

To be referred to NSW Rural Fire Service

## Amended Bush Fire Assessment Report – Planning Proposal

LGA:	Byron Shire Council
Lot & DP:	5//585928
Street Address:	55 Settlement Road Main Arm
Building Use:	Class 1a Residential (non-SFPP)
Development:	Existing Unauthorised Dwelling
Prepared For:	Planners North Pty Ltd

Prepared By:	Peter Thornton BPAD-L3 Accredited Practitioner No. 14867  
Report Reference:	23/117A (amended)
Report Details:	Revision A: 29.05.2024

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## DOCUMENT CONTROL

Revision No.	Date	Description	Prepared	Checked	Authorised
A	23.07.2023	Final Report	Peter Thornton	SJT	Peter Thornton
B	29.05.2024	Amended Final Report	Peter Thornton	SJT	Peter Thornton

## 1.0 AMENDMENT TO THE BUSHFIRE ASSESSMENT REPORT

In response to the Gateway Determination dated 18<sup>th</sup> January 2024 (see Appendix B), Bushfire Certifiers have been engaged to include the assessment of the detached dual occupancy dwelling to the Bushfire Assessment Report prepared by this office dated 23<sup>rd</sup> May 2024 (Rev A).

The additional dwelling is located within the southern precinct of the cleared areas of the site and adjacent to the western property boundary as shown in Figure 1. For this amended bushfire assessment report the northern dwelling (circled blue) will be referenced as Dwelling No. 1 and the southern dwelling (circled yellow) referenced as Dwelling No. 2.



Figure 1: Location detached dual occupancy dwelling.

The property access road assessed to the dwelling is as shown in the traffic report which traverses through the middle of the cleared areas of site and is not likely to be cut in a bushfire event. No other access road has been assessed. In turn, the performance solution for property access will not be adversely affected or require any further measures apart from compliance with Table 7.4a PBP2019. It is noted the same methodology for the first dwelling is used for the detached dual occupancy.

## 2.0 EXECUTIVE SUMMARY

The bushfire assessment report has been prepared for the purposes of the applicant obtaining a dwelling opportunity for two existing (unauthorised) dwellings at Lot 5 DP 585928, 55 Settlement Road Main Arm.

As requested, the study will be used to establish the two dwellings are suitable for residential use as the proposed siting option for the dwelling opportunities for the subject property. This report is to be referred to the NSW Rural Fire Service as a means of demonstrating compliance with the *Environment Planning and Assessment Act 1979* Section 9.1, Ministerial Direction 4.3, and Planning for Bush Fire Protection 2019 (PBP2019).

The study has determined that the subject land, supporting the two dwellings, is appropriate in the bushfire hazard context subject to the recommendations in this report. Bushfire mitigation and management measures for the development can be adequately addressed with the proposal having the ability within the subject property to comply with PBP2019, subject to the recommendations in this report. This is, however, contingent on the consent authority concurring with the public road assessment and upgrade Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A).

The report provides recommendations to demonstrate the land can meet the bushfire prevention measures of PBP2019 and Ministerial Direction 4.3, with the recommendations considering the following bushfire protection measure aspects -

- Bushfire Attack Level (BAL) construction standards
- Setbacks from bushfire hazard vegetation (Asset Protection Zones)
- Fuel management within APZs
- Access and egress from the proposed allotment via an appropriate well designed road system to support evacuation and firefighting demands.
- Underground electricity and gas services
- Compliant water supplies

The following table is provided as a summary of the recommendations and method of assessment for each consideration relating to Planning for Bushfire Protection 2019.

MEASURE	RECOMMENDATION	METHOD OF ASSESSMENT
Construction Standards	<p>The dwellings are to be upgraded to meet the requirements of BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019.</p> <p>Construction specifications detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by a registered building certifier.</p> <p>Fences and gates within the APZ are to be made of either hardwood or non-combustible material. Where a new fence or gate is constructed within 6m of the dwelling it is to be made of non-combustible material only.</p>	Acceptable Solution

APZ Required	<p>At the commencement of works and in perpetuity the following asset protection zones for the two dwellings are to be managed and maintained as an Inner Protection Area (IPA) in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see <b>attached</b> Appendix D &amp; Appendix E).</p> <p>Dwelling No. 1 – (North Precinct)</p> <ul style="list-style-type: none"> <li>• North for 12m</li> <li>• East for 12m</li> <li>• South for 9m</li> <li>• West for 10m</li> </ul> <p>Dwelling No. 2 – (South Precinct)</p> <ul style="list-style-type: none"> <li>• 20m around the entire dwelling.</li> </ul>	Acceptable Solution
Water Supply	<p>Static water supplies are to comply with Section 5.3.3 and Table 5.3c of Planning for Bushfire Protection 2019 and AS 3959-2018.</p> <p>A 30,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 1.</p> <p>A 10,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 2.</p> <p>A fire fighter minimum 5hp or 3kW petrol or diesel-powered pump for each dwelling is to be provided within the recommended asset protection zones and shielded against bush fire attack (note – no electric pumps). An associated hose and reel for firefighting is to be connected to the pump and shall be 19mm internal diameter. A fire hose reel is to be constructed in accordance with AS/NZS 1221:1997 and installed in accordance with the relevant clauses of AS 2441:2005.</p>	Acceptable Solution & Additional Measures due to access performance solution.
Electricity & Gas Supply	Electricity and gas for the two dwellings are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 & AS3959-2018.	Acceptable Solution
Landscape	Landscaping for the dwellings is to be undertaken in accordance with Appendix 4 of PBP2019.	Acceptable Solution
Access	The internal property access road is to be constructed to comply with Section 7.4 and Table 7.4a of Planning for	Performance Solution

	<p>Bushfire Protection 2019 except no alternative access road is required. The property access road will need to provide access to each dwelling with the firefighting water tanks located within 4m of the access road or turning head.</p> <p>The upgrading of Settlement Road recommended by the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A) is to be approved by Byron Shire Council. Any variations to the upgrade requirements or refusal of the report will require re-evaluation and an amended bushfire report for consideration, if meritorious.</p>	
<i>Bushfire preparation planning</i>	<p><i>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 <a href="http://www.rfs.nsw.gov.au">www.rfs.nsw.gov.au</a></i></p>	<i>Advisory Note Only</i>

### 3.0 INTRODUCTION

#### 3.1 GENERAL

The purpose of this report is to establish suitable bushfire mitigation measures for the existing (unauthorised) dwelling for the purposes of obtaining a dwelling entitlement at Lot 5 DP 585928, 55 Settlement Road Main Arm, demonstrating compliance with the Environment Planning and Assessment Act 1979 Section 9.1, Ministerial Direction 4.3, and Planning for Bush Fire Protection 2019 (PBP2019).

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2019 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.

#### 3.2 SIGNIFICANT ENVIRONMENTAL FEATURES

An assessment is to be undertaken, if applicable, regarding:

- SEPP (Biodiversity and Conservation) 2021
- SEPP (Resilience and Hazards) 2021
- 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)

Note: This report does not consider the above legislation and in this regard this report should be read in conjunction with the Statement of Environmental Effects submitted with the development application. There will be some vegetation to be removed to satisfy the recommendations in this report. In this regard, the ecological report is to assess the vegetation to be removed and trees to remain.

### 3.3 PROPOSED DEVELOPMENT

The applicant has submitted a Planning Proposal for a dwelling entitlement at Lot 5 DP 585928, 55 Settlement Road Main Arm. The subject property currently supports two existing (unauthorised) dwellings as shown on the aerial in Figure 2. Dwelling No. 1 is constructed of timber with a metal roof and bearer and joist construction with Dwelling No. 2 construction with a combination of timber, fibre cement and metal roof.



Figure 1: Location of subject property and dwellings

Source: NSW Govt. Six Maps





Figure 2: Existing Dwelling No. 1

*Source: Nearmap, 17.03.2023*



Figure 3: Existing Dwelling No. 2.

*Bushfire Certifiers 15.5.2024*



## 4.0 BUSHFIRE THREAT ASSESSMENT

### 4.1 BUSHFIRE PRONE LAND MAP

The bushfire prone mapping identifies the subject allotment as being bushfire prone (Figure 4). Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate with respect to the current bushfire hazard.



Figure 4: Bushfire prone land map

Source: BSC online mapping

### 4.2 ASSESSMENT – ASSET PROTECTION ZONES & CONSTRUCTION STANDARDS

Identification of the vegetation formations for each aspect within 140 metres of the dwelling as per Keith (2004) classifications was undertaken and is detailed as follows. The slope was measured onsite with a 'Tru Pulse 3600 R' laser range finder and inclinometer with the assessment undertaken.

Asset Protection Zones are areas established and maintained to ensure that bushfire fuels are progressively reduced between the development and the bushfire hazard. The asset protection zone incorporates an Inner Protection Area (IPA) having reduced fuel loadings.

The following assessment for the asset protection zones and construction standards are provided for each dwelling separately given the distance between both dwellings.



Dwelling No. 1



Figure 5: Vegetation communities 2023

Source: BSC online mapping



Figure 6: Bushfire threat analysis (Dwelling No. 1) yellow circled; neighbouring dwelling red circled

Source: BSC online mapping



The following table summarises the category of bushfire attack pursuant to Planning for Bushfire Protection 2019.

Table 1: Summary Bushfire Threat Assessment, APZs & Construction Standards – Dwelling No 1					
ASPECT	SLOPE	VEG. CLASS Figure A1.2 PBP2019	APZ REQUIRED Table A1.12.3 PBP2019	APZ RECOMMENDED	CONSTRUCTION AS 3959-2018
Northeast	0-5 <sup>0</sup> d/s	Rainforest	12m	12m	To be upgraded to meet the construction standard requirements of BAL 29 + s.7.5 PBP 2019
East & Southeast	Upslope	Rainforest	9m	9m	
Southwest	Upslope	Grassland	10m	10m	
West & Northwest	Upslope	Rainforest	9m	9m	



Figure 7: Location of recommended asset protection zones to dwelling.  
 Source: Biodiversity Report dated 28<sup>th</sup> June 2023.





Figure 8: Close up of recommended APZ and location of rainforest hazard.

Source: Biodiversity Report dated 28<sup>th</sup> June 2023.

## Dwelling No. 2

The bushfire hazard directly impacting Dwelling No.2 is forest vegetation to the west and south located upslopes exceeding 10 degrees. To the north and east is a grassland hazard being the vegetation classification primarily influencing the bushfire behaviour at the recommended asset protection zone interface.

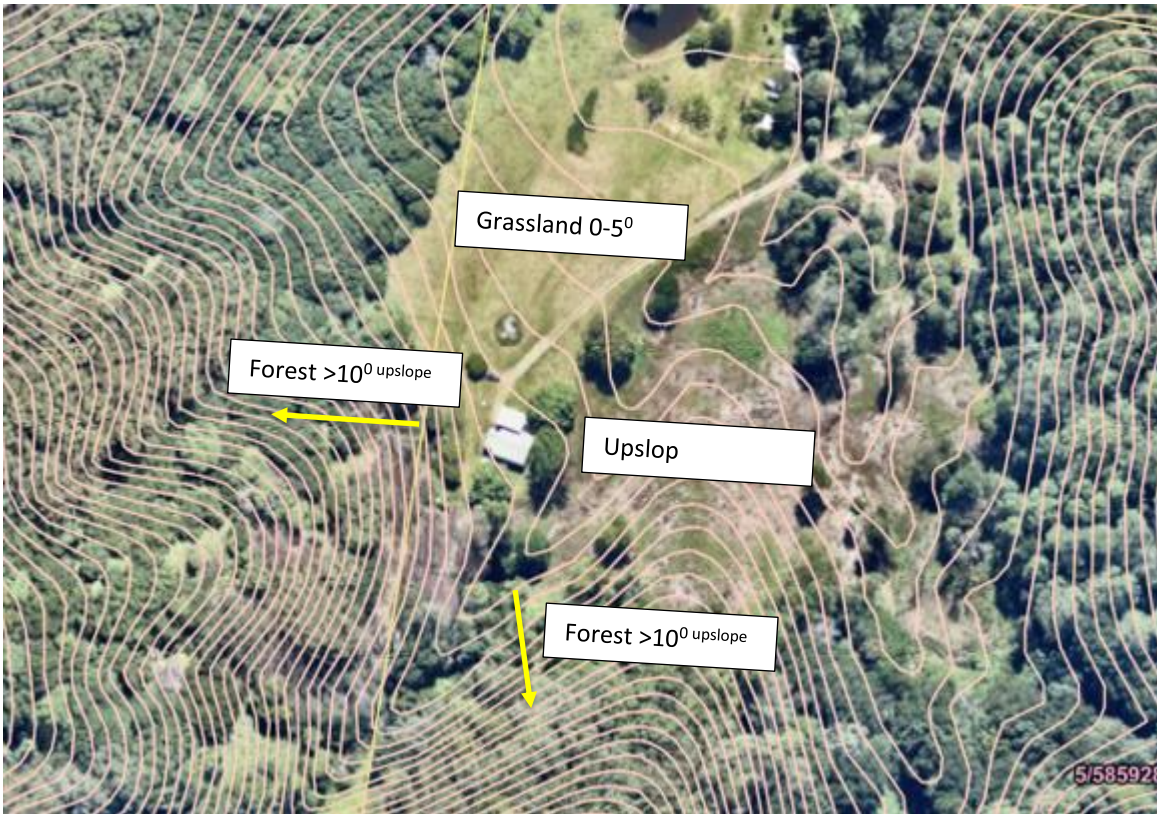


Figure 9: Bushfire threat analysis (Dwelling No. 2).

The following table summarises the category of bushfire attack for Dwelling No. 2 pursuant to Planning for Bushfire Protection 2019.

Table 1: Summary Bushfire Threat Assessment, APZs & Construction Standards –Dwelling No 2					
ASPECT	SLOPE	VEG. CLASS Figure A1.2 PBP2019	APZ REQUIRED Table A1.12.3 PBP2019	APZ RECOMMENDED	CONSTRUCTION AS 3959-2018
North	0-5 <sup>0</sup> d/s	Grassland	11m	20m	To be upgraded to meet the construction standard requirements of BAL 29 + s.7.5 PBP 2019
East	Upslope	Grassland	10m	20m	
South	Upslope >10 <sup>0</sup>	Forest	20m	20m	
West	Upslope >10 <sup>0</sup>	Forest	20m	20m	

## 5.0 MINISTERIAL DIRECTION 4.3 INCLUDING STRATEGIC BUSHFIRE STUDY (Table 4.2.1 PBP2019)

Ministerial Direction 4.3 contained within the NSW Department of Planning and Environment Local Planning Directions, states:

**(1) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.**

**(2) A planning proposal must:**

**(a) have regard to Planning for Bushfire Protection 2019**

The report identifies the required Bushfire Protection Measures required for the proposed dwelling opportunity for the subject property in relation to the existing dwellings constructed without prior Council approval. The report provides recommendations for compliance with the performance criteria of Planning for Bushfire Protection 2019 however it does rely on the consent authority's concurrence with the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A) in relation to adequate public road access/egress during an emergency event, including non-bushfire events.

**(b) introduce controls that avoid placing inappropriate developments in hazardous areas**

### Location/siting

The existing unauthorised dwellings are in the location where the dwelling opportunities are proposed however there are other areas on site that will also comply if further assessments are required. The dwellings are both in locations that limit the impact from bushfire relating to all potential ignition sources i.e. convective heat, radiant heat, and ember attack.

The dwellings are both located adjacent to a gully with the predominant rainforest bushfire hazard for Dwelling No. 1 and forest bushfire hazard for Dwelling No. 2 being located on upslopes. The upslope location of the bushfire hazard will result in a reduced intensity of the fire front due to a reduced rate of spread as fuel availability from the seat of the fire is decreased.

The fire behaviour is more likely to have the fire front tilt closer to 90 degrees limiting potential flame contact and radiant heat based on the APZ recommendations. Further, the location in some cases creates a lee-side eddy (Cheney 2008) with wind traversing back into the front of the fire lessening embers impact compared to downslopes.



**(c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).**

The recommendation for the dwelling incorporates APZ setbacks for 29kW/m<sup>2</sup> in accordance with Tables A1.12.3 of Planning for Bushfire Protection 2019. The ecological assessment is to confirm that the recommended asset protection zone and access locations/upgrades will be capable of being implemented in accordance with the relevant legislation and heads of consideration relating to ecology.

**(3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:**

**(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:**

- i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and**
- ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,**

Locations of asset protection zones have been identified in Section 4 of the report.

**(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with**

Section 4 of this report provides the asset protection zone location and depths for the non-SFPP development. The report identifies there is merit to provide performance solutions to further reduce the asset protection depths for non-SFPP development subject to a specific assessment in consultation with the NSW Rural Fire Service (NSW RFS) if required. This, however, is used as redundancy for the access being greater than 200m in length.

**(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks**

The capacity of the internal access and wider public road network has been considered by a traffic consultant, regarding the performance criteria of PBP2019 which states –

*The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile; and*

*The location of key access routes and direction of travel; and*

*The potential for development to be isolated in the event of a bush fire.*

The assessment of the existing public road network for emergency access and egress from the subject property has been assessed by SDS Civil Enterprises with the Traffic Safety Assessment report (May 2024) provided in Appendix A, which demonstrates -

- (i) Compliance with AS2890.1 driveway sight lines can be achieved;*
- (ii) Bushfire truck access can be achieved via localised upgrade of the driveway entrance as per the works identified in Figure 3.3;*
- (iii) Bushfire truck access and turning tee facility can be provided to the rear dual occupancy dwelling;*
- (iii) A net benefit is able to be provided to the wider community via implementing the passing bay works within Settlement Road as identified in Figure 4.*
- (iv) By installing 3 x 600dia culverts, the internal driveway will achieve a 1yr flood immunity.*

**(d) contain provisions for adequate water supply for firefighting purposes,**

Water supply will be required to comply with Section 5.3.3 and Table 5.3c of Planning for Bushfire Protection 2019. In this regard the following recommendations are made for each consideration, consistent with the acceptance solutions.

Static Water Supply

A 30,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 1.

A 10,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 2.

A fire fighter minimum 5hp or 3kW petrol or diesel-powered pump for each dwelling is to be provided within the recommended asset protection zones and shielded against bush fire attack (note – no electric pumps). An associated hose and reel for firefighting is to be connected to the pump and shall be 19mm internal diameter. A fire hose reel is to be constructed in accordance with AS/NZS 1221:1997 and installed in accordance with the relevant clauses of AS 2441:2005.

**(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,**

The existing dwellings are in a location that limits the interface of the hazard given their location at the bottom of the steep slopes rather than on ridge tops or saddles which are undesirable locations to reduce risk from bushfire. In this regard the siting is positive given the reduced rate of spread traversing an upslope from the dwellings locations.

**(f) introduce controls on the placement of combustible materials in the Inner Protection Area.**

As identified in Section 4 of this report, the asset protection zones are to be managed and maintained in accordance with Table 5.3a PBP2019. This requirement limits the placement of combustible material with the Inner Protection Area; however, this can be reinforced with planning controls if deemed necessary.

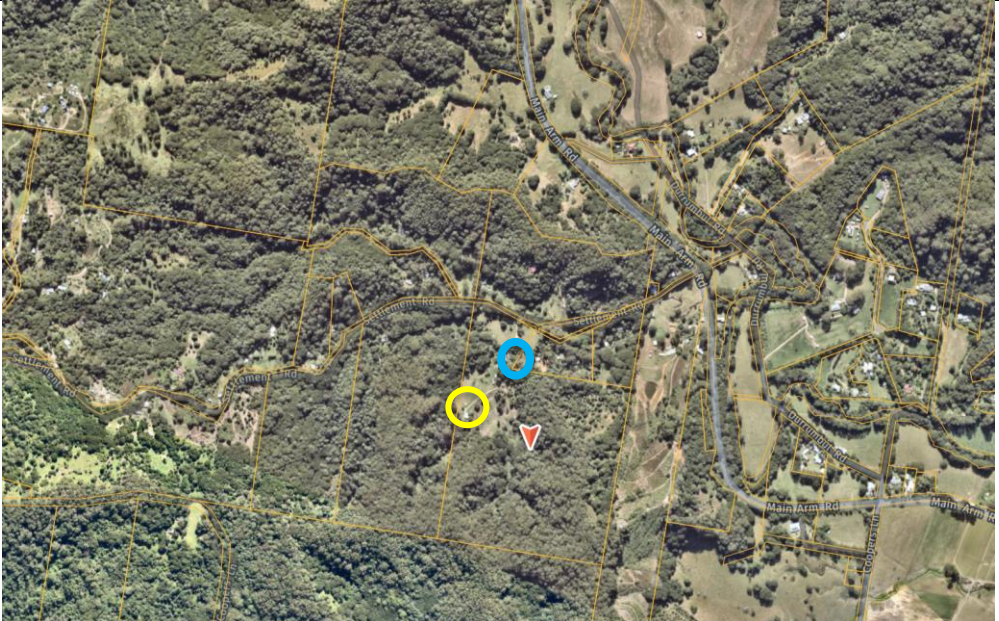
Landscaping

Landscaping for the proposed dwellings is to be undertaken in accordance with Appendix 4 of PBP2019.



**Table 1:** Summary Strategic Bush Fire Study (Table 4.2.1 PBP 2019).

ISSUE	DETAIL	ASSESSMENT CONSIDERATIONS	COMMENT
<b>Bush fire landscape assessment</b>	Considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	The bush fire hazard in the surrounding area, including vegetation, topography, and weather.	Addressed in bushfire report. Minimum required APZ setbacks capable of complying with PBP2019. Suitable for the dwelling opportunities.
		The potential fire behaviour that might be generated based on the above.	Addressed in bushfire report. Suitable for the dwelling opportunities.
		History of bush fire in the area.	The area has a history of bushfires although specific information was not available at the time of reporting. The bushfire hazard assessment has included recommendation based on a fire occurring in the locality to the limitations in s1.3 of Planning for Bushfire Protection 2019
		Potential fire runs into the site and the intensity of such fire runs.	The fire runs are limited in areas given the location of adjoining and existing development in the locality. The fire run intensity however is reduced due to the location of the dwellings being at the bottom of ridges to the west, southeast and south. Suitable for the dwelling opportunities.
		The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	The fire run intensity however is reduced due to the location of the dwellings being at the bottom of ridges to the west, southeast and south. The fragmentation of the landscape in the locality identified in the following aerial, consists of areas of managed vegetation around existing development particularly to the north, east and northwest to a degree. This fragmentation will reduce fire intensity due to disrupted fuel loads.

			 <p>Areas of managed land disrupts continuity of fuels and bushfire intensity.</p> <p>The property access is to be upgraded to fully comply with the acceptable solutions of Planning for Bushfire Protection 2019. The existing public road access is recommended for upgrading as outlined in the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A).</p> <p>Water supplies will be provided for firefighting intervention and a pump and fire hose added to the recommendation to allow for occupant suppression if safe to do so.</p>
<b>Land use assessment</b>	The land use assessment will identify the most appropriate locations within	<p>The risk profile of different areas of the development layout based on the above landscape study.</p> <p>The proposed land use zones and permitted uses.</p>	<p>Dwelling opportunities are considered reasonable based on the location of the existing dwellings on site.</p> <p>Dwelling opportunities are considered reasonable based on the location of the existing dwellings on site.</p>

	the masterplan area or site layout for the proposed land uses.	The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development located in lower risk areas of the site).	As previously outlined the dwellings are in the lower areas of the topography in the locality i.e. located away from ridge tops, etc.
		The impact of the siting of these uses on APZ provision.	Consultant ecologist report is provided confirming the recommended asset protection zones can be created.
<b>Access and egress</b>	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile.	<p>The following comments are provided directly from the Traffic Safety Assessment. For further detail and context refer to the Traffic report is Appendix A.</p> <p><i>(i) Compliance with AS2890.1 driveway sight lines can be achieved;</i></p> <p><i>(ii) Bushfire truck access can be achieved via localised upgrade of the driveway entrance as per the works identified in Figure 3.3;</i></p> <p><i>(iii) Bushfire truck access and turning tee facility can be provided to the rear dual occupancy dwelling;</i></p> <p><i>(iii) A net benefit is able to be provided to the wider community via implementing the passing bay works within Settlement Road as identified in Figure 4.</i></p> <p><i>(iv) By installing 3 x 600dia culverts, the internal driveway will achieve a 1yr flood immunity.</i></p>
		The location of key access routes and direction of travel.	<p><i>The first 350m of Settlement Road is of a 3m sealed width on 4m wide pavement. Refer Plate 2.</i></p> <p><i>The balance of Settlement Road is gravel pavement from the end of bitumen seal to the driveway access to this planning proposal site as shown in Plate 1. The length of this section of gravel pavement is 170m.</i></p>
		The potential for development to be isolated in the event of a bush fire.	<p><i>Settlement Road is considered a minor rural road within Byron Shire Council's road hierarchy classification. It services nominally 30+ dwellings. The intersection of Settlement Road with Main Arm Road has recently been upgraded in year 2020 via black spot funding.</i></p>

<b>Emergency services</b>	An assessment of the future impact of new development on emergency services.	Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades.	The increase of two bushfire compliant dwellings (see recommendations) is not considered to have a significant impact on existing emergency services.
		Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	Static water supply recommended with compliant property road access upgrade to comply with PBP2019.
<b>Infra-structure</b>	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants.	No reticulated supply available or proposed.
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas lines etc.	Nil known in the proximity.
<b>Adjoining land</b>	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	The proposal will not increase pressure on Bushfire Protection Measures (BPMs) to adjoining properties. Conversely, the approval of the dwelling use and bushfire recommendations will further reduce bushfire impact on adjoining properties. This is achieved by providing specific asset protection zones creating further disruption to fuel availability in a bushfire event, provides additional water source and access for NSW Rural Fire Service to attend for fuel reduction.







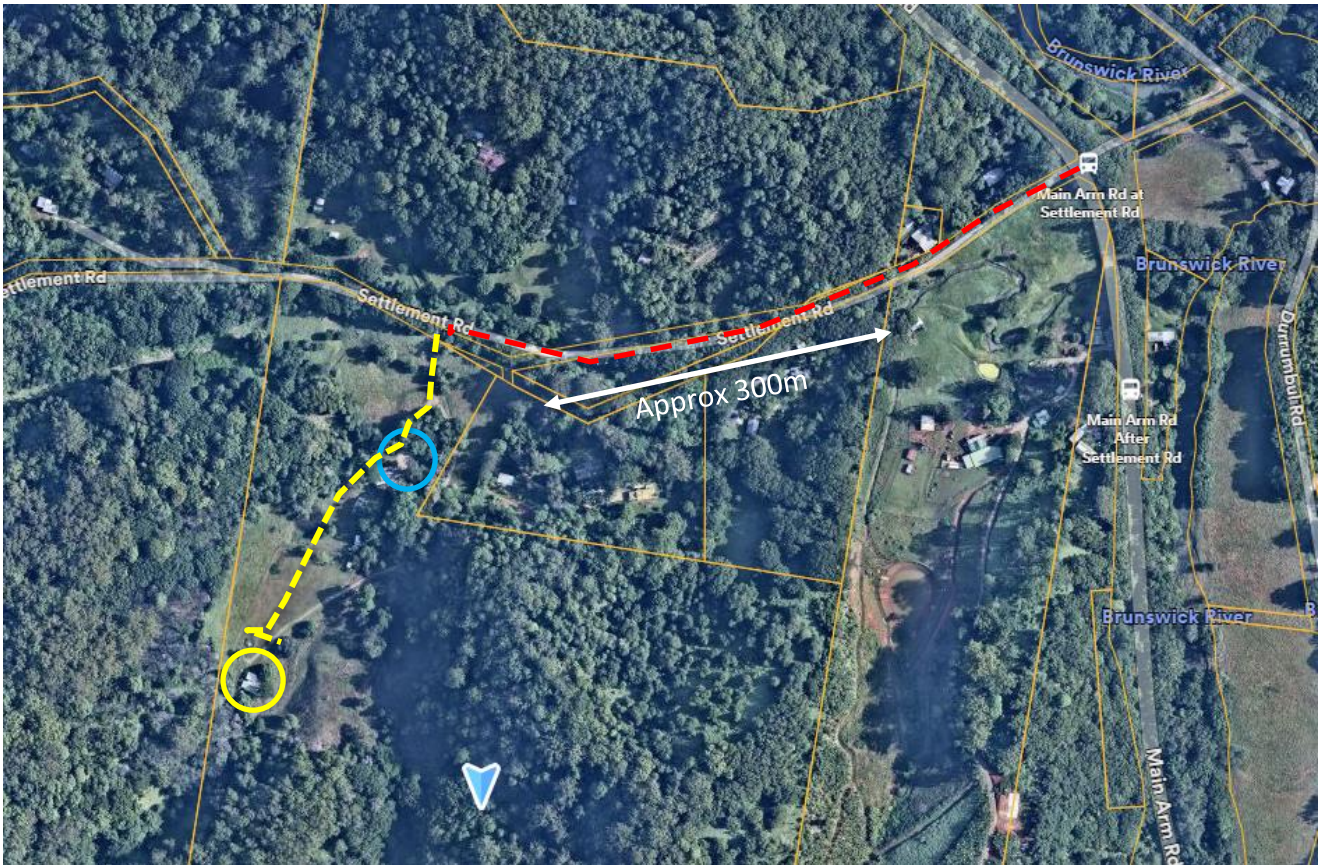


Figure 11: Distance is approximately 600m from the dwelling to the two-way road with approximately 300m passing by unmanaged land, with the remainder having a level of forest management.

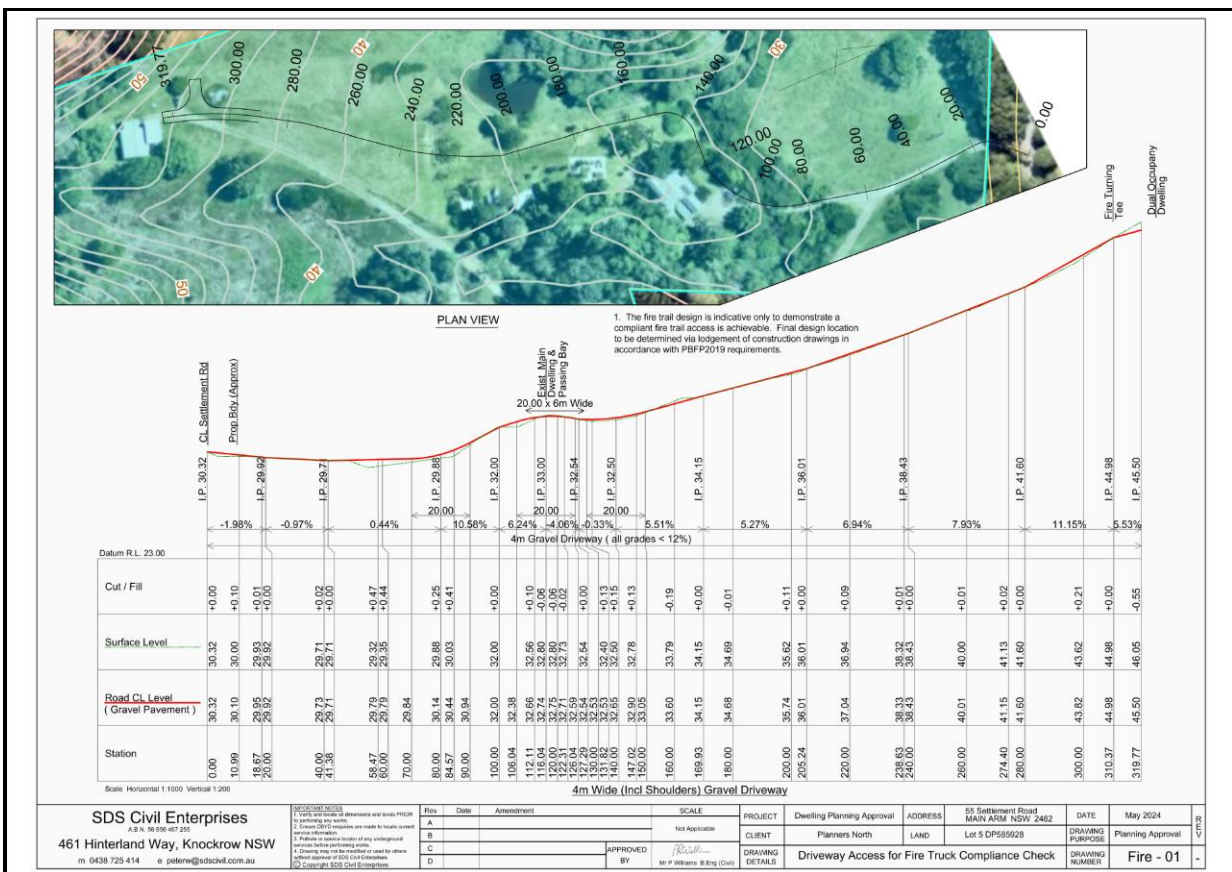


Figure 12: Civil engineers schematic design demonstrating compliance can be achieved.

## **ACCEPTABLE SOLUTION RELATING TO ACCESS >200M FROM PUBLIC THROUGH ROAD**

The application departs from the acceptable solutions relating to access specified in Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 which states:

*'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'.*

## **PERFORMANCE CRITERIA RELATING TO ACCESS**

The relevant performance criteria in this regard is:

*'firefighting vehicles can access the dwelling and exit the property safely' (Table 7.4a PBP2019).*

## **ACCEPTANCE CRITERIA**

Demonstration the proposed internal property access road will use the acceptable solutions as a guide to provide a reasonable outcome for infill development to aid firefighting operations.

*'Provide access to aid firefighting operations.'*

## **SCOPE**

The scope of the performance solution is limited to the departure from the acceptable solution requirements identified in this report.

## **LIMITATIONS**

The report provides recommendations that will reduce the risk of ignition to dwellings while the fire front passes however as documented:

*'The goal of absolute safety during a bush fire event is not attainable and despite best effort there is the ever-present risk of personal injury or damage to property. Ultimately, it is the responsibility of the owner/occupier to comply with conditions of consent and to maintain systems designed to mitigate the impacts of bush fire'.*

The report also acknowledges and reflects the limitations outlined in Section 1.3 of Planning for Bushfire Protection 2019 being -



*'Due to a range of limitations, the measures contained in this document do not guarantee that loss of life, injury and/or property damage will not occur during a bush fire event. Limitations of this document include but are not limited to uncertainties in the following areas: Fire Danger Index; fuel loads; existing developments; human behavior; and maintenance'.*

The study relies on the owner/occupier to comply with the recommendations in this report and the consent conditions and to maintain in perpetuity systems designed to mitigate the impacts of bush fire. The report is not considered to be a compliance report for any other aspects other than that specified in the scope.

The report has not assessed existing building materials for compliance with the recommendations. This will need to be assessed by an accredited Building Surveyor with the application prior to the issue of a Building Information Certificate or Construction Certificate.

For the consideration of the adequacy of the Settlement Road in an emergency event, the report relies upon the expertise of the civil engineer and the adequacy and upgrade of Settlement Road outlined in the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A).

## **ASSUMPTIONS**

The dwellings, once upgraded in accordance with the recommendations, are compliant with the acceptable solutions of Planning for Bushfire Protection 2019 and the recommendations within this report relating to the performance study. The building and asset protection zones, water, access, and landscaping will be managed and maintained in perpetuity in accordance with Planning for Bushfire Protection 2019.

## **STAKEHOLDERS**

- BCA Check Pty Ltd t/a Bushfire Certifiers – Bushfire Consultants – Peter Thornton
- NSW Rural Fire Service – Advice agency for referral and comment
- Byron Shire Council – Consent Authority
- Consultant Town Planner – Planners North – Kate Singleton
- Consultant Civil Engineer - SDS Civil Enterprises – Peter Williams
- Consultant Ecologist – Biodiversity Assessments and Solutions – Adam Gosling
- Owners – Caroline Kinsella and Glenn Wright
- Environmental Consultant – Tim Fitzroy

## TRIAL DESIGN

The trail design will be as follows -

1. The existing dwellings subject to this application, are to be upgraded to comply with BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019. Construction specifications detailing compliance shall be shown on the plans submitted with the application for a Building Information Certificate/Construction Certificate to the satisfaction of the consent authority.
2. Fences and gates within the APZ are to be made of either hardwood or non-combustible material. Where a fence or gate is constructed within 6m of the dwellings it is to be made of non-combustible material only. Post and wire farm fences are excluded.
3. At the commencement of works and in perpetuity the following asset protection zones for the two dwellings are to be managed and maintained as an Inner Protection Area (IPA) in accordance with Appendix 4 of Planning for Bushfire Protection 2019 and the requirements of 'Standards for Asset Protection Zones' (RFS 2005) (see attached Appendix D & Appendix E).

### Dwelling No. 1 – (North Precinct)

North for 12m

East for 12m

South for 9m

West for 10m

### Dwelling No. 2 – (South Precinct)

20m around the entire dwelling.

4. Landscaping is to be in accordance with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019.
5. A 30,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 1.

A 10,000-litre water supply and 65mm Storz fitting to a non-combustible water tank is to provide coverage for Dwelling No. 2.

A fire fighter minimum 5hp or 3kW petrol or diesel-powered pump for each dwelling is to be provided within the recommended asset protection zones and shielded against bush fire attack (note – no electric pumps). An associated hose and reel for firefighting is to be connected to the pump and shall be 19mm internal diameter. A fire hose reel is to be

constructed in accordance with AS/NZS 1221:1997 and installed in accordance with the relevant clauses of AS 2441:2005.

6. Electricity and gas for the dwelling are to be upgraded to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019.
7. The internal property access road is to be upgraded to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 except no alternative access road is required.
8. The upgrading of Settlement Road recommended by the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A) and approved by Byron Shire Council. Any variations to the upgrade requirements or refusal of the report will require re-evaluation and an amended bushfire report for consideration if meritorious.

### **ANALYSIS OF PROPOSED ACCESS ROAD**

The acceptable solutions of s7.4a of Planning for Bushfire Protection 2019 permits one internal property access where the dwelling is within 200m of a public through road.

Although a method of measurement is not provided in Planning for Bushfire Protection 2019, for the purpose of this report it is considered reasonable to deduce the intent is for the property access road to have a 200m limitation when measured along the property access road and including the portion of the public road to the point where alternate egress is available.

The analysis will provide qualification demonstrating in the following heads of consideration subject to the recommendation will be at least equivalent to the deemed-to-satisfy provisions (acceptable solutions).



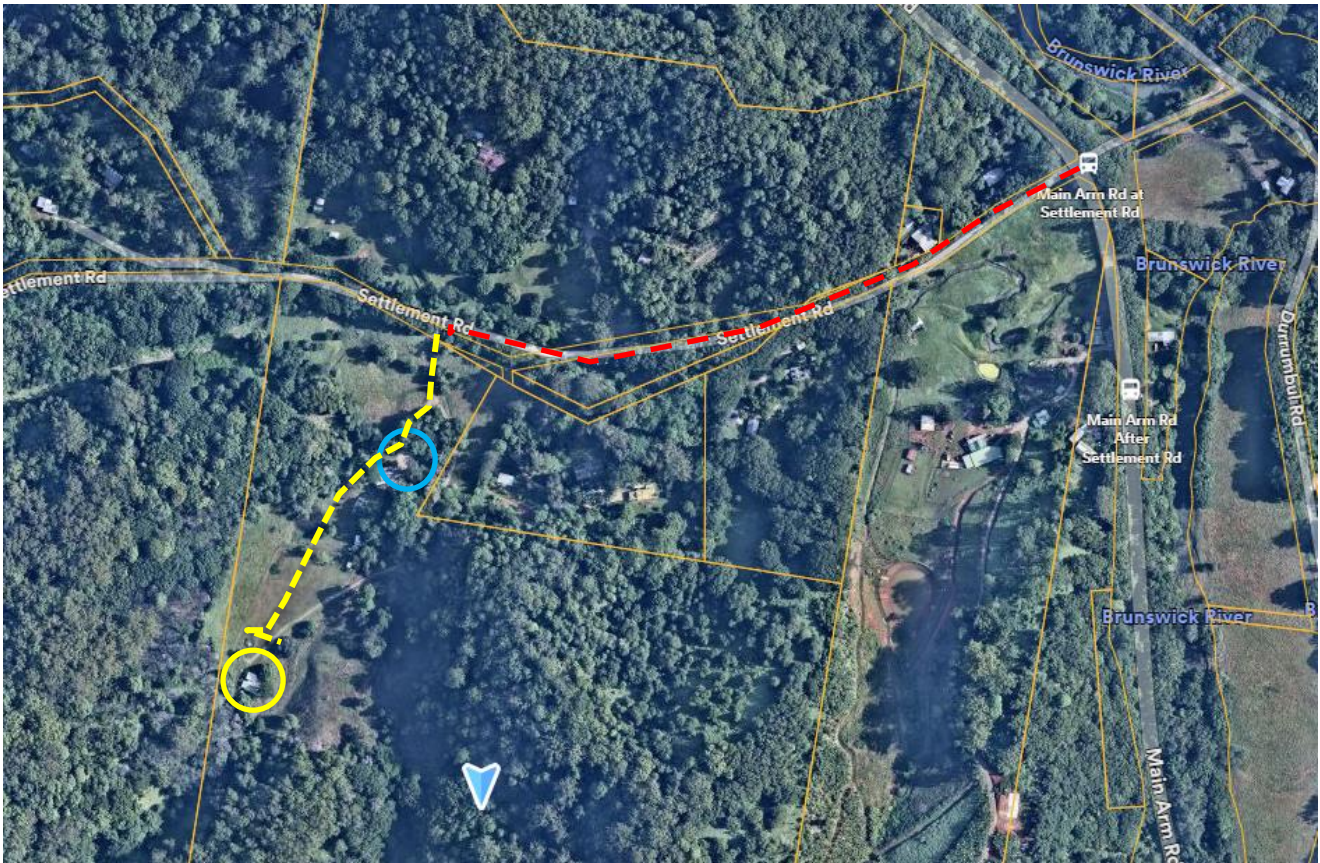


Figure 13: Public road ~500m from Main Arm Road (red dashed line); onsite access road ~110m (yellow dashed line) to Dwelling No. 1 and approx. 300m to Dwelling No. 2.

Source: Nearmap, 22.05.2024

**Access road being cut by falling trees or stalled vehicle.**

The portion of property access road within the subject property will be upgraded to comply with the acceptable solutions of PBP2019 which will include a compliant turning head providing access to a static water supply for firefighting purposes.

Consideration of the adequacy of Settlement Road has been considered by the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A). Upgrade measures have been included in the report recommending additional passing bays in conjunction with other considerations and measures. These have been deemed suitable by the civil engineer as being suitable for an emergency event whilst providing a better bushfire outcome for other properties currently accessed directly from Settlement Road.

Notwithstanding this, consideration has also been given to the length of Settlement Road directly impacted by unmanaged forest vegetation capable of supporting a fully intense forest fire. In this regard approximately 50-66% of the total access distance to the subject dwellings traverses by land that has a reasonable degree of management sufficient to disrupt fuel load availability and lessening the bushfire impact on the road when compared to a compliant access road traversing through 200m of forest with no alternative egress. Whilst the distances exceed 200m, it is not considered

unreasonable when consideration of the opportunity to create a better bushfire outcome for the locality.

Further, the intent of s5.1.1 PBP2019 - isolated subdivisions is commensurate to the bushfire risk and site conditions, allowing for increased asset protection zone depths when modelling of fire behaviour is provided and water supply aids for occupants, if it is safe to do so.

**No passing opportunities within the 200m length of road.**

Consideration of the adequacy of Settlement Road has been considered by the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A). Upgrade measures have been included in the report recommending additional passing bays in conjunction with other considerations and measures. This will create a better bushfire outcome for emergency services and other residents that require access directly from Settlement Road.

**Exposure to bushfire hazard if stranded on the property access road and isolated subdivision.**

Whilst in a rural area, the subject property is near other rural residential developments that have a reasonable degree of management. In this regard, the location is not considered 'isolated' to the degree of many rural properties where the public roads have significant distances through forests, increasing the risk of pinch points.

Consideration has been given to Main Arm Road, which traverses large distances of managed land with managed development on each side of the road. Notwithstanding, consideration of the objectives for isolated subdivisions in s5.1.1 PBP2019 has resulted in the following increased bushfire measures –

- Asset Protection Zones have been provided to comply with Table A1.12.3 PBP2019. However as demonstrated with the following Method 2 modelling, the location of the dwellings in relation to the rainforest and forest hazard located on an upslope demonstrates the added safety margin in relation to radiant heat received by the dwelling against the recommended Bushfire Attack Level (BAL) AS 3959.

The sensitivity study as shown in Figure 14 and 15 establishes the rainforest vegetation located on an upslope of minimum 10 degrees will halve the rate of spread and reduce fire intensity. The forecast radiant heat received by Dwelling No. 1 with the recommended APZs depth is 16.75kW/m<sup>2</sup> and Dwelling No. 2 being 18.69kW/m<sup>2</sup>. The recommended BAL construction of BAL 29 will provide additional resistance to the dwellings should firefighters and occupants be unable to evacuate early as recommended. This is consistent with the objectives of isolated subdivisions.

- Further measures are recommended with the increase of firefighting static water supply volume by 50% to minimum 30,000L for the primary dwelling No. 1 and 10,000L for Dwelling 2 consistent with PBP2019. In addition, a fighting pump and fire hose reels to assist with site preparation is recommended for after the passing of the fire front if safe to do so.

<b>Equations Used</b>			
Transmissivity: Fuss and Hammins, 2002			
Flame Length: RFS PBP, 2001/Vesta/Catchpole			
Rate of Fire Spread: Noble et al., 1980			
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005			
Peak Elevation of Receiver: Tan et al., 2005			
Peak Flame Angle: Tan et al., 2005			
<b>Run Description:</b>		Sensitivity Study	
<b><u>Vegetation Information</u></b>			
<b>Vegetation Type:</b>	Rainforest		
<b>Vegetation Group:</b>	Forest and Woodland		
<b>Vegetation Slope:</b>	10 Degrees	<b>Vegetation Slope Type:</b>	Upslope
<b>Surface Fuel Load(t/ha):</b>	10	<b>Overall Fuel Load(t/ha):</b>	13.2
<b>Vegetation Height(m):</b>	2	Only Applicable to Shrub/Scrub and Vesta	
<b><u>Site Information</u></b>			
<b>Site Slope:</b>	10 Degrees	<b>Site Slope Type:</b>	Downslope
<b>Elevation of Receiver(m):</b>	Default	<b>APZ/Separation(m):</b>	9
<b><u>Fire Inputs</u></b>			
<b>Veg./Flame Width(m):</b>	100	<b>Flame Temp(K):</b>	1090
<b><u>Calculation Parameters</u></b>			
<b>Flame Emissivity:</b>	95	<b>Relative Humidity(%):</b>	25
<b>Heat of Combustion(kJ/kg)</b>	18600	<b>Ambient Temp(K):</b>	308
<b>Moisture Factor:</b>	5	<b>FDI:</b>	80
<b><u>Program Outputs</u></b>			
<b>Level of Construction:</b>	BAL 19	<b>Peak Elevation of Receiver(m):</b>	0.76
<b>Radiant Heat(kW/m2):</b>	16.75	<b>Flame Angle (degrees):</b>	85
<b>Flame Length(m):</b>	4.71	<b>Maximum View Factor:</b>	0.254
<b>Rate Of Spread (km/h):</b>	0.48	<b>Inner Protection Area(m):</b>	9
<b>Transmissivity:</b>	0.868	<b>Outer Protection Area(m):</b>	0
<b>Fire Intensity(kW/m):</b>	3284		

Figure 14: Dwelling No. 1 - Modelling 10 degrees upslope to the south, southeast and west.



### Equations Used

Transmissivity: Fuss and Hammins, 2002  
Flame Length: RFS PBP, 2001/Vesta/Catchpole  
Rate of Fire Spread: Noble et al., 1980  
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005  
Peak Elevation of Receiver: Tan et al., 2005  
Peak Flame Angle: Tan et al., 2005

**Run Description:** Design Fire Dwelling No. 2

### Vegetation Information

**Vegetation Type:** Forest (including Coastal Swamp Forest)  
**Vegetation Group:** Forest and Woodland  
**Vegetation Slope:** 10 Degrees **Vegetation Slope Type:** Upslope  
**Surface Fuel Load(t/ha):** 22 **Overall Fuel Load(t/ha):** 36.1  
**Vegetation Height(m):** 2 **Only Applicable to Shrub/Scrub and Vesta**

### Site Information

**Site Slope:** 10 Degrees **Site Slope Type:** Upslope  
**Elevation of Receiver(m):** Default **APZ/Separation(m):** 20

### Fire Inputs

**Veg./Flame Width(m):** 100 **Flame Temp(K):** 1090

### Calculation Parameters

**Flame Emissivity:** 95 **Relative Humidity(%):** 25  
**Heat of Combustion(kJ/kg)** 18600 **Ambient Temp(K):** 308  
**Moisture Factor:** 5 **FDI:** 80

### Program Outputs

**Level of Construction:** BAL 19 **Peak Elevation of Receiver(m):** 8.52  
**Radiant Heat(kW/m2):** 18.69 **Flame Angle (degrees):** 63  
**Flame Length(m):** 11.22 **Maximum View Factor:** 0.293  
**Rate Of Spread (km/h):** 1.06 **Inner Protection Area(m):** 11  
**Transmissivity:** 0.839 **Outer Protection Area(m):** 9  
**Fire Intensity(kW/m):** 19758

Figure 15: Dwelling No. 2 – Modelling 10-degree upslope to the south and west.

## CONCLUSION

The study demonstrates compliance with the Intent of Planning for Bushfire Protection 2019 via the proposed trial design.

## 7.0 WATER, ELECTRICITY AND GAS

### 7.1 WATER SUPPLY

A minimum 30,000L static water supply for Dwelling No. 1 and 10,000L for Dwelling No. 2 is to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows:

- a connection for firefighting purposes is to be located within the IPA or non-hazard side and away from the structure;
- a 65mm Storz outlet with a ball valve is to be fitted to the outlet;
- ball valve and pipes are to be adequate for water flow and are to be metal;
- supply pipes from tank to ball valve are to have the same bore size to ensure flow volume;
- underground tanks to have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is to be supplied within 4m;
- above-ground tanks are to be manufactured from concrete or metal;
- raised tanks are to have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F of AS 3959);
- unobstructed access is to be provided at all times;
- underground tanks are to be clearly marked;
- tanks on the hazard side of a building are to be provided with adequate shielding for the protection of firefighters;
- all exposed water pipes external to the building are to be metal, including any fittings;
- A minimum 5hp or 3kW petrol or diesel-powered pump is to be provided and shielded against bush fire attack (note – no electric pumps);
- A hose and reel for firefighting connected to the pump shall be 19mm internal diameter;
- fire hose reels are to be constructed in accordance with AS/NZS 1221:1997, and installed in accordance with the relevant clauses of AS 2441:2005.

In addition, a SWS - Stored Water Supply sign is recommended to be attached to the front gate or in that proximity.

### 7.2 ELECTRICITY SERVICES

Electrical transmission lines, if required, are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows:

- where practicable, electrical transmission lines are underground; and
- where overhead, electrical transmission lines are proposed as follows:
  - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
  - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

### 7.3 GAS SERVICES

The following aspects are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 should a gas service be applicable:

- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used
- all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side
- connections to and from gas cylinders are metal
- polymer-sheathed flexible gas supply lines are not used
- above-ground gas service pipes are metal, including and up to any outlets.

### 8.0 LANDSCAPING

Most 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 any landscaping is undertaken in accordance with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 as follows and managed and maintained for the life of the development.

- compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4 of PBP 2019);
- a clear area of low-cut lawn or pavement is maintained adjacent to the house;
- fencing is constructed in accordance with section 7.6; and
- trees and shrubs are located so that:
  - the branches will not overhang the roof;
  - the tree canopy is not continuous; and
  - any proposed windbreak is located on the elevation from which fires are likely to approach.

This office has not specifically assessed landscape plans. In this regard it is recommended the landscaping plans be accompanied by a design statement of compliance from the landscape designer, relevant to the recommendations in this report and to be assessed by the consent authority for compliance.



## 9.0 EMERGENCY AND EVACUATION PLANNING

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](http://www.rfs.nsw.gov.au)

## 10.0 CONCLUSION

The report provides recommendations for compliance with the performance criteria of Planning for Bushfire Protection 2019 to provide the dwelling opportunities to the subject property and authorized the existing dwellings for occupation. The report provides a compliance demonstration with a combination of acceptable solutions and a performance solution for access.

Property access within the subject property is recommended to comply with the acceptable solutions of Table 7.4a PBP2019. The primary consideration for access is the adequacy of the portion of Settlement Road from the intersection of Main Arm Road to the entrance to the subject property.

In this regard, the upgrading of Settlement Road recommended by the Traffic Safety Assessment report prepared by SDS Civil Enterprises Pty Ltd dated May 2024 (Rev A) has provided recommendations to upgrade Settlement Road to account for emergency services intervention and to achieve a better access outcome for general access which includes bushfire.

This report relies on the recommendations being assessed and approved by Byron Shire Council. Any variations to the upgrade requirements or refusal of the report will require re-evaluation and an amended bushfire report for consideration if meritorious.

## DISCLAIMER

This report was prepared for the purposes and exclusive use of the stated client specifically relating to the unauthorised Class 1a dwellings 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 or intumescent paints 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 2019 and the Building Code of Australia the report is to provide 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 the 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

Keith, D.A. (2004). *'Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT'*. NSW Department of Environment and Conservation.

NSW Rural Fire Service (2019), *Planning for bushfire protection, A guide for councils, planners, fire authorities and developers'*. November 2019, NSW Government.

Standards Australia, (2018), *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.

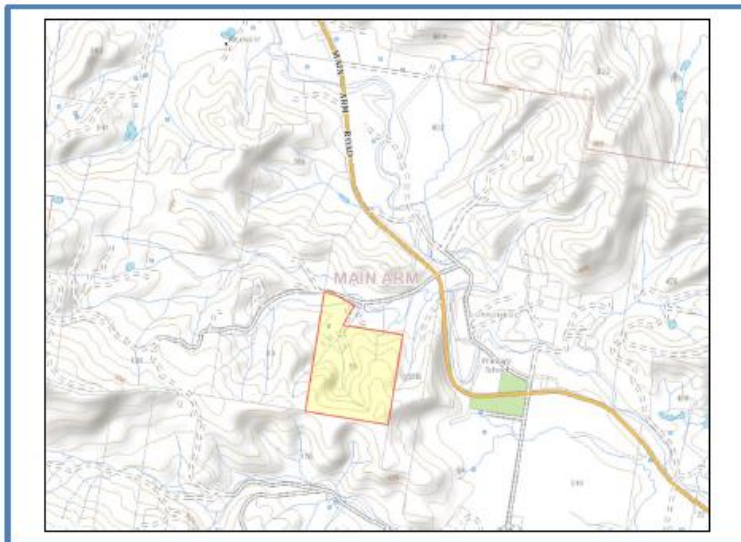
## APPENDIX A: Traffic Safety Assessment - SDS Civil Enterprises dated May 2024 Rev A



# TRAFFIC SAFETY ASSESSMENT

For A

## Low Impact Dual Occupancy Planning Proposal



At  
55 Settlement Road  
MAIN ARM NSW 2482

Upon  
Land Title  
Lot 5 DP 585928

May2024  
(Rev A)

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## 1 INTRODUCTION

This Traffic Safety Assessment been prepared to address driveway and traffic access matters associated with the formalisation of a dwelling entitlement via a planning proposal for the existing dual occupancy upon the holding.

The site is identified as Lot 5 DP 585928 and has a site area of 23.6ha and is located at Settlement Road, Main Arm. The allotment has an irregular frontage to Settlement Road with an overall frontage length of 177m. The Settlement Road site frontage is of a gravel construction, being 4m wide pavement including shoulders on a 5m earthen formation. Refer Plate 1.



*Plate 1 – View To West (Car Located Within Existing Driveway Entry)*

Settlement Road is considered a minor rural road within Byron Shire Council's road hierarchy classification. It services nominally 30+ dwellings. The existing dual occupancy would generate  $2 \times 7.4^* = 15$  trips per day within the current road network. The intersection of Settlement Road with Main Arm Road was recently been upgraded in year 2020 via black spot funding and includes the trip generation of this site within existing traffic flows. Refer to Figure 1.0 below.

\* RMS *Technical Direction Guide To Traffic Generating Developments – Updated Traffic Surveys (TDT 2013/04a)* = 7.4 trips per dwelling in regional areas



## Two notorious black spots removed on Main Arm Road

Published on 02 June 2020

Council is putting down line marking and the finishing touches on priority roadworks and safety improvements at two black spots on Main Arm Road thanks to two \$300K grants – one from the Australian Government's Black Spot Program and the other \$300K from the NSW Government's Safer Roads program.

The roadworks are expected to be finished within weeks – on time and on budget. The project has included road-widening and new high-friction surfacing for greater safety, pavement reconstruction and installation of guardrails, guide posts, markers and line marking.



*Figure 1.0 – Byron Shire Council Press Release of Main Arm Road Black Spot Upgrade*

The first 350m of Settlement Road is of a 3m sealed width on 4m wide pavement. Refer Plate 2.

The balance of Settlement Road is gravel pavement from the end of bitumen seal to the driveway access to this planning proposal site as shown in Plate 1. The length of this section of gravel pavement is 170m.

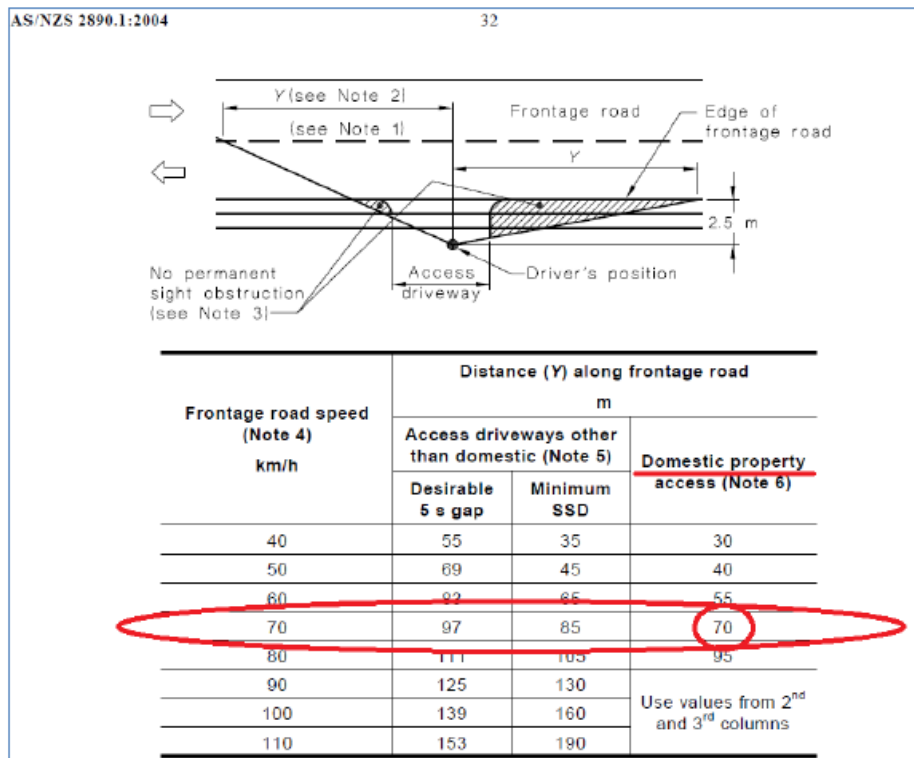


*Plate 2 – 3m Sealed Section Settlement Road (view towards Main Arm Road Intersection)*

## 2 SIGHTLINE ACCESS TO THE SITE

A site inspection was undertaken on 10<sup>th</sup> August 2020 to assess sight lines and access options for the proposal to which sight distances were assessed as compliant based upon the following:

- No sign posted speed was present on Settlement Road, thereby NSW State speed limit of technically 100kph applies.
- Notwithstanding the speed limit, road topography dictates a lesser travel speed. The actual travel speed (ie via multiple drive by's and visual timing assessment of vehicles) ranged between 60kph to 70kph.
- Sight distance to the east was measured at 90m (require 70m to AS2890.1)
- Sight distance to the west was measured at 80m (require 70m to AS2890.1)



Extract – Figure 3.2 Sight Distance Requirements at Access Driveways (AS2890.1)

### 3 DRIVEWAY ENTRANCE COMPLIANCE

The site inspection identified that the existing driveway access would require localised upgrade improvement works to facilitate bushfire truck entry/exit to the property. A bushfire truck (MRV size) template was used with AutoTURN PRO software to assess the extent of new pavement / fencing works necessary. The works required as shown in Figure 3.3 below are:

- Widen driveway to 11m width at Settlement Road
- Transition from 11m width to 5m width, over a 10m length.
- If a rural gate on boundary is to be installed, needs to have a 5m opening width.



**Figure 3.3 Turning Template Assessment of Works Required**

The existing internal driveway will require upgrade to provide a 4m gravel formation width. In addition, the internal driveway crosses a significant gully flow path which has a catchment area of 33Ha. Preliminary design assessment calculates that to provide a 1yr flood immunity, culverts required on the internal private driveway need to be 3 x 600 dia pipes.



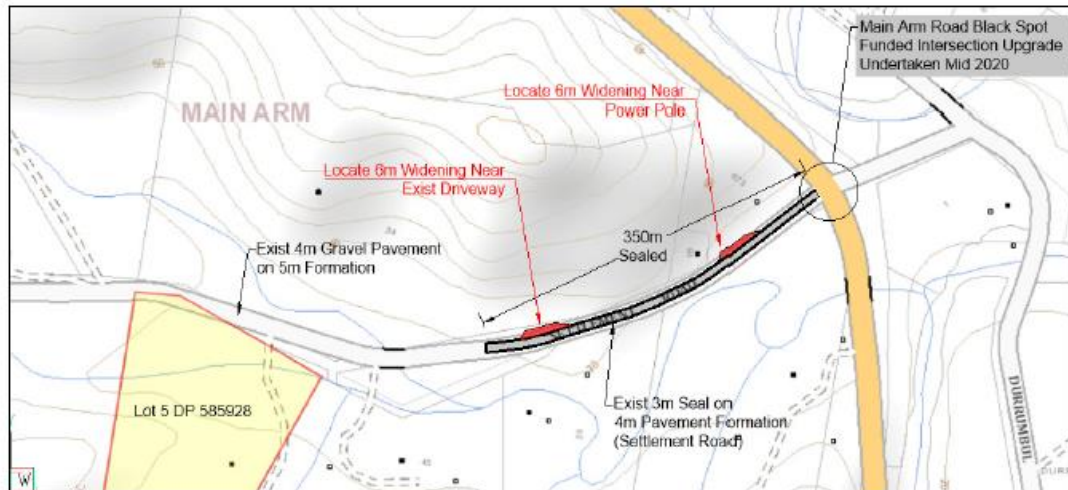
#### 4 OTHER ROAD MATTERS

The existing Settlement Road is less than the minimum public road geometric standard (ie 6m sealed pavement on 7m formation) that Byron Shire Council nominates for NEW SUBDIVISIONS as per the Northern Rivers Design Guideline. The ongoing management of existing roads of lesser geometric service standard is one to which Byron Shire Council manages in conjunction with the competing funding needs of the broader road network. To meet the incremental upgrade needs of the rural road network, Council has developed a Rural Roads Contribution Plan to which this development will be required to contribute.

The rural roads contribution contribution levy is \$16,700 per 3 bedroom dwelling as at end of year 2022.

#### 5 BUSHFIRE ACCESS STANDARD

Consideration has also been had as to the extent of localised upgrades of Settlement Road so as to improve passing bay opportunities between the planning proposal site and Main Arm Road. This is to accord with Planning for Bush Fire Protection (2019) which notes in Table 4.2.1 that '*consideration of the existing and proposed road networks*' to deal with evacuating residents and emergency services be had. It is thereby raised that by implementing passing bay opportunities ( which would facilitate a compliance with the minimum bushfire standard of passing bays at 200m distances), a net beneficial road outcome is able to be provided for the use of the wider community. Refer to *Figure 4 – Existing Settlement Road and Passing Bay Options*.



**Figure 4 – Existing Settlement Road and Passing Bay Options**

Preliminary design of the driveway access to the rear dual occupancy dwelling has been undertaken to demonstrate a functional fire trail access can be provided. Refer to *Drg No: Fire-01* as shown in **Appendix A – Driveway Fire Access Details**.

The length of the access is 320m and a passing bay can be provided at CH120, which is the location of the front dual occupancy dwelling. Gradient of the road will be less than 12% so thereby can be a gravel surface in accordance with Council policy. Sufficient room is available adjacent to the rear dual occupancy to install a 12m turning tee and dedicated fire tank as per PBFP2019 standard requirements.

## 5 COMPLIANCE SUMMARY OF PROPOSAL

This Traffic Safety Assessment has had regard to assessing the existing driveway and the planning proposals emergency access to Main Arm Road and confirms that:

- (i) Compliance with AS2890.1 driveway sight lines can be achieved;
- (ii) Bushfire truck access can be achieved via localised upgrade of the driveway entrance as per the works identified in Figure 3.3;
- (iii) Bushfire truck access and turning tee facility can be provided to the rear dual occupancy dwelling;
- (iii) A net benefit is able to be provided to the wider community via implementing the passing bay works within Settlement Road as identified in Figure 4.
- (iv) By installing 3 x 600dia culverts, the internal driveway will achieve a 1yr flood immunity.

## **APPENDIX A – Driveway Fire Access Details**

Drg No: Fire 01 – Driveway Access For Bushfire Compliance Check

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Dual Occupancy Planning Proposal





Station	Road CL Level (Gravel Pavement)	Surface Level	Cut / Fill	Datum R.L. 23.00	Grades	Vertical Curve Data
0.00	30.32	30.32	+0.00		-1.98%	I.P. 30.32
10.99	30.10	30.00	+0.10		-0.97%	I.P. 29.92
18.67	29.95	29.93	+0.01		0.44%	I.P. 29.71
20.00	29.92	29.92	+0.00			
40.00	29.73	29.71	+0.02			
41.38	29.71	29.71	+0.00			
58.47	29.79	29.32	+0.47			
60.00	29.79	29.35	+0.44			
70.00	29.84					
80.00	30.14	29.88	+0.25			
84.57	30.44	30.03	+0.41			
90.00	30.94					
100.00	32.00	32.00	+0.00			
106.04	32.38					
112.11	32.66	32.56	+0.10			
116.04	32.74	32.80	-0.06			
120.00	32.75	32.80	-0.06			
122.31	32.71	32.73	-0.02			
126.04	32.59					
127.29	32.54	32.54	+0.00			
130.00	32.53					
131.82	32.53	32.40	+0.13			
140.00	32.65	32.50	+0.15			
147.02	32.90	32.78	+0.13			
150.00	33.05					
160.00	33.60	33.79	-0.19			
169.93	34.15	34.15	+0.00			
180.00	34.68	34.69	-0.01			
200.00	35.74	35.62	+0.11			
205.24	36.01	36.01	+0.00			
220.00	37.04	36.94	+0.09			
238.63	38.33	38.32	+0.01			
240.00	38.43	38.43	+0.00			
260.00	40.01	40.00	+0.01			
274.40	41.15	41.13	+0.02			
280.00	41.60	41.60	+0.00			
300.00	43.82	43.62	+0.21			
310.37	44.98	44.98	+0.00			
319.77	45.50	46.05	-0.55			

Scale Horizontal 1:1000 Vertical 1:200

4m Wide (Incl Shoulders) Gravel Driveway

1. The fire trail design is indicative only to demonstrate a compliant fire trail access is achievable. Final design location to be determined via lodgement of construction drawings in accordance with PBF2019 requirements.

Fire Turning Tee  
Dual Occupancy Dwelling

**SDS Civil Enterprises**  
A.B.N. 56 869 497 255  
461 Hinterland Way, Knockrow NSW  
m 0438 726 414 e peterw@sdscivil.com.au

**APPROVED NOTES**  
1. Verify and locate all dimensions and levels PRIOR to construction.  
2. Ensure DPO requirements are made to local council.  
3. Services located on underground.  
4. Drawing may not be printed or used by others without the written consent of SDS Civil Enterprises.  
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Rev	Date	Amendment
A		
B		
C		
D		

**SCALE**  
Not Applicable

PROJECT	ADDRESS	DATE
Dwelling Planning Approval	55 Settlement Road MAIN ARM NSW 2482	May 2024
CLIENT	Lot 5 DP585928	PLANNING PURPOSE
Planners North		Planning Approval

**DRAWING DETAILS**  
Driveway Access for Fire Truck Compliance Check

APPROVED BY	DATE	DRAWING NUMBER
<i>Peter Williams</i> Mr P Williams B.Eng (Civil)		Fire - 01

## APPENDIX B: Gateway Determination

## Gateway Determination

*Planning proposal (Department Ref: PP-2021-5766): to permit a dual occupancy (detached) with development consent at Lot 5 DP 585928, 55 Settlement Road, Main Arm.*

I, the Acting Director, Northern Region at the Department of Planning, Housing and Infrastructure, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Byron Local Environmental Plan 2014 to permit a dual occupancy (detached) with development consent at Lot 5 DP 585928, 55 Settlement Road, Main Arm should proceed subject to the following conditions:

The Council as planning proposal authority is authorised to exercise the functions of the local plan-making authority under section 3.36(2) of the Act subject to the following:

- (a) the planning proposal authority has satisfied all the conditions of the gateway determination;
- (b) the planning proposal is consistent with applicable directions of the Minister under section 9.1 of the Act or the Secretary has agreed that any inconsistencies are justified; and
- (c) there are no outstanding written objections from public authorities.

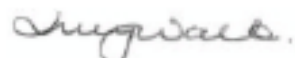
The LEP should be completed within 9 months of the Gateway determination.

### Gateway Conditions

1. Prior to agency and community consultation:
  - (a) the planning proposal must be updated to:
    - correct the reference to zone R2 on page 3;
    - include additional discussion of Aboriginal cultural heritage, including a recent AHIMS search;
    - reflect the required upgrades to the driveway access, internal driveway and Settlement Road outlined in the submitted Traffic Safety Assessment and Bushfire Assessment;
    - include additional information regarding flooding, such as a map that illustrates inundation of the site and further details regarding access (including the type of flood event that will affect the access as well as the duration that the road is inaccessible); and
    - address the outcomes and recommendations of the updated reports required by conditions 1(b) and 1(c).
  - (b) the following reports must be updated to include an assessment of both dwellings on the land:
    - Preliminary Site Contamination Report
    - On-Site Wastewater Management System Review
    - Traffic Safety Assessment
    - Land Use Conflict Risk Assessment

- Ecological Assessment
  - Bush Fire Assessment Report
- (c) the Ecological Assessment must be amended to address the required upgrades to the driveway access, internal driveway and Settlement Road outlined in the submitted Traffic Safety Assessment and Bushfire Assessment.
2. Public exhibition is required under section 3.34(2)(c) and clause 4 of Schedule 1 to the Act as follows:
- (a) the planning proposal is categorised as standard as described in the *Local Environmental Plan Making Guideline* (Department of Planning, Housing and Infrastructure , August 2023) and must be made publicly available for a minimum of 20 working days; and
- (b) the planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in *Local Environmental Plan Making Guideline* (Department of Planning, Housing and Infrastructure , August 2023).
3. Consultation is required with the following public authorities and government agencies under section 3.34(2)(d) of the Act and/or to comply with the requirements of applicable directions of the Minister under section 9 of the Act:
- NSW Rural Fire Service
  - NSW State Emergency Service
  - Tweed Byron Local Aboriginal Land Council
  - Arakwal Corporation
- Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material via the NSW Planning Portal, where possible, and given at least 30 working days to comment on the proposal.
4. A public hearing is not required to be held into the matter by any person or body under section 3.34(2)(e) of the Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

Dated 18 January 2024



**Lucy Walker**  
A/Director, Northern Region  
Local and Regional Planning  
Department of Planning, Housing and  
Infrastructure

**Delegate of the Minister for Planning and  
Public Spaces**

PP-2021-5766 (IRF23/3162)



## APPENDIX C: Turning Head Requirements

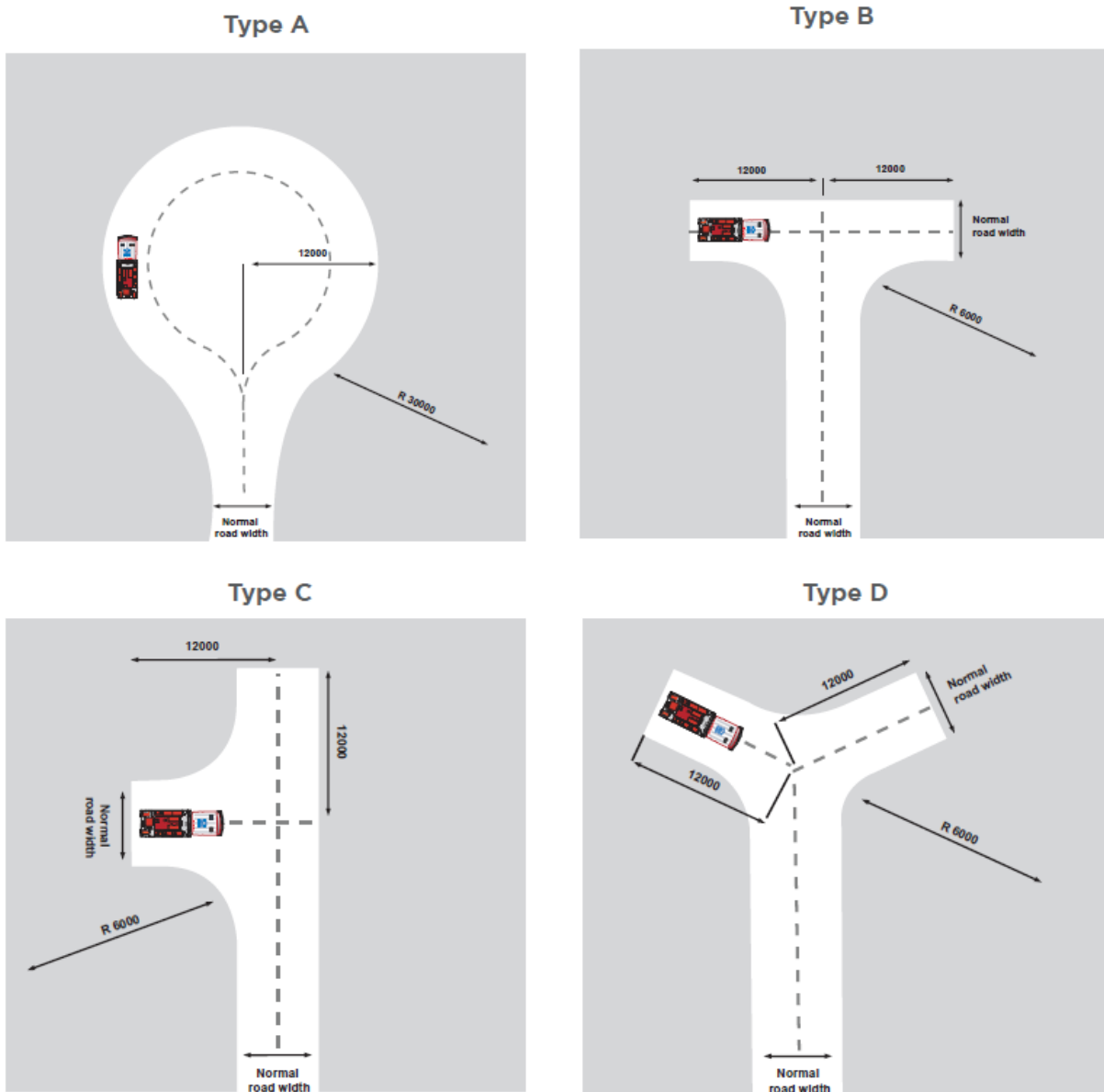
### A3.3 Vehicle turning head requirements

Dead ends that are longer than 200m must be provided with a turning head area that avoids multipoint turns. "No parking" signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2. Where multipoint turning is proposed the NSW RFS will consider the following options:

**Figure A3.3**

Multipoint turning options.



## APPENDIX D: Asset Protection Zone Requirements - Appendix 4 PBP 2019

# APPENDIX 4

## ASSET PROTECTION ZONE REQUIREMENTS

In combination with other BPMs, a bush fire hazard can be reduced by implementing simple steps to reduce vegetation levels. This can be done by designing and managing landscaping to implement an APZ around the property.

Careful attention should be paid to species selection, their location relative to their flammability, minimising continuity of vegetation (horizontally and vertically), and ongoing maintenance to remove flammable fuels (leaf litter, twigs and debris).

This Appendix sets the standards which need to be met within an APZ.

### A4.1 Asset Protection Zones

An APZ is a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bush fire hazard.

For a complete guide to APZs and landscaping, download the NSW RFS document *Standards for Asset Protection Zones* at the NSW RFS Website [www.rfs.nsw.gov.au](http://www.rfs.nsw.gov.au).

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows for suppression of fire;
- an area from which backburning or hazard reduction can 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.

Bush fire fuels should be minimised within an APZ. This is so that the vegetation within the zone does not provide a path for the spread of fire to the building, either from the ground level or through the tree canopy.

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

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

The methodology for calculating the required APZ distance is contained within Appendix 1. The width of the APZ required will depend upon the development type and bush fire threat. APZs for new development are set out within Chapters 5, 6 and 7 of this document.

In forest vegetation, the APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).



#### A4.1.1 Inner Protection Areas (IPAs)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defensible space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well maintained gardens.

When establishing and maintaining an IPA the following requirements apply:

##### Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building;
- lower limbs should be removed up to a height of 2m above the ground;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

##### Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

##### Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

#### A4.1.2 Outer Protection Areas (OPAs)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns; reducing the level of direct flame, radiant heat and ember attack on the IPA.

Because of the nature of an OPA, they are only applicable in forest vegetation.

When establishing and maintaining an OPA the following requirements apply:

##### Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

##### Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

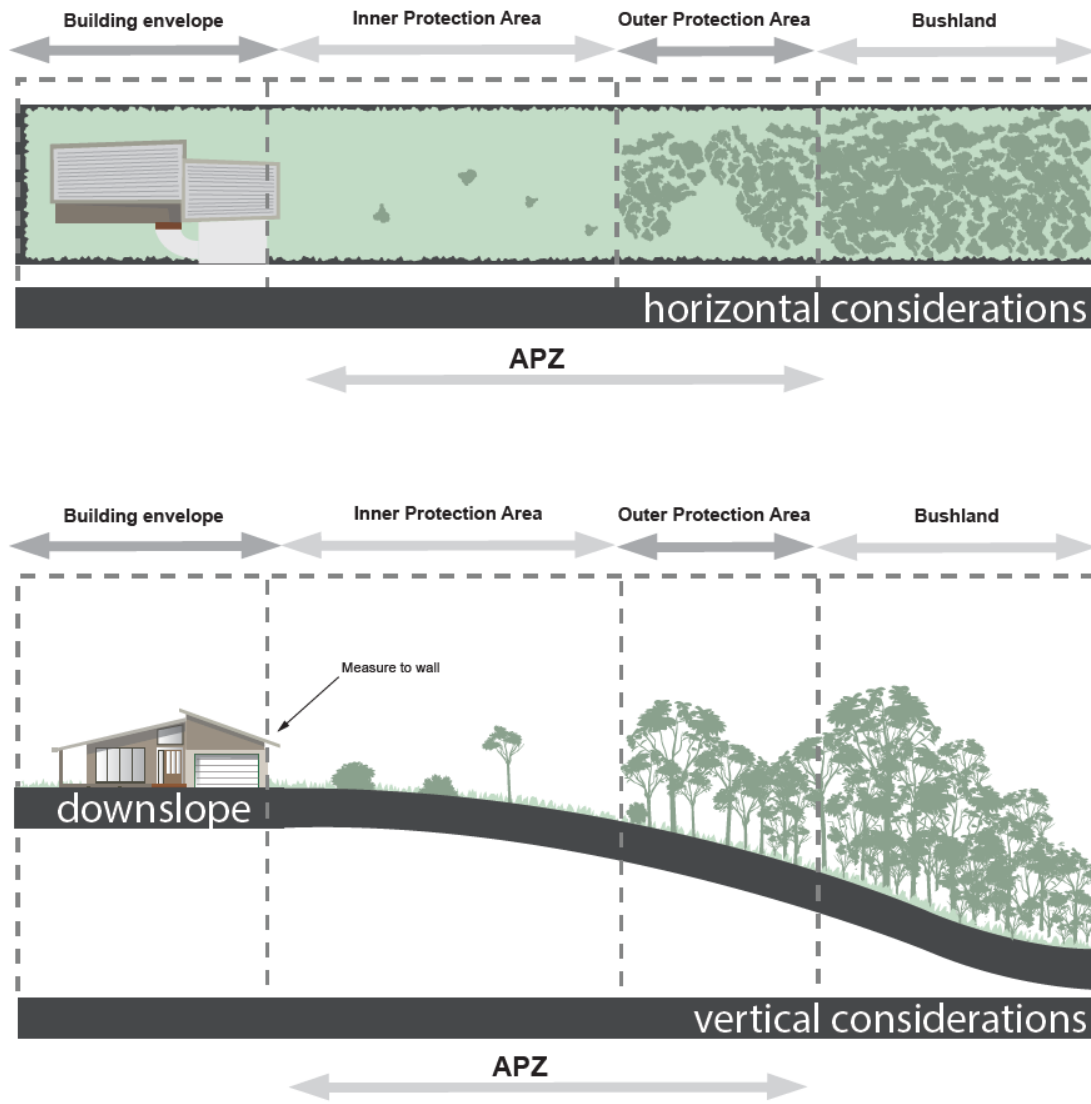
##### Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

**Figure A4.1**

Typical Inner and Outer Protection Areas.



## APPENDIX E: Standards for Asset Protection Zones (RFS 2005)





## STANDARDS FOR ASSET PROTECTION ZONES

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## 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.

3

## 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.

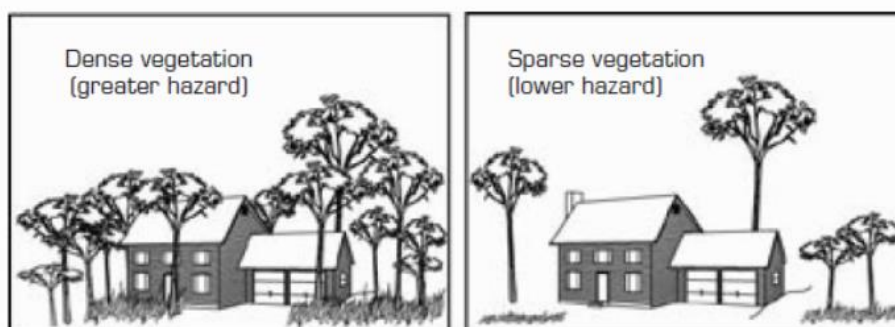
## STEP 1. DETERMINE IF AN APZ IS REQUIRED

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.

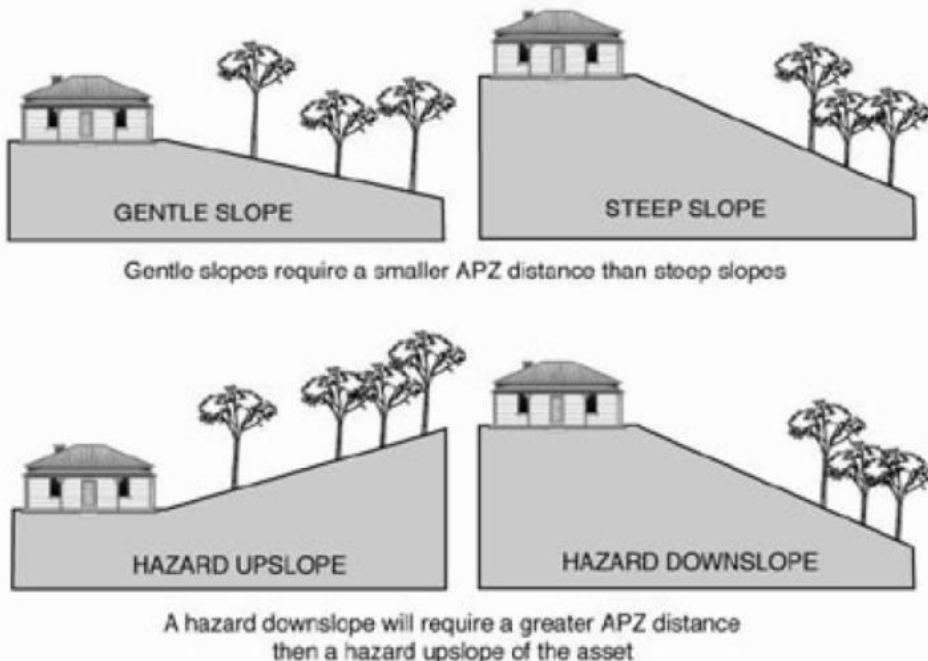
If you intend to burn off to reduce fuel levels on your property you may also need to obtain a Fire Permit through the RFS or NSW Fire Brigades. See the RFS document *Before You Light That Fire* for an explanation of when a permit is required.

## 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





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.

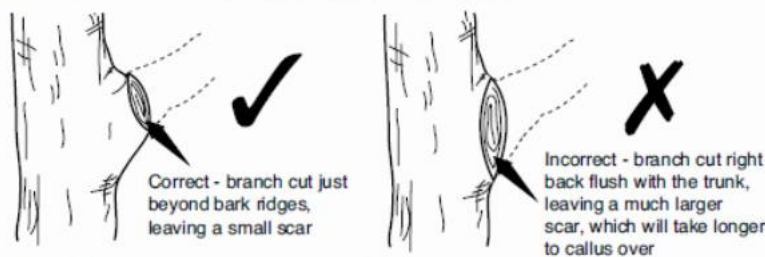
When choosing plants for removal, the following basic rules should be followed:

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/](http://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

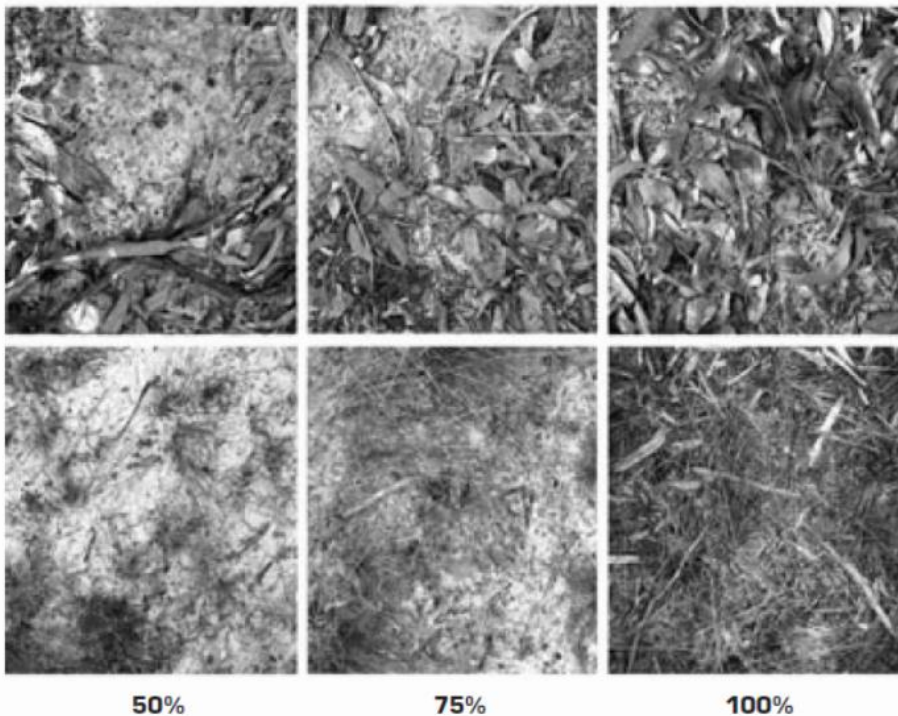
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

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

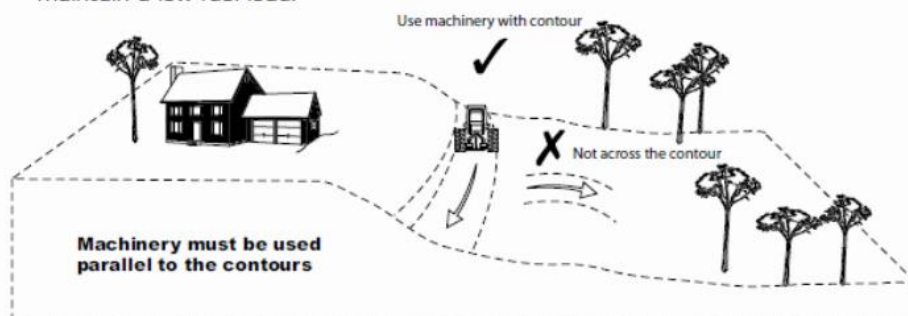
A small amount of ground cover can greatly improve soil stability and does not constitute a significant bush fire hazard. Ground cover includes any material which directly covers the soil surface such as vegetation, twigs, leaf litter, clippings or rocks. A permanent ground cover should be established (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.



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.





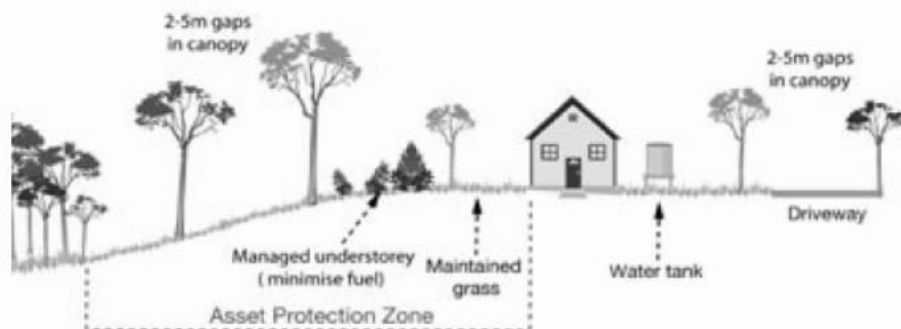
## STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

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*.

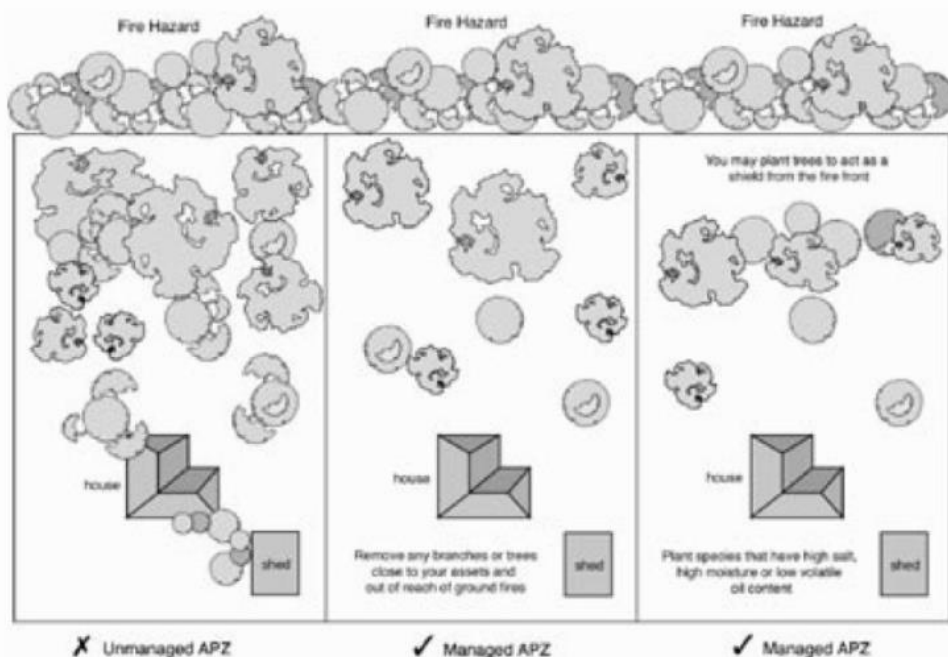
### WIND BREAKS

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.



## 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](http://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](http://www.rfs.nsw.gov.au).

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