway 5 Wide (DP 268963)
- (D) Right of Carriageway 5 Wide (DP 265767)
- (E) Easement for Overhead Power Reticulation 20 Wide (DP 1084810)
- (F) Easement for Underground Power Reticulation 6 Wide (DP 1084810)
- (G) Easement for Overhead Power Reticulation 6 Wide (DP 1084810)

Issue Description	Chk	Draw	Date	Appd
<p>DISCLAIMER</p> <p>The concepts and information contained in this document are the Copyright of Heath & McPhail Surveying Pty Ltd. Use or duplication of this document in part or in full without written permission of Heath & McPhail Surveying Pty Ltd constitutes infringement of copyright.</p> <p>DRAWING STATUS: Unless there is an approved signature on the notice provided, this plan is not valid.</p> <p>CAUTION: The information shown on this plan may be insufficient for some types of detailed design. Heath & McPhail Surveying Pty Ltd should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on this plan.</p>				

Client: W. Weisse

Plan Showing Partial Detail & Contour Survey over Part of Lot 2 in DP 445771 183 Coopers Lane West, Main Arm.

Scale: 1:800 at A3
 Level Datum: AHD
 Origin: CORS RTK Network
 Contour Int: 0.5m

Locality: Main Arm
 LGA: Byron
 Cad File: HM18147-1
 Magnet File: HM18147.mxd

HM Heath & McPhail SURVEYING

Heath & McPhail Surveying Pty Ltd
 60 Hillcrest Avenue
 Goonellabah, NSW 2490, Australia
 Office (02) 66 896181
 Glen Heath 0417 677 689 Ian McPhail 0407 289 192

Sheet No: 1 of 2
 Checked By: GH
 Approved By: [Signature]
 Date of Survey: 10.10.2018

Urg No: HM18147-1
 Issue: A

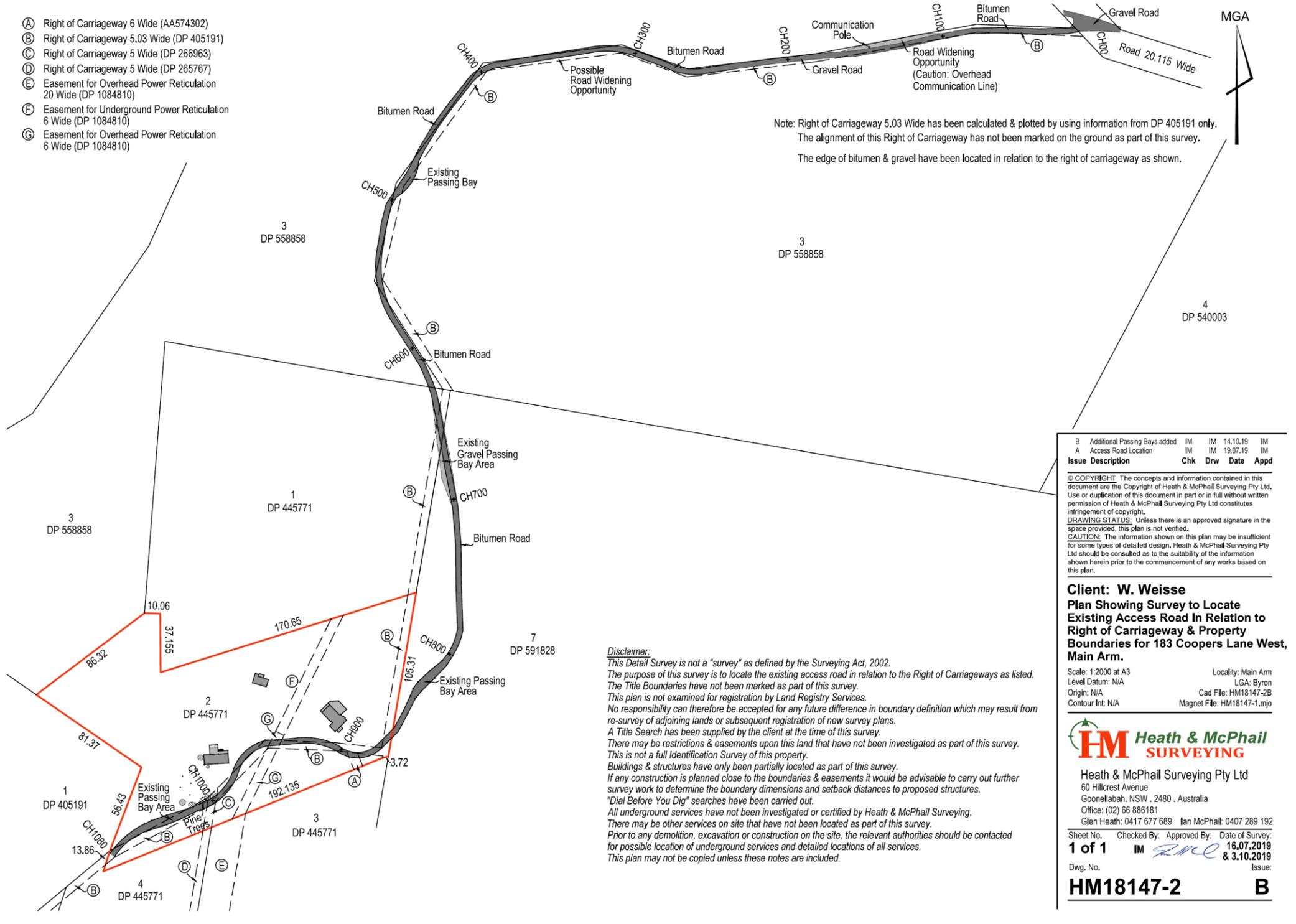
Disclaimer
 This Detail Survey is not a "survey" as defined by the Surveying Act, 2002. The Title Boundaries have been partially marked as part of this survey. This plan is not examined for registration by Land Registry Services. No responsibility can therefore be accepted for any future difference in boundary definition which may result from re-survey of adjoining lands or subsequent registration of new survey plans. A Title Search has been supplied by the client at the time of this survey. There may be restrictions & easements upon this land that have not been investigated as part of this survey. This is not a full Identification Survey of this property. Buildings & structures have only been partially located as part of this survey. Individual trees have only been partially located within the surveyed area & not over the entire site. Trees have only been located for orientation purposes on site. The tree species have not been identified or certified by Heath & McPhail Surveying.

AMENDED SITE PLAN

Amended Design & Additional Information - DA 10. 2018.384.1
Uses existing structure as a detached dual occupancy & alterations & additions.
Alterations and additions to the existing dwelling. Alter existing shed to make non habitable. Upgrade existing waste water systems.
 Lot 2 DP 445771 No. 183 Coopers West Lane Main Arm. **AMENDMENT B**

Drawn C. Lonergan (base plan HM Surveying) Scale 1:800 Date 18/7/19 A Plan P1

- (A) Right of Carriageway 6 Wide (AA574302)
- (B) Right of Carriageway 5.03 Wide (DP 405191)
- (C) Right of Carriageway 5 Wide (DP 266963)
- (D) Right of Carriageway 5 Wide (DP 265767)
- (E) Easement for Overhead Power Reticulation 20 Wide (DP 1084810)
- (F) Easement for Underground Power Reticulation 6 Wide (DP 1084810)
- (G) Easement for Overhead Power Reticulation 6 Wide (DP 1084810)



Note: Right of Carriageway 5.03 Wide has been calculated & plotted by using information from DP 405191 only. The alignment of this Right of Carriageway has not been marked on the ground as part of this survey. The edge of bitumen & gravel have been located in relation to the right of carriageway as shown.

Issue Description	Chk	Drw	Date	Appd
B Additional Passing Bays added	IM	IM	14.10.19	IM
A Access Road Location	IM	IM	19.07.19	IM

© COPYRIGHT The concepts and information contained in this document are the Copyright of Heath & McPhail Surveying Pty Ltd. Use or duplication of this document in part or in full without written permission of Heath & McPhail Surveying Pty Ltd constitutes infringement of copyright.
 DRAWING STATUS: Unless there is an approved signature in the space provided, this plan is not verified.
 CAUTION: The information shown on this plan may be insufficient for some types of detailed design, Heath & McPhail Surveying Pty Ltd should be consulted as to the suitability of the information shown herein prior to the commencement of any works based on this plan.

Client: W. Weisse
Plan Showing Survey to Locate Existing Access Road In Relation to Right of Carriageway & Property Boundaries for 183 Coopers Lane West, Main Arm.

Scale: 1:2000 at A3
 Level Datum: N/A
 Origin: N/A
 Contour Int: N/A

Locality: Main Arm
 LGA: Byron
 Cad File: HM18147-2B
 Magnet File: HM18147-1.mjo



Heath & McPhail Surveying Pty Ltd
 60 Hillcrest Avenue
 Goonellabah, NSW . 2480 . Australia
 Office: (02) 66 886181
 Glen Heath: 0417 677 689 Ian McPhail: 0407 289 192

Sheet No. 1 of 1
 Checked By: IM
 Approved By: IM
 Date of Survey: 16.07.2019 & 3.10.2019
 Issue: IM

HM18147-2 **B**

Disclaimer:
 This Detail Survey is not a "survey" as defined by the Surveying Act, 2002. The purpose of this survey is to locate the existing access road in relation to the Right of Carriageways as listed. The Title Boundaries have not been marked as part of this survey. This plan is not examined for registration by Land Registry Services. No responsibility can therefore be accepted for any future difference in boundary definition which may result from re-survey of adjoining lands or subsequent registration of new survey plans. A Title Search has been supplied by the client at the time of this survey. There may be restrictions & easements upon this land that have not been investigated as part of this survey. This is not a full Identification Survey of this property. Buildings & structures have only been partially located as part of this survey. If any construction is planned close to the boundaries & easements it would be advisable to carry out further survey work to determine the boundary dimensions and setback distances to proposed structures. "Dial Before You Dig" searches have been carried out. All underground services have not been investigated or certified by Heath & McPhail Surveying. There may be other services on site that have not been located as part of this survey. Prior to any demolition, excavation or construction on the site, the relevant authorities should be contacted for possible location of underground services and detailed locations of all services. This plan may not be copied unless these notes are included.

APPENDIX B: Access s4.1.3(2) PBP2006

Access (2) – Property Access

Intent of measures: to provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupants faced with evacuation.

Background

The public road system in a bush fire prone area should provide alternative access or egress for firefighters and residents during a bush fire emergency if part of the road system is cut by fire.

Property access is access from a public road system onto private land and access to the habitable building by fire fighters.

A distinction is drawn between rural private access roads and those in urban areas.

In rural areas, in particular isolated rural properties, operational difficulties can be experienced in accessing buildings. Examples include water crossings, roads being cut by fire and hazardous conditions. As a result, the location

and standards of property access roads should be carefully considered.

Where property access is required across other land, the owner's consent to legally binding arrangements covering access and ongoing maintenance are required prior to lodging a development application.

Short property access roads are preferable to long ones for the safety of evacuating residents and emergency service personnel, and therefore it is preferable to site dwellings as close as possible to public through roads.

By comparison, urban areas have an existing infrastructure and requirements are generally less of a problem. In addition, it is acknowledged that fire appliances will generally operate from the public road system.

Where a property access road provides internal access arrangements for community title or similar subdivision arrangements, the provisions of 4.2.7 in relation to internal roads also apply.

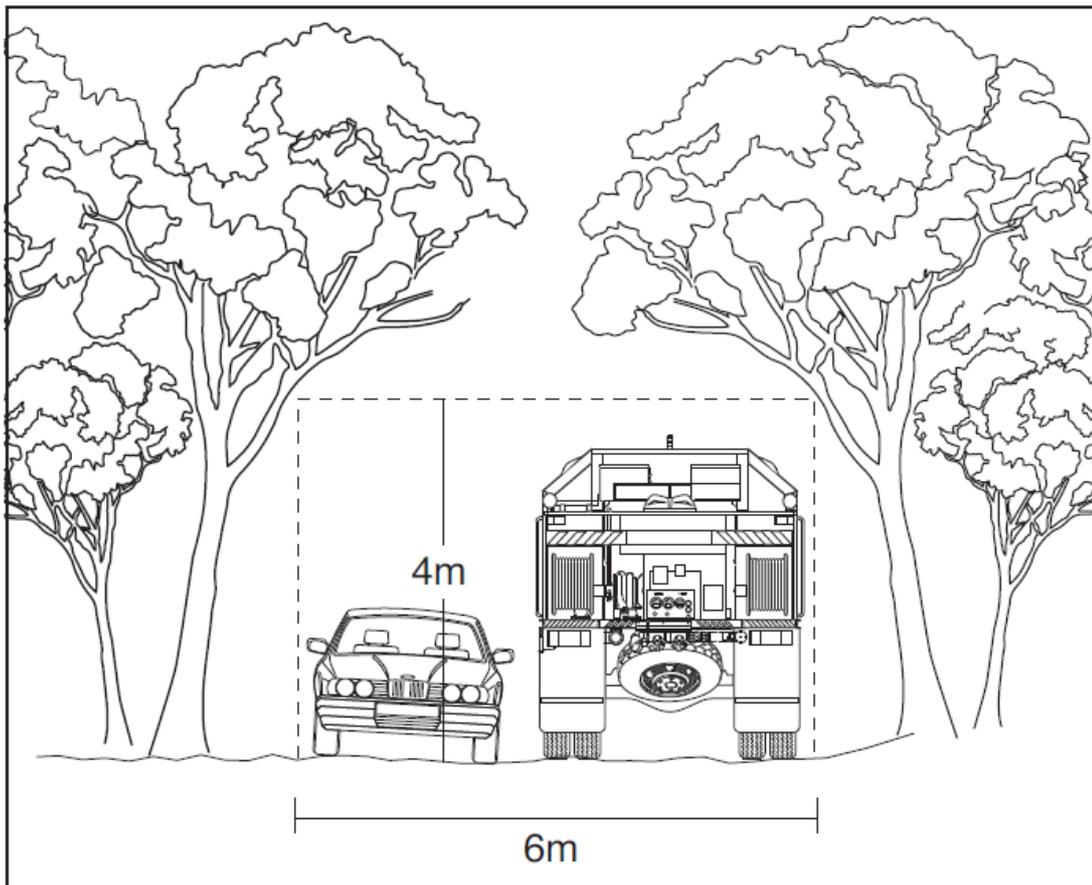


Figure 4.5 Property access road requirements (rural areas)

Performance Criteria	Acceptable solutions
The intent may be achieved where:	
<ul style="list-style-type: none"> access to properties is provided in recognition of the risk to fire fighters and/ or evacuating occupants. 	<ul style="list-style-type: none"> at least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road
<ul style="list-style-type: none"> the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles. all weather access is provided. 	<ul style="list-style-type: none"> bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).
<ul style="list-style-type: none"> road widths and design enable safe access for vehicles 	<ul style="list-style-type: none"> a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint). <p><i>Note: No specific access requirements apply in a urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).</i></p> <ul style="list-style-type: none"> in forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay. a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches. internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius. curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress. the minimum distance between inner and outer curves is six metres. the crossfall is not more than 10 degrees. maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads. <p><i>Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</i></p> <ul style="list-style-type: none"> access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.

APPENDIX C: Turning Head Requirements

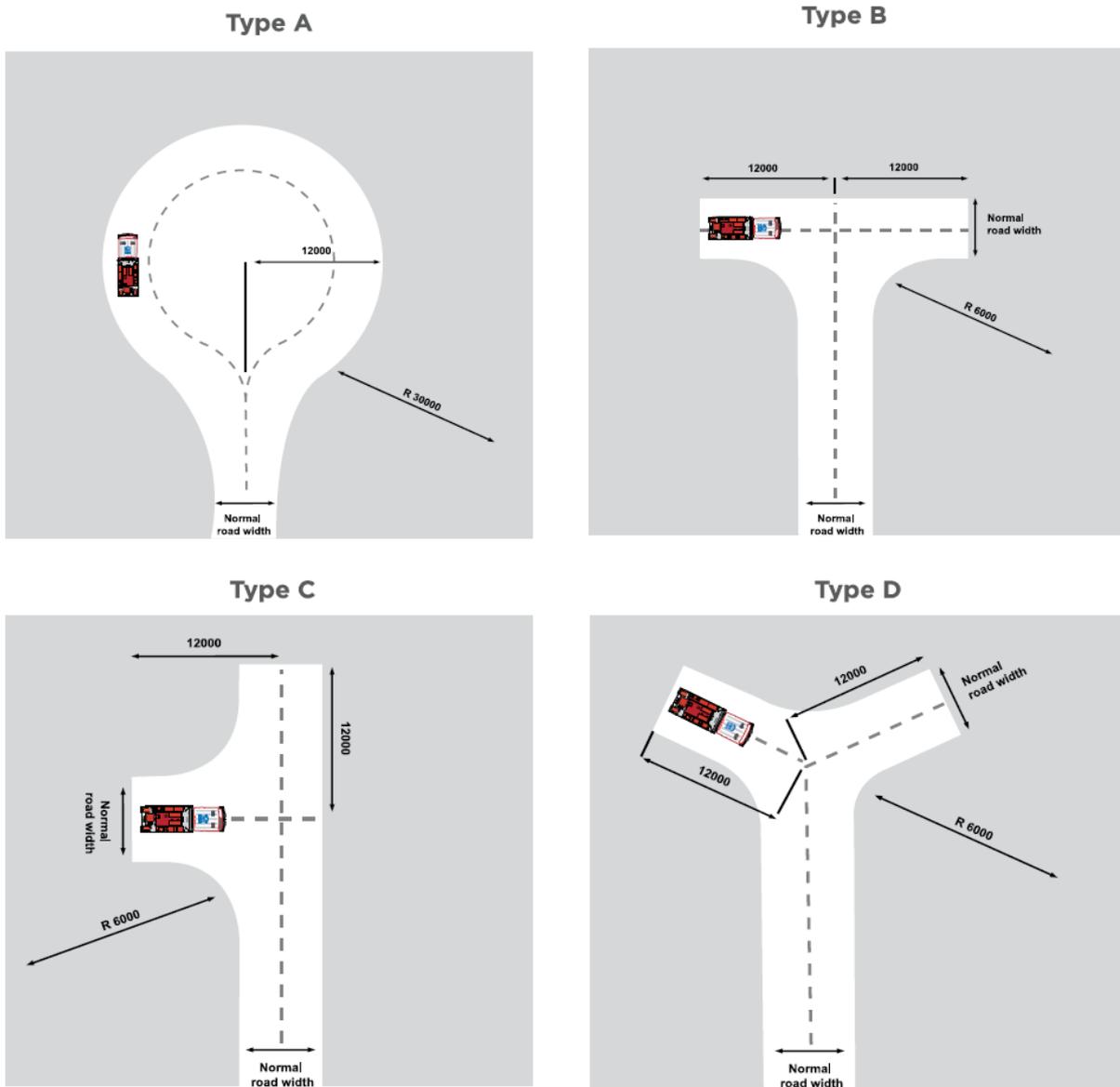
A3.3 Vehicle turning head requirements

Where a turning head is proposed the NSW RFS requires that dead ends having a length greater than 20 metres should be provided with a turning head area which avoids multipoint turns.

The minimum turning radius should be no less than the respective outer radius given in table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following types:

Figure A3.5

Multipoint turning options



APPENDIX D: Standards for Asset Protection Zones (RFS 2005)

STANDARDS FOR ASSET PROTECTION ZONES

INTRODUCTION	3
WHAT IS AN ASSET PROTECTION ZONE?	3
WHAT WILL THE APZ DO?	3
WHERE SHOULD I PUT AN APZ?	4
STEP 1. DETERMINE IF AN APZ IS REQUIRED	4
STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ	5
STEP 3. DETERMINE ASSET PROTECTION ZONE WIDTH	5
STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ	6
STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION	9
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING	10
PLANTS FOR BUSH FIRE PRONE GARDENS	10
WIND BREAKS	11

INTRODUCTION

For thousands of years bush fires have been a natural part of the Australian landscape. They are inevitable and essential, as many Australian plants and animals have adapted to fire as part of their life cycle.

In recent years developments in bushland areas have increased the risk of bush fires harming people and their homes and property. But landowners can significantly reduce the impact of bush fires on their property by identifying and minimising bush fire hazards. There are a number of ways to reduce the level of hazard to your property, but one of the most important is the creation and maintenance of an Asset Protection Zone (APZ).

A well located and maintained APZ should be used in conjunction with other preparations such as good property maintenance, appropriate building materials and developing a family action plan.

WHAT IS AN ASSET PROTECTION ZONE?

An Asset Protection Zone (APZ) is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, commercial or heritage buildings.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and home owners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

WHAT WILL THE APZ DO?

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;
- damage to the built asset from intense radiant heat; and
- ember attack on the asset.

WHERE SHOULD I PUT AN APZ?

An APZ is located between an asset and a bush fire hazard.

The APZ should be located wholly within your land. You cannot undertake any clearing of vegetation on a neighbour's property, including National Park estate, Crown land or land under the management of your local council, unless you have written approval.

If you believe that the land adjacent to your property is a bush fire hazard and should be part of an APZ, you can have the matter investigated by contacting the NSW Rural Fire Service (RFS).

There are six steps to creating and maintaining an APZ. These are:

1. Determine if an APZ is required;
2. Determine what approvals are required for constructing your APZ;
3. Determine the APZ width required;
4. Determine what hazard reduction method is required to reduce bush fire fuel in your APZ;
5. Take measures to prevent soil erosion in your APZ; and
6. Landscape and regularly monitor in your APZ for fuel regrowth.

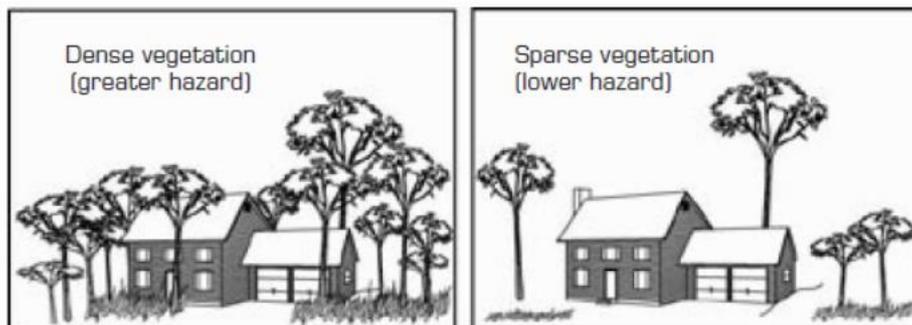
STEP 1. DETERMINE IF AN APZ IS REQUIRED

Recognising that a bush fire hazard exists is the first step in developing an APZ for your property.

If you have vegetation close to your asset and you live in a bush fire prone or high risk area, you should consider creating and maintaining an APZ.

Generally, the more flammable and dense the vegetation, the greater the hazard will be. However, the hazard potential is also influenced by factors such as slope.

- A large area of continuous vegetation on sloping land may increase the potential bush fire hazard.
- The amount of vegetation around a house will influence the intensity and severity of a bush fire.
- The higher the available fuel the more intense a fire will be.



Isolated areas of vegetation are generally not a bush fire hazard, as they are not large enough to produce fire of an intensity that will threaten dwellings.

This includes:

- bushland areas of less than one hectare that are isolated from large bushland areas; and
- narrow strips of vegetation along road and river corridors.

If you are not sure if there is a bush fire hazard in or around your property, contact your local NSW Rural Fire Service Fire Control Centre or your local council for advice.

STEP 2. DETERMINE WHAT APPROVALS ARE REQUIRED FOR CONSTRUCTING YOUR APZ

If you intend to undertake bush fire hazard reduction works to create or maintain an APZ you must gain the written consent of the landowner.

Subdivided land or construction of a new dwelling

If you are constructing an APZ for a new dwelling you will need to comply with the requirements in *Planning for Bushfire Protection*. Any approvals required will have to be obtained as part of the Development Application process.

Existing asset

If you wish to create or maintain an APZ for an existing structure you may need to obtain an environmental approval. The RFS offers a free environmental assessment and certificate issuing service for essential hazard reduction works. For more information see the RFS document *Application Instructions for a Bush Fire Hazard Reduction Certificate* or contact your local RFS Fire Control Centre to determine if you can use this approval process.

Bear in mind that all work undertaken must be consistent with any existing land management agreements (e.g. a conservation agreement, or property vegetation plan) entered into by the property owner.

If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

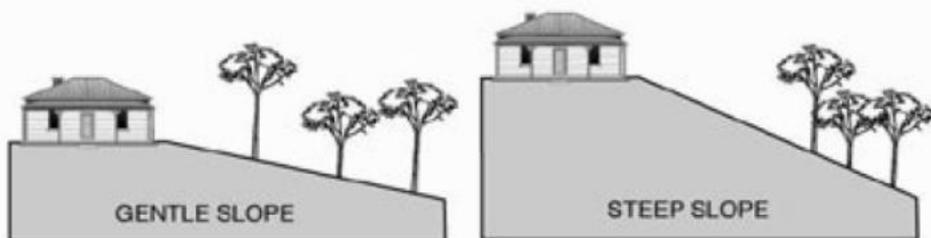
If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

STEP 3. DETERMINE THE APZ WIDTH

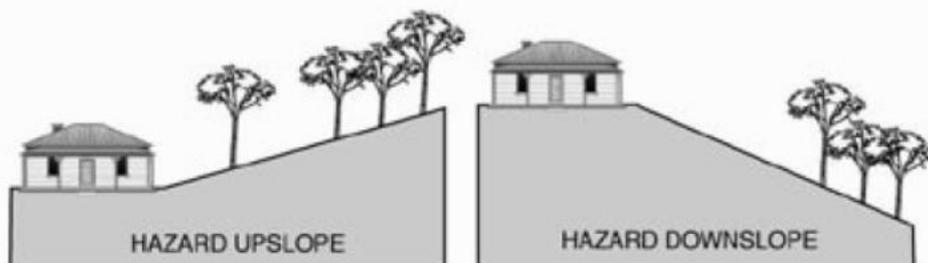
The size of the APZ required around your asset depends on the nature of the asset, the slope of the area, the type and structure of nearby vegetation and whether the vegetation is managed.

Fires burn faster uphill than downhill, so the APZ will need to be larger if the hazard is downslope of the asset.

5



Gentle slopes require a smaller APZ distance than steep slopes



A hazard downslope will require a greater APZ distance than a hazard upslope of the asset

Different types of vegetation (for example, forests, rainforests, woodlands, grasslands) behave differently during a bush fire. For example, a forest with shrubby understorey is likely to result in a higher intensity fire than a woodland with a grassy understorey and would therefore require a greater APZ width.

A key benefit of an APZ is that it reduces radiant heat and the potential for direct flame contact on homes and other buildings. Residential dwellings require a wider APZ than sheds or stockyards because the dwelling is more likely to be used as a refuge during bush fire.

Subdivided land or construction of a new dwelling

If you are constructing a new asset, the principles of *Planning for Bushfire Protection* should be applied. Your Development Application approval will detail the exact APZ distance required.

Existing asset

If you wish to create an APZ around an existing asset and you require environmental approval, the Bush Fire Environmental Assessment Code provides a streamlined assessment process. Your Bush Fire Hazard Reduction Certificate (or alternate environmental approval) will specify the maximum APZ width allowed.

For further information on APZ widths see *Planning for Bushfire Protection* or the *Bush Fire Environmental Assessment Code* (available on the RFS website), or contact your local RFS Fire Control Centre.

STEP 4. DETERMINE WHAT HAZARD REDUCTION METHOD IS REQUIRED TO REDUCE BUSH FIRE FUEL IN YOUR APZ

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. In order to control bush fire fuels you can reduce, remove or change the state of the fuel through several means.

Reduction of fuel does not require removal of all vegetation, which would cause environmental damage. Also, trees and plants can provide you with some bush fire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover is also needed to prevent soil erosion.

Fuels can be controlled by:

1. raking or manual removal of fine fuels

Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be removed on a regular basis. This is fuel that burns quickly and increases the intensity of a fire.

Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

2. mowing or grazing of grass

Grass needs to be kept short and, where possible, green.

3. removal or pruning of trees, shrubs and understorey

The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation.

Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by two to five metres. A canopy should not overhang within two to five metres of a dwelling.

Native trees and shrubs should be retained as clumps or islands and should maintain a covering of no more than 20% of the area.

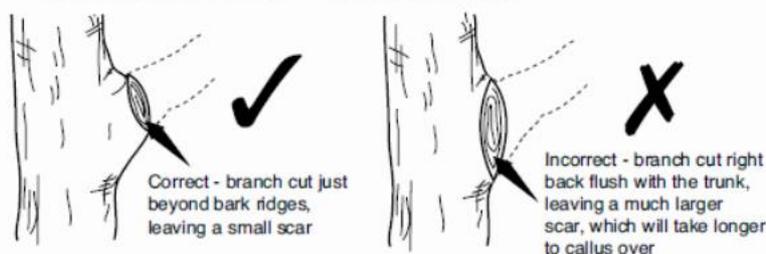
When choosing plants for removal, the following basic rules should be followed:

1. Remove noxious and environmental weeds first. Your local council can provide you with a list of environmental weeds or 'undesirable species'. Alternatively, a list of noxious weeds can be obtained at www.agric.nsw.gov.au/noxweed/;
2. Remove more flammable species such as those with rough, flaky or stringy bark; and
3. Remove or thin understorey plants, trees and shrubs less than three metres in height

The removal of significant native species should be avoided.

Prune in accordance with the following standards:

- Use sharp tools. These will enable clean cuts and will minimise damage to the tree.
- Decide which branches are to be removed before commencing work. Ensure that you maintain a balanced, natural distribution of foliage and branches.
- Remove only what is necessary.
- Cut branches just beyond bark ridges, leaving a small scar.
- Remove smaller branches and deadwood first.



There are three primary methods of pruning trees in APZs:

1. Crown lifting (skirting)

Remove the lowest branches (up to two metres from the ground). Crown lifting may inhibit the transfer of fire between the ground fuel and the tree canopy.

2. Thinning

Remove smaller secondary branches whilst retaining the main structural branches of the tree. Thinning may minimise the intensity of a fire.

3. Selective pruning

Remove branches that are specifically identified as creating a bush fire hazard (such as those overhanging assets or those which create a continuous tree canopy). Selective pruning can be used to prevent direct flame contact between trees and assets.

Your Bush Fire Hazard Reduction Certificate or local council may restrict the amount or method of pruning allowed in your APZ.

See the *Australian Standard 4373 (Pruning of Amenity Trees)* for more information on tree pruning.

4. Slashing and trittering

Slashing and trittering are economical methods of fuel reduction for large APZs that have good access. However, these methods may leave large amounts of slashed fuels (grass clippings etc) which, when dry, may become a fire hazard. For slashing or trittering to be effective, the cut material must be removed or allowed to decompose well before summer starts.

If clippings are removed, dispose of them in a green waste bin if available or compost on site (dumping clippings in the bush is illegal and it increases the bush fire hazard on your or your neighbour's property).

Although slashing and trittering are effective in inhibiting the growth of weeds, it is preferable that weeds are completely removed.

Care must be taken not to leave sharp stakes and stumps that may be a safety hazard.

5. Ploughing and grading

Ploughing and grading can produce effective firebreaks. However, in areas where this method is applied, frequent maintenance may be required to minimise the potential for erosion. Loose soil from ploughed or graded ground may erode in steep areas, particularly where there is high rainfall and strong winds.

6. Burning (hazard reduction burning)

Hazard reduction burning is a method of removing ground litter and fine fuels by fire. Hazard reduction burning of vegetation is often used by land management agencies for broad area bush fire control, or to provide a fuel reduced buffer around urban areas.

Any hazard reduction burning, including pile burns, must be planned carefully and carried out with extreme caution under correct weather conditions. Otherwise there is a real danger that the fire will become out of control. More bush fires result from escaped burning off work than from any other single cause.

It is YOUR responsibility to contain any fire lit on your property. If the fire escapes your property boundaries you may be liable for the damage it causes.

Hazard reduction burns must therefore be carefully planned to ensure that they are safe, controlled, effective and environmentally sound. There are many factors that need to be considered in a burn plan. These include smoke control, scorch height, frequency of burning and cut off points (or control lines) for the fire. For further information see the RFS document *Standards for Low Intensity Bush Fire Hazard Reduction Burning*, or contact your local RFS for advice.

7. Burning (pile burning)

In some cases, where fuel removal is impractical due to the terrain, or where material cannot be disposed of by the normal garbage collection or composted on site, you may use pile burning to dispose of material that has been removed in creating or maintaining an APZ.

For further information on pile burning, see the RFS document *Standards for Pile Burning*.

In areas where smoke regulations control burning in the open, you will need to obtain a Bush Fire Hazard Reduction Certificate or written approval from Council for burning. During the bush fire danger period a Fire Permit will also be required. See the RFS document *Before You Light that Fire* for further details.

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

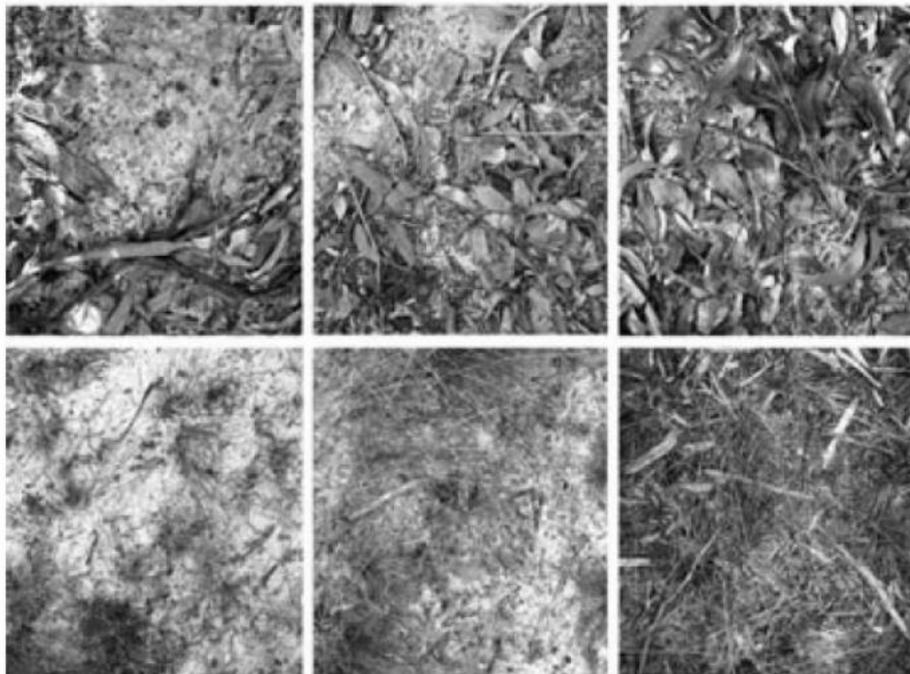
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

Soil erosion can greatly reduce the quality of your land through:

- loss of top soil, nutrients, vegetation and seeds
- reduced soil structure, stability and quality
- blocking and polluting water courses and drainage lines

A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (for example, short grass). This will provide an area that is easy to maintain and prevent soil erosion.

When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



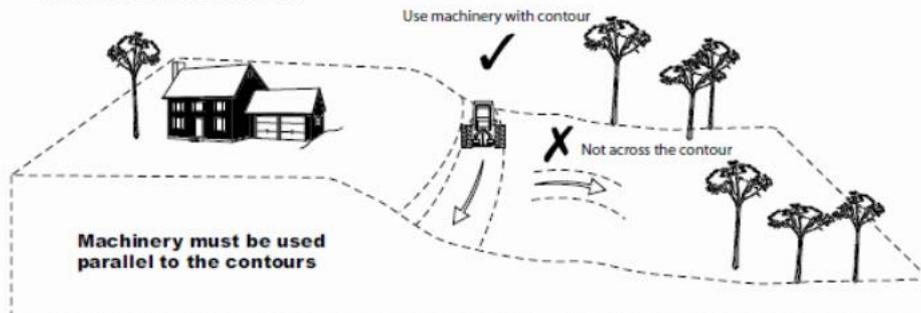
50%

75%

100%

Ground Cover

To reduce the incidence of soil erosion caused by the use of heavy machinery such as ploughs, dozers and graders, machinery must be used parallel to the contours. Vegetation should be allowed to regenerate, but be managed to maintain a low fuel load.



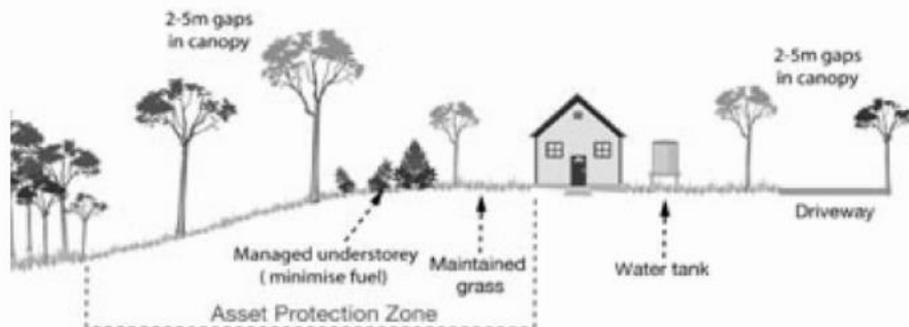
STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

Your home and garden can blend with the natural environment and be landscaped to minimise the impact of fire at the same time. To provide an effective APZ, you need to plan the layout of your garden to include features such as fire resistant plants, radiant heat barriers and windbreaks.

Layout of gardens in an APZ

When creating and maintaining a garden that is part of an APZ you should:

- ensure that vegetation does not provide a continuous path to the house;
- remove all noxious and environmental weeds;
- plant or clear vegetation into clumps rather than continuous rows;
- prune low branches two metres from the ground to prevent a ground fire from spreading into trees;
- locate vegetation far enough away from the asset so that plants will not ignite the asset by direct flame contact or radiant heat emission;
- plant and maintain short green grass around the house as this will slow the fire and reduce fire intensity. Alternatively, provide non-flammable pathways directly around the dwelling;
- ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non flammable ground cover such as pebbles and crush tile; and
- avoid erecting brush type fencing and planting "pencil pine" type trees next to buildings, as these are highly flammable.



Removal of other materials

Woodpiles, wooden sheds, combustible material, storage areas, large quantities of garden mulch, stacked flammable building materials etc. should be located away from the house. These items should preferably be located in a designated cleared location with no direct contact with bush fire hazard vegetation.

Other protective features

You can also take advantage of existing or proposed protective features such as fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts and vegetable gardens as part of the property's APZ.

PLANTS FOR BUSH FIRE PRONE GARDENS

When designing your garden it is important to consider the type of plant species and their flammability as well as their placement and arrangement.

Given the right conditions, all plants will burn. However, some plants are less flammable than others.

Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage the ground fire to spread up to, and then through, the crown of the trees.

Plants that are less flammable, have the following features:

- high moisture content
- high levels of salt
- low volatile oil content of leaves
- smooth barks without "ribbons" hanging from branches or trunks; and
- dense crown and elevated branches.

When choosing less flammable plants, be sure not to introduce noxious or environmental weed species into your garden that can cause greater long-term environmental damage.

For further information on appropriate plant species for your locality, contact your local council, plant nurseries or plant society.

If you require information on how to care for fire damaged trees, refer to the Firewise brochure *Trees and Fire Resistance; Regeneration and care of fire damaged trees*.

WIND BREAKS

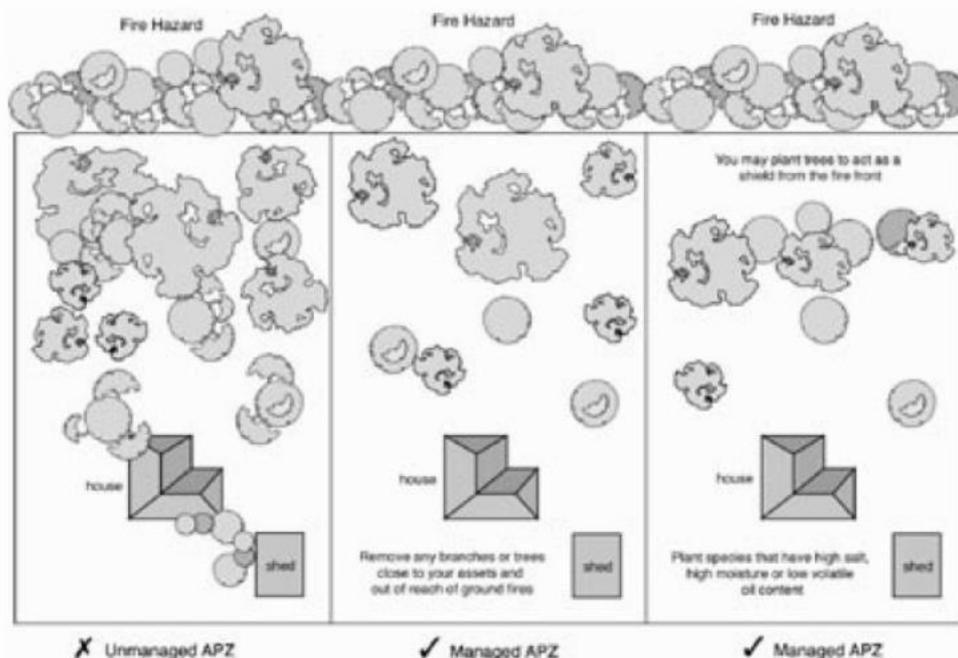
Rows of trees can provide a wind break to trap embers and flying debris that could otherwise reach the house or asset.

You need to be aware of local wind conditions associated with bush fires and position the wind break accordingly. Your local RFS Fire Control Centre can provide you with further advice.

When choosing trees and shrubs, make sure you seek advice as to their maximum height. Their height may vary depending on location of planting and local conditions. As a general rule, plant trees at the same distance away from the asset as their maximum height.

When creating a wind break, remember that the object is to slow the wind and to catch embers rather than trying to block the wind. In trying to block the wind, turbulence is created on both sides of the wind break making fire behaviour erratic.

11



HOW CAN I FIND OUT MORE?

The following documents are available from your local Fire Control Centre and from the NSW RFS website at www.rfs.nsw.gov.au.

- Before You Light That Fire
- Standards for Low Intensity Bush Fire Hazard Reduction Burning
- Standards for Pile Burning
- Application Instructions for a Bush Fire Hazard Reduction Certificate

If you require any further information please contact:

- your local NSW Rural Fire Service Fire Control Centre.
Location details are available on the RFS website or
- call the NSW RFS Enquiry Line 1800 679 737
(Monday to Friday, 9am to 5pm), or
- the NSW RFS website at www.rfs.nsw.gov.au.

**Produced by the NSW Rural Fire Service, Locked Mail Bag 17,
GRANVILLE, NSW 2142. Ph. 1800 679 737**
www.rfs.nsw.gov.au

Printed on 100% Recycled Cyclus Offset paper.

APPENDIX E: NSW Rural Fire Service correspondence dated 9 May 2019

All communications to be addressed to:

Headquarters
4 Murray Rose Ave
Sydney Olympic Park NSW 2127

Headquarters
Locked Bag 17
Granville NSW 2142

Telephone: 1300 NSW RFS
e-mail: records@rfs.nsw.gov.au

Facsimile: 8741 5433



The General Manager
Byron Shire Council
PO Box 219
MULLUMBIMBY NSW 2482

Your Ref: 10.2018.384.1
Our Ref: D18/6791
DA18081014495 NP

ATTENTION: Heidi Hutchinson

9 May 2019

Dear Ms Hutchinson

Development Application - 2//445771 - 183 Coopers West Lane Main Arm

I refer to your correspondence dated 3 April 2019 seeking advice regarding bush fire protection for the above Development Application in accordance with Clause 55(1) of the Environmental Planning and Assessment Regulation 2000.

The New South Wales Rural Fire Service (NSW RFS) has considered the information submitted and provides the following recommended conditions:

Asset Protection Zones

The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

1. At the commencement of building works and in perpetuity, the property around the existing dwelling shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones':
 - north for a distance of 50 metres or to the property boundary, whichever is the lesser, as an asset protection zone (APZ);
 - south for a distance of 40 metres or to the property boundary, whichever is the lesser, as an asset protection zone;
 - east for a distance of 50 metres or to the property boundary, whichever is the lesser, as an asset protection zone; and
 - west for a distance of 90 metres as an asset protection zone.

(Note: in forested areas a portion of the APZ may be maintained as an outer protection zone as specified in Table A2.7 of 'Planning for Bush Fire Protection 2006'.)

2. At the commencement of building works and in perpetuity, the property around the 2nd dwelling (detached) shall be managed as outlined within section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones':

- north and northwest for a distance of 52 metres or to the property boundary, whichever is the lesser, as an asset protection zone (APZ);
- northeast for a distance of 42 metres as an asset protection zone;
- east for a distance of 27 metres as an asset protection zone;
- south and southwest for a distance of 21 metres as an asset protection zone; and
- west for a distance of 40 metres as an asset protection zone.

(Note: in forested areas a portion of the APZ may be maintained as an outer protection zone as specified in Table A2.7 of 'Planning for Bush Fire Protection 2006'.)

Water and Utilities

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

3. Water, electricity and gas are to comply with section 4.1.3 of 'Planning for Bush Fire Protection 2006'.

Access

The intent of measures for property access is to provide safe access to/from the public road system for fire fighters providing property protection during a bush fire and for occupants faced with evacuation. To achieve this, the following conditions shall apply:

4. Property access roads shall comply with section 4.1.3 (2) of 'Planning for Bush Fire Protection 2006'.

Design and Construction

The intent of measures is that buildings are designed and constructed to withstand the potential impacts of bush fire attack. To achieve this, the following conditions shall apply:

5. The existing dwelling is required to be upgraded to improve ember protection. This is to be achieved by enclosing all openings (excluding roof tile spaces) or covering openings with a non-corrosive metal screen mesh with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draft excluders.

6. Construction on the 2nd dwelling shall comply with Sections 3 and 7 (BAL 29) Australian Standard AS3959-2009 'Construction of buildings in bush fire-prone areas' and section A3.7 Addendum Appendix 3 of 'Planning for Bush Fire Protection'.

General Advice – consent authority to note

The recommendations are based on the plans prepared by Heath & McPhail Surveying Pty Ltd, titled 'Plan Showing Partial Detail & Contour Survey over Part of Lot 2 in DP 445771, 183 Coopers Lane West, Main Arm', Survey dated 10 October 2018 (Amended 17 January 2019), Statement of Environmental Effects prepared by Chris Lonergan of Byron Bay Planning & Property Consultants dated 17 July 2018 and correspondence prepared by Bushfire Certifiers dated 22 March 2019.

The NSW RFS acknowledges that the existing road system servicing the subject land has some constraints, but is serviceable for the current proposed development. However, Council would need to undertake appropriate traffic studies to determine the capacity of the current Right of Way and Coopers West Lane with respect to increased traffic generated by increased dwelling densities in the locality.

This letter is in response to a further assessment of the application submitted and supersedes our previous advice regarding bush fire protection dated 22 November 2018.

Should you wish to discuss this matter please contact Neil Pengilly on 1300 NSW RFS.

Yours sincerely



Alan Bawden
Team Leader - Development Assessment and Planning

For general information on bush fire protection please visit www.rfs.nsw.gov.au