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BUSHFIRE ASSESSMENT REPORT

SFPP INCLUDING PERFORMANCE SOLUTION FOR ACCESS

Lot 6 DP 259024

184 Possum Creek Road Possum Creek

Proposed Ecotourism Development, Dwelling & Farm Building/Office

Prepared for: Mike Tomkins

Prepared by: Peter Thornton
BPAD-L3 Accredited Practitioner

Date: 23 November 2021

Ref: 21/245

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DOCUMENT CONTROL				
Rev	**Date**	**Description**	**Prepared**	**Authorised**
-	29.09.2021	Bushfire Design Brief	Peter Thornton	Peter Thornton
A	19.11.2021	Draft Final report	Peter Thornton	Peter Thornton
B	23.11.2021	Attachment F included - FINAL	Peter Thornton	Peter Thornton

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1.0 EXECUTIVE SUMMARY

This report has been prepared to provide supporting information to enable the NSW Rural Fire Service to assess the proposed development at Lot 6 DP 259024, 184 Possum Creek Road Possum Creek being a Special Fire Protection Purpose (SFPP) against the requirements of Planning for Bushfire Protection 2019 and to accompany an application for a Bush Fire Safety Authority.

The development consists of a dwelling house, five one-bedroom ecotourist cabins, a building comprising parking / guest services / farm shed and a recreation building for guests which will also comprise a fire refuge and is accessed directly from Possum Creek Road.

The report establishes compliance with the acceptable solutions of Planning for Bushfire Protection 2019 except in regard to access for which a performance solution has been provided in Section 6. In this regard, a Bushfire Design Brief dated 29th September was prepared as a consultation document for consideration of the NSW Rural Fire Service with NSW RFS concurrence and advice received on the 2nd November 2021.

The following table provides a summary of the recommendations within this report and the method of assessment.

MEASURE	RECOMMENDATION	ASSESSMENT
Construction	Dwelling - BAL 19 AS 3959-2018 + Section 7.5 PBP 2019. Refuge Building - BAL 12.5 AS 3959-2018 + Section 7.5 PBP 2019. Farm Building/Office - BAL 29 AS 3959-2018 + Section 7.5 PBP 2019.	Acceptable Solution
APZ Required	See Recommendations 4, 5 & 6	Acceptable Solution
Water Supply	Dwelling & Refuge Building - 20,000 litre non-combustible tank required (each) + other conditions as stated in Section 6.1. Farm Building/Office - 10,000 litre non-combustible tank required + other conditions as stated in Section 6.1.	Acceptable Solution
Electricity Supply	Electricity supply to be in accordance with to comply with s6.8.3 and Table 6.8c of PBP2019	Acceptable Solution
Gas Supply	Gas supply to comply with s6.8.3 and Table 6.8c of PBP2019 and cl. 5.8 of AS3959-2018	Acceptable Solution
Landscape	Landscaping is to comply with Appendix 4 of PBP2019	Acceptable Solution
Access	To comply with s6.8.2 and Table 6.8b of PBP2019 except no alternative access road required.	Performance Solution
Emergency & Evacuation Planning	To be prepared in accordance with s6.8d of PBP2019	Acceptable Solution

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

1. The proposed dwelling is to be constructed to BAL 19 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019. Construction specification detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by an accredited building certifier.

2. The proposed refuge building is to be constructed to BAL 12.5 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019. Construction specification detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by an accredited building certifier.

3. The proposed farm building/office is to be constructed to BAL 29 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019. Construction specification detailing compliance shall be shown on the plans submitted with the application for a construction certificate and certified by an accredited building certifier.

4. At the commencement of works and in perpetuity a distance of 20m to the north and east, and 40m to the south, southwest and west of the proposed dwelling as an Inner Protection Area (IPA) is to be managed and maintained to prevent the spread of a fire towards the building 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).

5. At the commencement of works and in perpetuity a distance of 38m to the north, west and southwest; and 47m to the south, east and northeast of the proposed refuge building as an Inner Protection Area (IPA) is to be managed and maintained to prevent the spread of a fire towards the building 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).

6. At the commencement of works and in perpetuity a distance of 12m around the farm building/office as an Inner Protection Area (IPA) is to be managed and maintained to prevent the spread of a fire towards the building 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).

7. Fences and gates are to be made of either hardwood or non-combustible material. Where a fence or gate is constructed within 6m of the buildings, with exception to the eco-tourist cabins, it is to be made of non-combustible material only.

8. The internal property access road/s and crossing from Possum Creek Road to the dwelling and the refuge building are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection except no alternative access road is required.

The proposed rainforest fruit orchard must not be located within 10 metres either side of the property access road, reducing the potential impact of trees or obstructions falling across the road in these locations. The 10m width is not required to be managed as an asset protection zone however it must, in the worst case, not consist of a bushfire hazard other than a grassland hazard.

A compliant turning head at the refuge building and dwelling is also required in accordance with Section 3.3 and Figure 3.3 of PBP2019 (see ***attached*** Appendix C).

9. A 20,000 litre water supply and RFS connection to a non-combustible water tank is to be provided for both the proposed dwelling and refuge building to comply with Section 6.8.3 and Table 6.8c of PBP2019 including other conditions detailed in Section 7.1 of this report.

   It is recommended that a fire fighter minimum 5hp or 3kW petrol or diesel-powered pump be provided for both buildings 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.

10. A 10,000-litre water supply and RFS connection to a non-combustible water tank is to be provided for the farm shed/guest services to comply with Section 6.8.3 and Table 6.8c of PBP2019 including other conditions detailed in Section 7.1 of this report.

11. A Vegetation Management Plan (VMP) is to be prepared prior to release of the construction certification ensuring vegetation does not compromise the recommendations in this report relating to asset protection zones, buffer to property access roads as outlined and relating to the rainforest fruit plantation. Landscaping is to be undertaken in accordance with Appendix 4 of PBP2019.

12. Electricity and gas, if required, are to comply with Section 6.8.3 and Table 6.8c of PBP2019 and cl. 5.8 of AS3959-2018 as detailed in Section 7.2 and Section 7.3 of this report.

13. An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with s6.8d of PBP2019. In this regard a Bush Fire Emergency Management and Evacuation Plan is prepared consistent with:

    - The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;

    - Australian Standard AS 3745:2010 Planning for emergencies in facilities;

    - The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants;

- An Emergency Planning Committee is to be established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and
- Detailed plans of all emergency assembly areas including onsite and off-site arrangements as stated in AS 3745:2010 are to be clearly displayed, and an annually emergency evacuation is to be conducted.

Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.

2.0 INTRODUCTION

2.1 GENERAL

The proposed development at Lot 6 DP 259024, 184 Possum Creek Road Possum Creek is classified as a 'Special Fire Protection Purpose'. The report has been prepared against the requirements of s100B of the Rural Fires Act 1997 and to accompany an application for a Bush Fire Safety Authority.

The recommendations within this report address the aims and objectives of Planning for Bushfire Protection 2019 to reduce the risk of ignition of the buildings in a bushfire event. It is noted however that bushfire is a natural phenomenon and there can never be any guarantee that a building or occupants will not be adversely affected by bushfire.

2.2 SIGNIFICANT ENVIRONMENTAL FEATURES

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

- State Environmental Planning Policy (Koala Habitat Protection) 2019
- Biodiversity Conservation Act 2016 (NSW)
- Local Land Services Act 2013 (NSW)
- Land Management (Native Vegetation) Code 2017 (NSW)
- National Parks and Wildlife Act 1974 (NSW)
- Environmental Protection and Biodiversity Conservation Act 1999 (Cwlth)

This report 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.

2.3 REPORT DETAILS

Report Reference No.:	21/245
Property Address:	Lot 6 DP 259024, 184 Possum Creek Road Possum Creek
Local Government Area:	Byron Shire Council
Proposal:	See description in Section 3
Drawings:	Attached in Appendix B
Report Prepared By:	Peter Thornton MFireSafeEng
	Building Surveyor (MAIBS)
	BPAD – L3 Accredited Practitioner

3.0 PROPOSED DEVELOPMENT

The proposed development is located at Lot 6 DP 259024, 184 Possum Creek Road Possum Creek as shown in Figure 1 and Figure 2. The following description of the proposed development has been provided as follows –

The proposed development comprises: the construction of a new access driveway incorporating a vehicular crossing over Possum Creek; a dwelling house containing four (4) bedrooms; five (5) x one (1) bedroom ecotourist cabins; a building comprising parking / guest services / farm shed; a recreation building for guests which will also comprise a fire refuge; and site revegetation and rehabilitation.

Figure 1: Location of the subject property to the broader area. Red circle = ecotourism, Blue circle = residential dwelling, Yellow circle = Farm Shed/guest services.

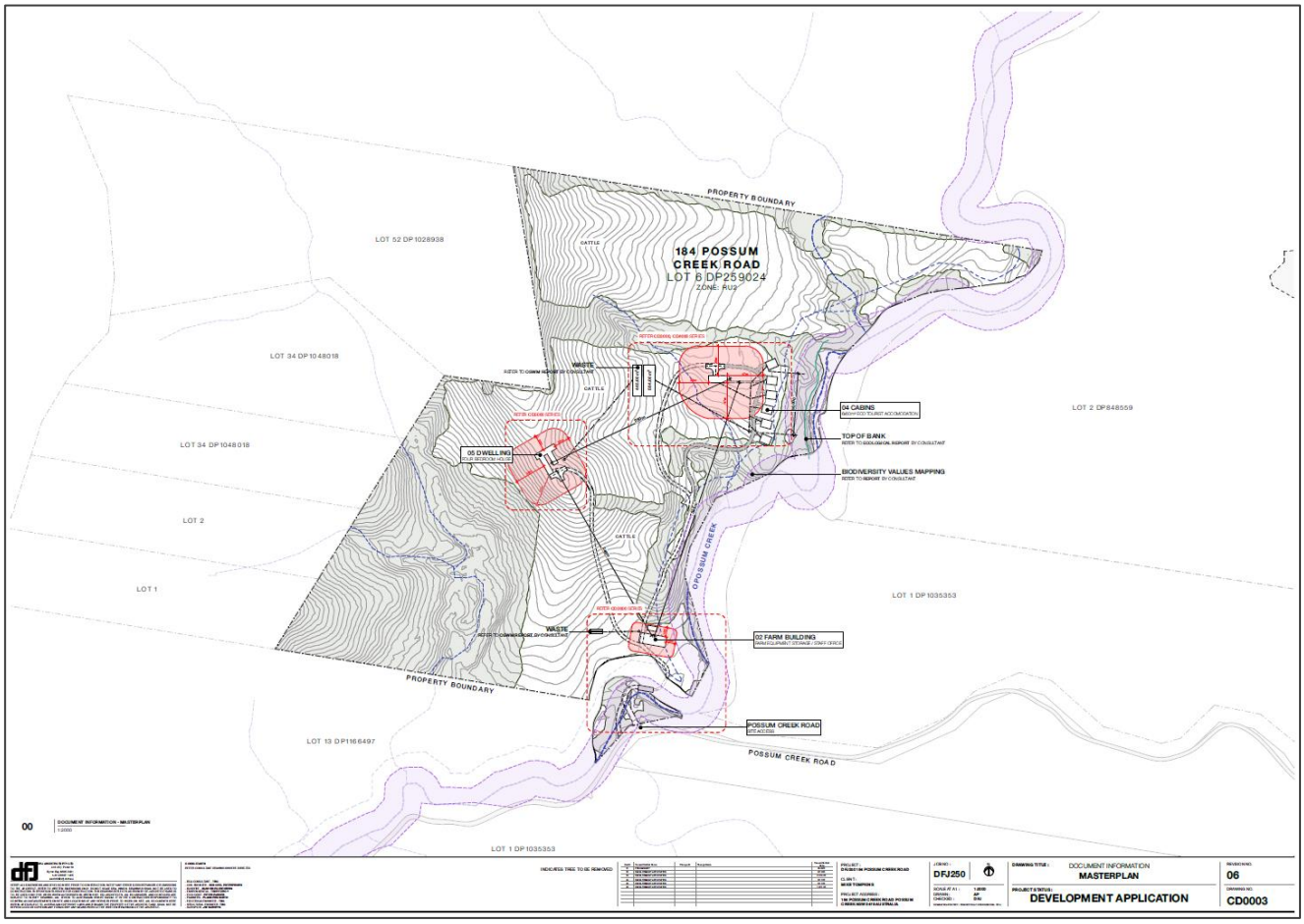

Figure 2: Proposed dwelling, farm shed/guest services and ecotourism refuge and cabins.

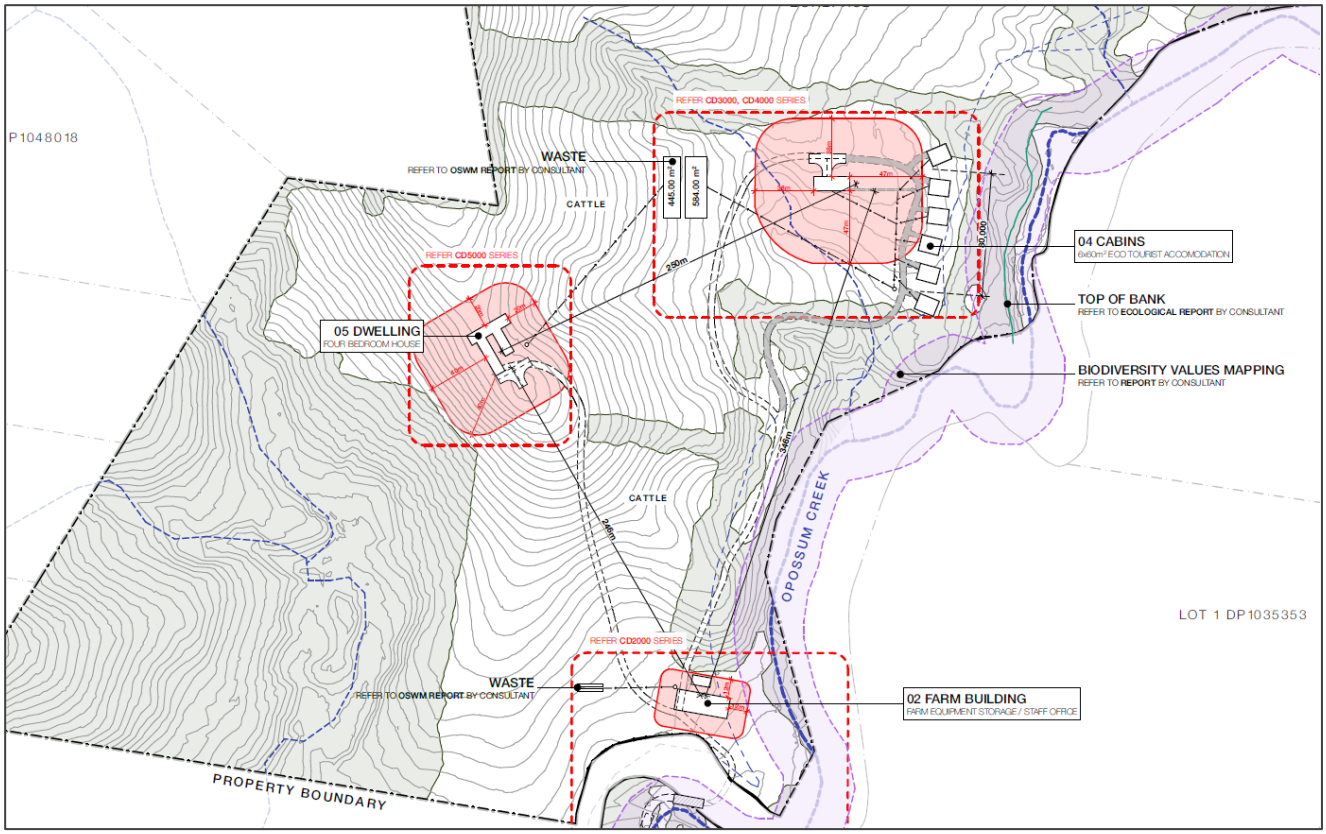

Figure 3: Site plan (close up)

4.0 BUSHFIRE THREAT ASSESSMENT

4.1 OVERVIEW

The bushfire threat assessment as required by Planning for Bushfire Protection 2019 comprises the identification of the vegetation formations and the effective slope of the land within the bushfire hazard considered most likely to influence the bushfire behaviour as required by Appendix 1 of PBP2019.

4.2 BUSHFIRE PRONE LAND MAP

The bushfire prone land mapping identifies the subject property as being bushfire prone for the purpose of assessing a Special Fire Protection Purpose development. The site inspection established the bushfire prone land mapping is not completely accurate in that –

- It does not acknowledge the rainforest vegetation to the southwest of the proposed dwelling and extending beyond the western side of the creek in the southwest precinct of the property.
- Remnant rainforest vegetation adjacent to the creek lines have not been mapped.
- The areas mapped as Category 1 vegetation is rainforest vegetation and is better classified as Category 2 vegetation.

Figure 4: Bushfire prone land mapping. *NSW Planning Portal*

5.0 ASSET PROTECTION ZONES & CONSTRUCTION STANDARDS

5.1 GENERAL

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 of approximately 3t/ha.

The development application being for an eco-tourism development permits the cabins to be sacrificed in a bushfire event due to the nature of an eco-tourism use however this is based on a having a safe refuge building that can be demonstrated as not receiving levels of radiant heat exceeding 10kW/m^2. In turn, the bushfire threat to the cabins is not considered in this report and the assessment will be focused on the remaining proposed buildings including the initial on-site refuge as required by PBP2019.

Figure 5 is a summary of the bushfire hazard assessment as described in the following sections of this report for each proposed use.

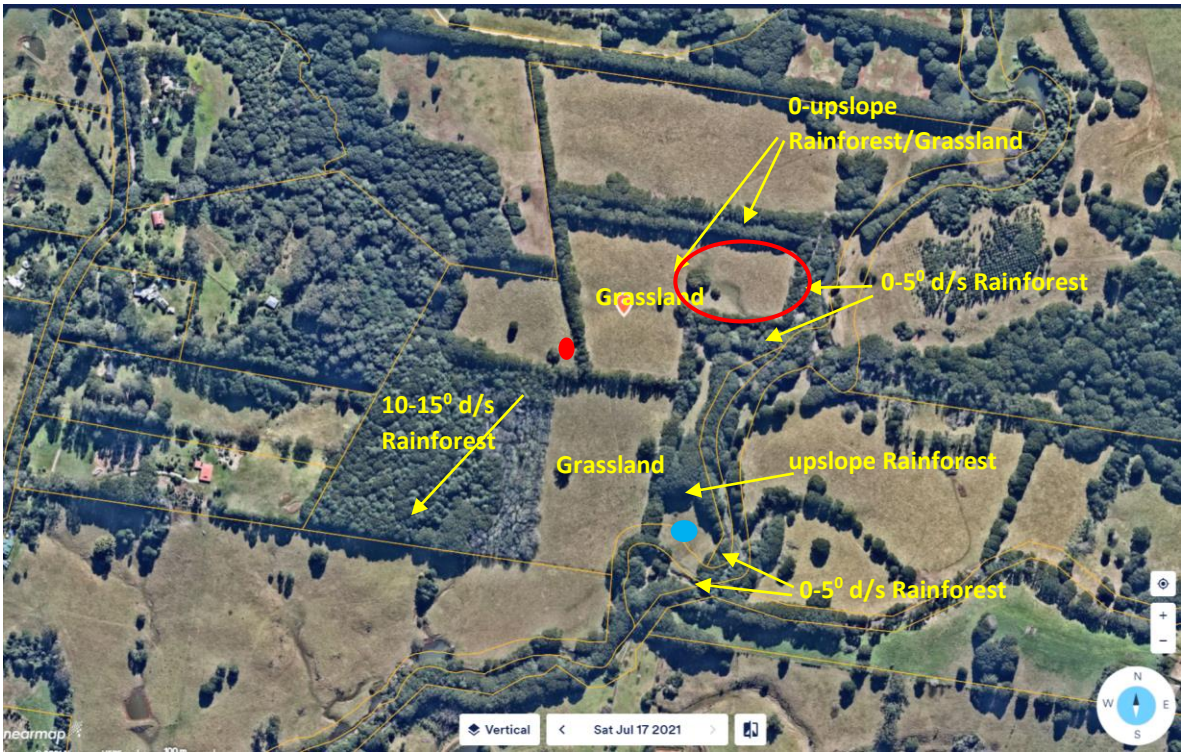

Figure 5: Summary of bushfire assessment

5.2 Eco-tourism - On-Site Evacuation Building – 10kW/m²

The applicant has advised the eco-tourism cabins will be sacrificial and will not be provided with a specific Bushfire Attack Level (BAL) AS 3959-2018 pursuant to Section 6.3.1 PBP2019 which states –

Due to its focus on the natural environment and creating minimal impact, the principles of ecotourism and the establishment of APZs for bush fire mitigation are often in conflict. All relevant parties must accept that there is an increase for the potential for loss of structures due to the competing objectives to reduce the environmental footprints of these types of developments.

The emphasis is therefore placed on emergency management, leaving early and non-operation on days of extreme or catastrophic fire weather. At least one building must be provided on site that can be used as a refuge for the maximum number of occupants on site. The building must have a minimum 10kW/m² APZ, be constructed to BAL-12.5 and have vehicular access. Cabins must be within a 100m walking distance of the refuge building.

The acceptable solutions only require asset protection zones and construction standards to apply to the 'refuge' building only, dwelling and the building comprising parking / guest services / farm shed use. The ecotourism component of the development will include an onsite initial evacuation 10kW/m² building with the satellite cabins located within 100m walking distance to the refuge building.

The cabins will not have a specific asset protection zone or bushfire construction standards pursuant to acceptable solutions of Table 6.8b PBP2019.

As outlined in Section 6.3.1 PBP2019, as the cabins do not require bushfire attack level (BAL) construction or asset protection zones, all parties "must accept that there is an increase for the potential loss of structures". In this regard the owner has provide correspondence (see ***attached*** in Appendix F) acknowledging the potential loss and subsequent potential insurance conflicts e.g. insurance may not be available.

The bushfire hazard impacting the refuge building is described in each direction as follows.

East

Remnant rainforest vegetation either side of the existing creek. The applicant also proposes to provide a rainforest vegetation buffer located around the sacrificial cabins as part of the ecological enhancement which compliments and enhances the specific ecotourism use. The buffer planting subsequently increases the width of the hazard on the western side of the creek however the fire runs are still not substantial having regard to bushfire risk to the refuge.

Whilst there is no proposed short fire run performance solutions quantifying the potential to reduce asset protection zones, this aspect has been assessed via the acceptable solutions of Table 6.8a PBP2019 to provide additional redundancy to the performance solution for access being greater than 200m in length when measured from the two-way public road.

The rainforest/camphor vegetation is located on a downslope of 0-5 degrees when the grade most likely to influence the bushfire rate of spread has been assessed. There are some minor slopes slighting exceeding 5 degrees downslope however most of the slope and in particular the slope closer to the APZ interface is within 5 degrees downslope.

Camphor laurel and rainforest vegetation to the east. Creek will have rainforest rehabilitation.

West

As shown on the site plan, the applicant is proposing to plant rainforest native fruits in an orchard setting on the western side of the dry gully to the west and southwest of the refuge building.

Planning for Bushfire Protection 2019 defines an orchard as being a non-bushfire hazard. However, for asset protection zone purposes the orchard has been classified as a potential rainforest hazard as further redundancy for the performance solution relating to the property access being greater than 200m in length when measured from the two-way public road. The assessment in turn addresses the scenario that an orchard may not be managed adequately in the future, becoming a rainforest bushfire hazard to the refuge.

South

To the south of the on-site evacuation refuge building is a combination of grassland and rainforest vegetation located on a 0–5-degree downslope.

North

To the north is a narrow corridor of predominantly camphor laurel located on flat and slightly upslope land with grazing land beyond. The canopy of the exotic vegetation is greater than 70% closed with negligible mid-storey and near surface vegetation. The hazard in turn is classified as being exotic vegetation with fuel loads consistent with rainforest vegetation pursuant to Table A1.9 of PBP2019.

Table No. 1 is a summary of the bushfire assessment for the proposed refuge building associated with sacrificial cabins located within 100m walking distance from the refuge building. Figure 6 shows the location of the recommended asset protection zones complying with Table A1.12.1 PBP2019, around the proposed on-site evacuation refuge building.

Table 1: Bushfire Assessment - On-Site Refuge Building – 10kW/m^2

ASPECT	SLOPE	VEGETATION CLASS	APZ Table A1.12.1 PBP2019	Construction Standards AS 3959-2018 + PBP2019
South	0-5°	Rainforest	47m	BAL 12.5 AS 3959-2018 + s7.5 PBP2019.
West/southwest	Upslope	Rainforest	38m	BAL 12.5 AS 3959-2018 + s7.5 PBP2019.
East	0-5°	Rainforest	47m	BAL 12.5 AS 3959-2018 + s7.5 PBP2019.
North	Upslope	Rainforest	38m	BAL 12.5 AS 3959-2018 + s7.5 PBP2019.

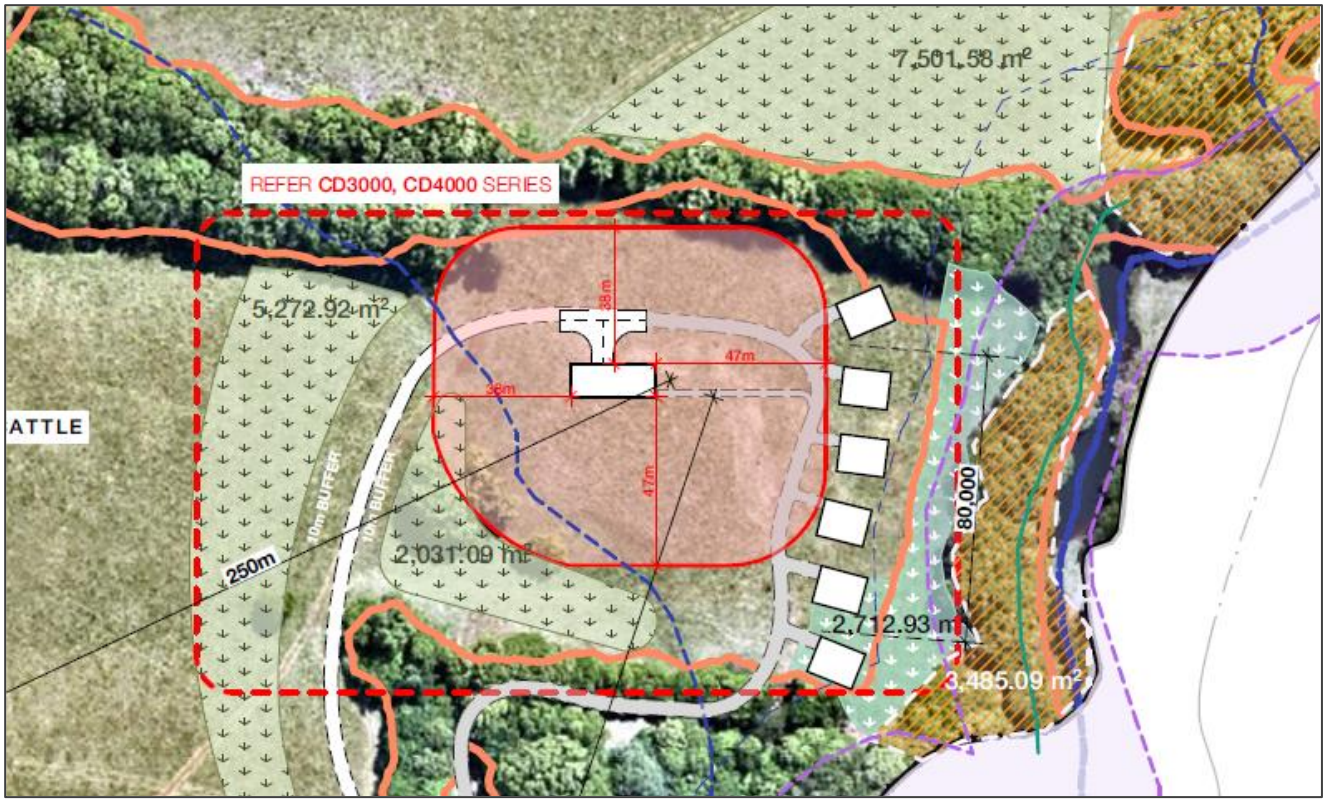

Figure 6: Location of bushfire hazard, refuge building with recommended APZs and sacrificial cabins.

5.3 Residential Dwelling – 29kW/m²

The bushfire hazard impacting the proposed dwelling is described in each direction as follows.

East

To the east is grazed land which is classified as a potential grassland hazard located on varying slopes between 0-10 degrees downslope. The applicant proposes a rainforest fruit tree orchard to further to the east and slightly beyond 100m from the dwelling. This orchard will not directly influence the forecast fire behaviour potentially impacting the proposed dwelling.

West

Directly to the west is grazed land which is classified as a potential grassland hazard located on varying slopes between 0-5 degrees downslope. Beyond the grassland hazard is rainforest vegetation approximately 100m from the dwelling which will not directly influence the fire behaviour of the fire front at the proposed APZ interface.

The rainforest vegetation is located on a short steep downslope adjacent to the backs of the creek at which point the rainforest vegetation is located on a steep upslope.

Southwest

To the southwest of the proposed dwelling is closed forest vegetation consisting of a combination of exotic camphor laurel and rainforest species. The vegetation is located on an effective slope of 10-15 degrees downslope over approximately 90m at which point the land transitions to a steep upslope on the southwestern side of the creek. Within the 90m downslope fire run there is a short run of a steeper downslope of 15-20 degrees however this section of slope is 50m from the proposed APZ interface.

The short depth of downslope and the location of the slope from the interface, together with the steep upslope occurring nearby on the southwest side of the creek will negate this steeper section of slope influencing the fire behaviour. This is assessment is considering the time and distance required for equilibrium rate of spread as a function of grade having regard to fire acceleration. The slope of 10-15 degrees over the final 50m of the fire run will most influence the fire behaviour at the APZ interface.

North

To the north is grazed land which is classified as a potential grassland hazard located on an upslope. Table No. 2 is a summary of the bushfire assessment for the proposed dwelling with the recommended asset protection zones shown in Figure 7.

The asset protection zone has been extended to 40m to the south and southwest/west of the dwelling to accommodate the methodology for the performance solution relating to the property access performance criteria.

The methodology used is to recommend the asset protection zone for the bushfire hazard (southwest) requiring the largest asset protection zone equivalent to the BAL 12.5 threshold of AS 3959-2018. In conjunction with the larger recommended asset protection zone, the construction standards have been recommended at an increased Bushfire Attack Level (BAL) required by Table A1.12.6 PBP2019.

Whilst Table A1.12.6 PBP2019 permits BAL 12.5 for the asset protection zones recommended, the construction standards will be increased to BAL 19 AS 3959-2018 + s7.5 PBP2019 to create additional redundancy into the construction and a higher level of amenity with the increased APZs should access be cut or it is too late to evacuate off-site.

Table 2: Bushfire Assessment – Residential Dwelling – 29kW/m²				
ASPECT	**SLOPE**	**VEGETATION CLASS**	**APZ Table A1.12.6 + Table 7.9 PBP2019**	**Construction Standards Table A1.12.6 PBP2019**
East	5-10°	Grassland	20m APZ proposed (Table 7.9 PBP2019)	BAL 12.5 AS 3959-2018 + s7.5 PBP2019. Recommended BAL 19 based on performance solution
West	0-5°	Grassland	40m APZ proposed – see access performance solution.	BAL 12.5 AS 3959-2018 + s7.5 PBP2019. Recommended BAL 19 based on performance solution
South & Southwest	10-15°	Rainforest	40m APZ proposed – see access performance solution.	BAL 12.5 AS 3959-2018 + s7.5 PBP2019. Recommended BAL 19 based on performance solution
North	Upslope	Grassland	20m APZ proposed (Table 7.9 PBP2019)	BAL 12.5 AS 3959-2018 + s7.5 PBP2019. Recommended BAL 19 based on performance solution

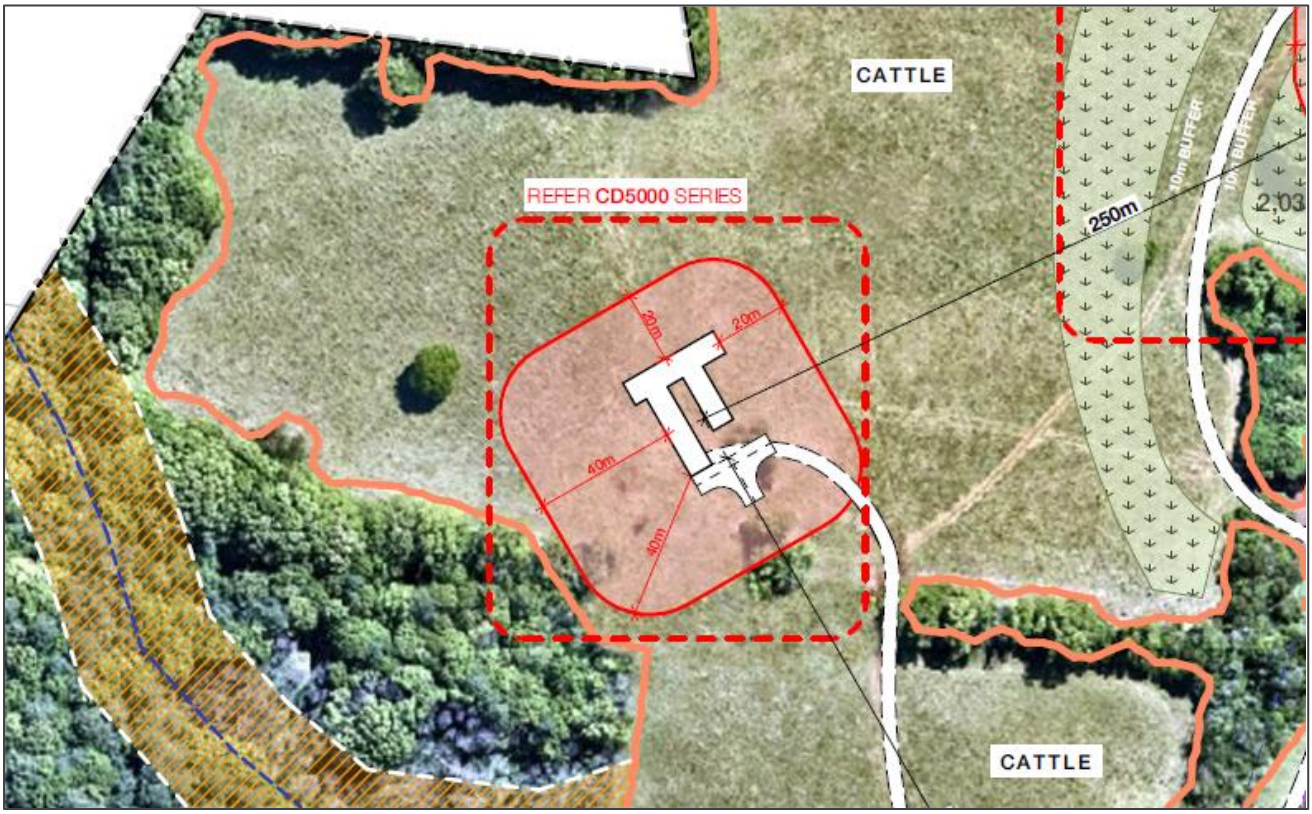

Figure 7: Location of proposed dwelling and the recommended asset protection zones

5.4 Farm Shed and Office – 29kW/m^2

Table No. 3 is a summary of the bushfire assessment for farm shed/guest services building which is located. The recommended asset protection zones are established to comply the objectives of Section 8.3.1 PBP2019 having regard to asset protection zones and construction standards.

The building will be provided with asset protection zones and construction standards consistent with BAL 29 AS 3959-2018 pursuant to Table A1.12.6 PBP2019. The plan shows a small, detached Class 10a building to the north of the services building. The structure is constructed of concrete blockwork and metal roof, located 6m from the primary building. With the construction, size of the Class 10a building and 6m separation, the structure will not require a specific Bushfire Attack Level

The proposed building will be potential impacted by a rainforest bushfire event with the hazard located on slopes varying from slight upslopes to the west and north to 0-5-degree downslopes to the south and east of the building.

Table 3: Bushfire Assessment – Farm Shed and Office – 29kW/m^2

ASPECT	SLOPE	VEGETATION CLASS	APZ Table A1.12.1 PBP2019	Construction Standards Table A1.12.6 PBP2019
South	0-5$^{o\ d/s}$	Rainforest	12m	BAL 29 AS 3959-2018 + s7.5 PBP2019.
West	Upslope	Rainforest	12m proposed	BAL 29 AS 3959-2018 + s7.5 PBP2019.
East	0-5$^{o\ d/s}$	Rainforest	12m	BAL 29 AS 3959-2018 + s7.5 PBP2019.
North	Upslope	Rainforest	12m proposed	BAL 29 AS 3959-2018 + s7.5 PBP2019.

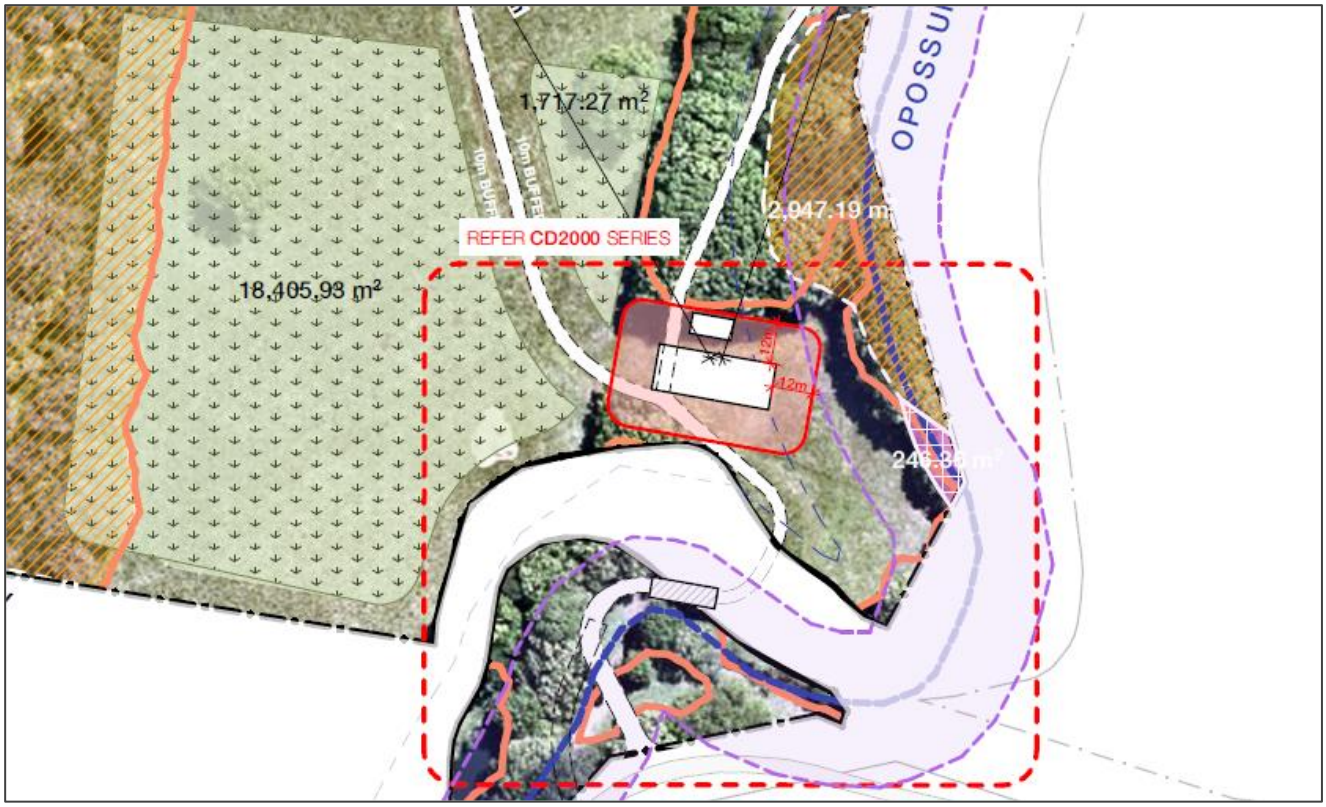

Figure 8: Farm/office building with a 12m APZ surrounding the building.

6.0 ACCESS

The applicant is proposing access directly from Possum Creek Road traversing over the creek to the majority land area of the subject property. The access will be direct to the farm shed/office/services at which point it forks off to the ecotourism development within the northeast precinct of the site and to the proposed dwelling to the west/northwest of the site as shown in Figure 10.

The property access road is recommended to fully comply with the requirements of Table 7.4a PBP2019 for the dwelling and Table 5.3b PBP2019 for the ecotourism development. However, a performance solution is provided for the access to the dwelling being restricted to one property access road greater than 200m from the public through road without an alternate egress, it being noted Possum Creek Road is a through road as shown in Figure 9.

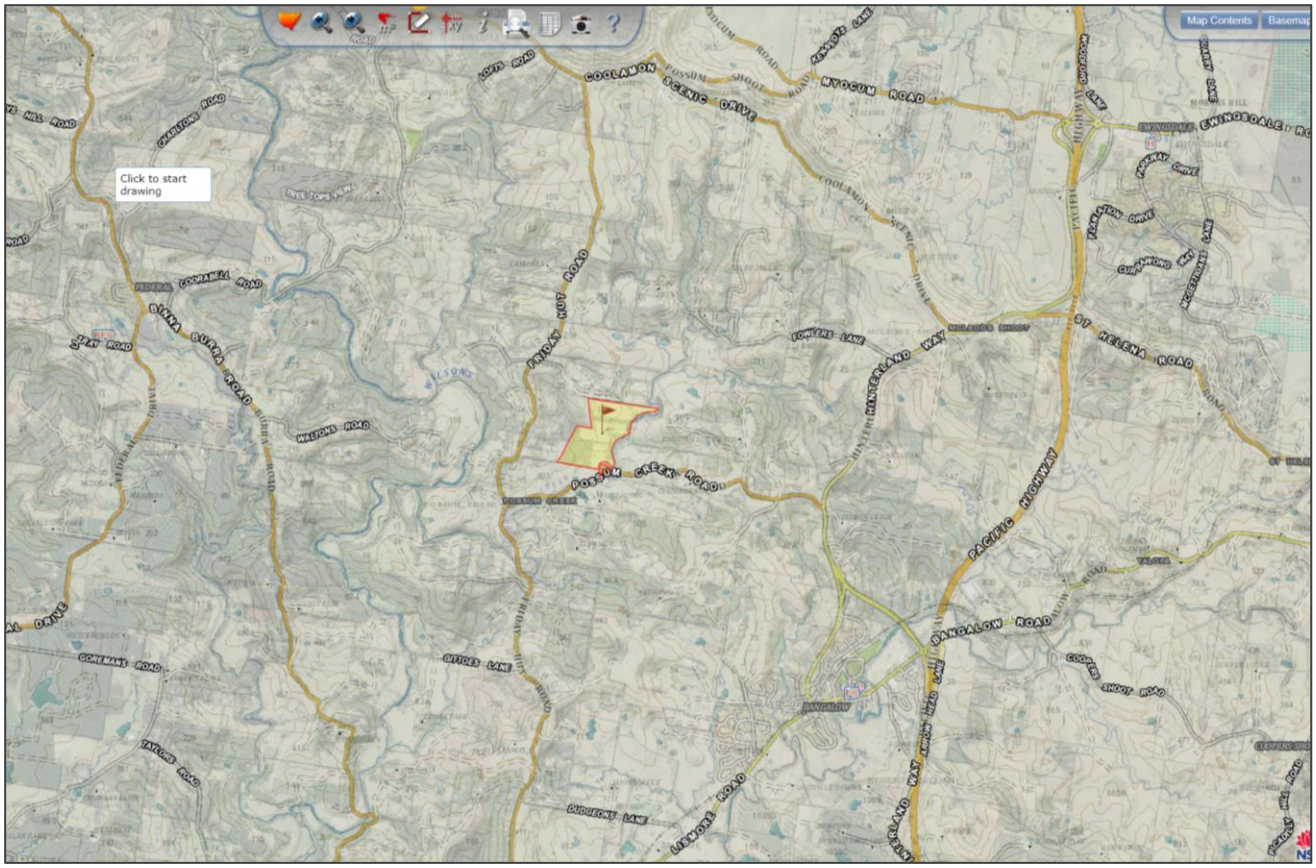

Figure 9: The subject property in the context of the existing public road network.

The performance solution demonstrates equivalence with the isolated subdivision development of Section 5.1.1 PBP2019 using the same objectives with additional measures provided as suitable redundancy. Further, the assessment considers the overall bushfire risk including the vegetation hazard classification, the hazard the property access road traverses through and the cleared and proposed development (ecotourism) affording other locations where on-site evacuation can occur early via an evacuation plan and procedure.

The performance solution will also include the property access road to the proposed on-site evacuation refuge building. There has been previously some uncertainty, due to the format of Table 5.3b PBP2019 as to whether the access requirements for ecotourism of Table 6.8b PBP2019 requiring compliance with the property access requirements of Table 5.3b PBP2019 and whether it also is intended to include the “General” access requirements of Table 5.3b, relating to the 200m length limitation for one access.

The performance solution for the dwelling will also extend to the same methodology for the refuge building concurrently given the methodology is similar.

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’.

The acceptable solution for the "General" property access requirements of Table 5.3b PBP2019 relating to the ecotourism development is:

'Dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end'

PERFORMANCE CRITERIA RELATING TO PROPERTY ACCESS

The relevant performance criteria for both the dwelling and ecotourism refuge in this regard is:

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

'firefighting vehicles are provided with safe, all-weather access to structures (Table 5.3b General access requirements).

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 a future building 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 behaviour; 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.

ASSUMPTIONS

The dwelling, once constructed, is compliant with the acceptable solutions of Planning for Bushfire Protection 2019 and the recommendations within this report. 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.

BUSHFIRE DESIGN BRIEF PROCESS

A Bushfire Design Brief dated 29th September 2021 was prepared by this office and submitted to the NSW Rural Fire Service as a consultation tool proposing the methodology to address the requirements for flame zone construction as required by Planning for Bushfire Protection 2019.

In response the NSW RFS offered the following response on the 2nd November 2021: -

- Minor bush fire hazard to the east and riparian corridor
- hazard is predominately exotic vegetation that is likely to be replaced with native species, upon more intense occupation of the land.
- proposed vegetation landscaping and forest fruit plantation should not provide fire pathways to refuge, residential buildings, access ways and pathways
- an access way needs to be constructed between the dwelling and the refuge building
- a Vegetation Management Plan (VMP) will be needed to ensure plantation and landscaping do not creep towards refuge, residential buildings, access roads and pathways

The report addresses each item with the summary of each corresponding point provided as follows –

- Noted
- Noted
- The forest fruit plantation will be managed consistent with a plantation and will subsequently have fuel reduction; however, the report recommends asset protection zones in accordance with the acceptable solutions of Planning for Bushfire Protection 2019 for each use rather than treating the plantation as a non-hazard.
- The access way proposes provides access from the dwelling to the refuge although it is noted the stand-alone performance solution for the dwelling demonstrates compliance with the performance solution and is consistent with isolated development requirements of PBP2019. The proposed property access road network however does provide an access way between the dwelling and the refuge if needed and will be activated by emergency planning and early triggers. The proposal is therefore consistent with the RFS advice.
- The VMP is to be prepared specifically for the 10m cleared area adjacent to the property access road leading to the dwelling and the plantation as outlined in the report. A recommendation has been included to address this point.

STAKEHOLDERS

- BCA Check Pty Ltd t/a Bushfire Certifiers – Bushfire Consultants
- NSW Rural Fire Service – Advice agency for referral and comment
- Byron Shire Council – Consent Authority
- Owner – Mike Tompkins
- Architects – DFJ Architects
- Consultant Ecologist – Peter Parker
- Consultant Town Planner – Kate Singleton (Planners North)
- Civil Engineer – Peter Williams

TRIAL DESIGN

The trail design will be as follows -

The internal property access road from Possum Creek Road to the dwelling and the refuge is shown with the white road in Figure 10. These sections of property access roads are to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection except no alternative access road. A compliant turning head will be required at refuge building and dwelling in accordance with Section 3.3 and Figure 3.3 of PBP2019.

The proposed rainforest fruit orchard must be located a minimum 10 metres either side of the property access road to reduce the potential impact of trees or obstructions falling across the road in these locations. It is noted the 10m width is not required to be managed as an asset protection zone however it must, in the worst case, not consist of a bushfire hazard other than a grassland hazard. Resulting from the bushfire design brief process, the NSW RFS have requested a Vegetation Management Plan (VMP) to support the recommendation.

The proposed dwelling will have an extended 40m Inner Protection Area to the south, west and southwest with the dwelling to be constructed to BAL 19 AS 3959-2018 + Section 7.5 PBP2019 construction.

The proposed on-site evacuation refuge building is to have a 38m Inner Protection Area to the north, west, southwest and 47m to the south, east and northeast with the refuge to be constructed to BAL 12.5 AS 3959-2018 + Section 7.5 PBP2019.

An accessible 20,000L static supply within a non-combustible tank and with a 65mm Storz fitting is to be provided within 4m of the turning area adjacent to both the refuge building and dwelling.

ANALYSIS OF PROPOSED INTERNAL PROPERTY 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.
It is noted, Possum Creek Road is a public through road providing egress options to the west and east via the existing public road network.

The analysis provides qualification and a comparative analysis demonstrating in the following heads of consideration for isolated development pursuant to s5.1.1 PBP2019. It is acknowledged this development is not a subdivision however the objectives are considered consistent. The following relevant heads of considerations and responses are provided -

Provide access to the adjacent hazard and for asset protection zone management.

The proposed property access roads will include a compliant turn around area within the recommended asset protection zones with coverage of the dwelling and refuge building. The property access road will pass by the farm shed/guest services building which will also be provided with an accessible static water supply.

As shown in Figure 10, the proposed access road (shaded white) will have turning bays adjacent to the water supply allowing access to the hazard and for asset protection zone management. The coverage of the supply will be required to cover the perimeter of the dwelling with the APZ located adjacent to the hazard and the coverage allowing adequate management of the asset protection zone with the recommendations of a firefighter pump and hose/s.

It is noted, the report specifically does not require the property access road shaded grey in Figure 10 accessing the cabins to be of bushfire specification due to additional ecological constraints and the amenity of the ecotourism development. The proposed bushfire access roads however will performance adequately as outlined commensurate to the remnant rainforest hazards and overall bushfire risk.

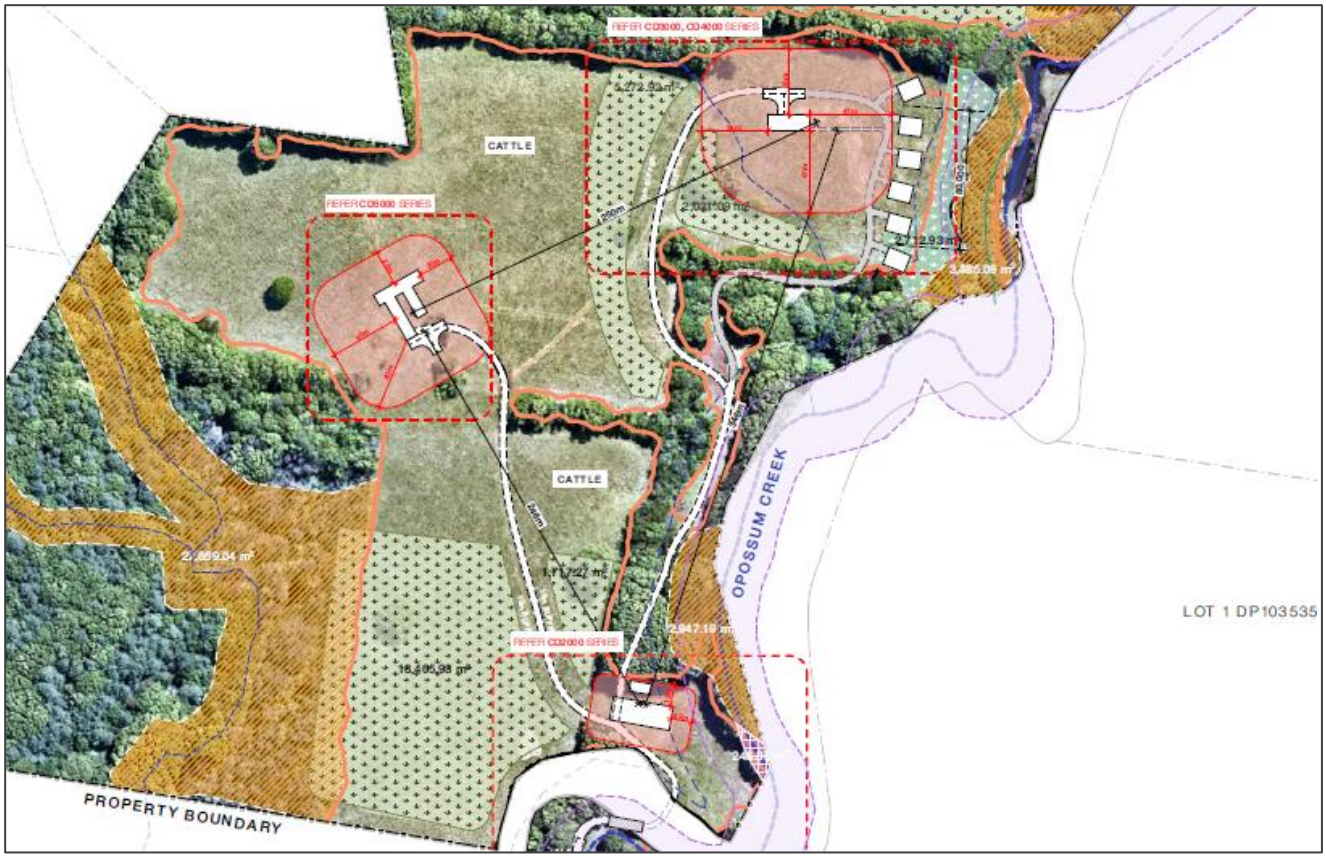

Figure 10: White shaded roads will comply with bushfire assess requirements.

Larger asset protection zones

Dwelling - The dwelling will have a recommended expanded 40m deep asset protection zone to the south and southwest with access provided for firefighting appliances provided with a turnaround area. The adjacent hazard is rainforest vegetation to the southwest on a 10–15-degree downslope with grassland to all other directions on slopes ranging from upslopes to 0–10-degree downslopes.

In this regard the deeming provision of PBP2019 requires 20m for BAL 12.5 however a 40m APZ has been recommended to the south and southwest. The asset protection zone recommended to the southwest is consistent with the BAL 12.5 threshold of Table A1.12.6 PBP2019.

The methodology provided for the performance solution incorporates large asset protection zones equivalent to the minimum required to achieve the BAL 12.5 threshold pursuant to Table A1.12.6 of Planning for Bushfire Protection 2019 with the dwelling to be constructed to BAL 19 AS 3959-2018 + Section 7.5 Planning for Bushfire Protection 2019 to provide additional redundancy to the constructions ability to withstand high level of radiant heat than forecast with the increased asset protection zones.

Whilst the dwelling is not to be considered as being entirely a safe refuge given the unpredictability of bushfire fire and lack of legislation to ensure ongoing maintenance of bushfire protection measures, the construction will increase the resilience of the dwelling and safety of occupants during

a bushfire event if evacuation has not been undertaken at an early stage. To provide additional mechanisms to increase the likelihood of early evacuation in extreme or catastrophic conditions, a recommendation has been made for an evacuation procedure to be prepared with offsite evacuation procedures and location.

The performance solution is comparable to s5.1.1 PBP2019 which states this approach will "create a safer area for occupants and firefighters remaining on site". If occupants and firefighters are to remain on site during the bushfire event, they will be able to exit the property safely once emergency services have established it is safe to do so post bushfire event.

Ecotourism - As outlined in Section 6.1 and 6.3 of Planning for Bushfire Protection 2019, certain SFPP developments such as eco-tourism developments with low occupancy levels, a resident/manager on site and construction to comply with AS 3959-2018 is assessed commensurate with the occupancy levels, assessed level of risk and occupant characteristics. In this regard the occupants are likely to be a cross section of the broader community within building from a physical and mental point of view e.g. not hospital or nursing home.

The specific variation requires a 10kW/m^2 on-site refuge building constructed to BAL 12.5 AS 3959-2018 in accordance with the acceptable solutions of Section 6 PBP2019 and Table A1.12.1 and Table A1.12.6 PBP209, as a reasonably safe area prior to off-site evacuation. This requirement is coupled with a requirement for evacuation procedures to provide adequate triggers to allow occupants to leave early.

The occupant numbers are low with only five (5) x one (1) bedroom cabins and a dwelling is proposed for an on-site manager. Whilst the cabins are sacrificial, consistent with PBP2019, the refuge will be fully accessible, provided with static water supply, pump/s and fire hose/s, evacuation planning and bushfire construction.

Whilst the property access road is greater than 200m in length, the refuge building will allow shelter for occupants and firefighters should egress/evacuation occur too late, allowing safe evacuation to occur post fire front.

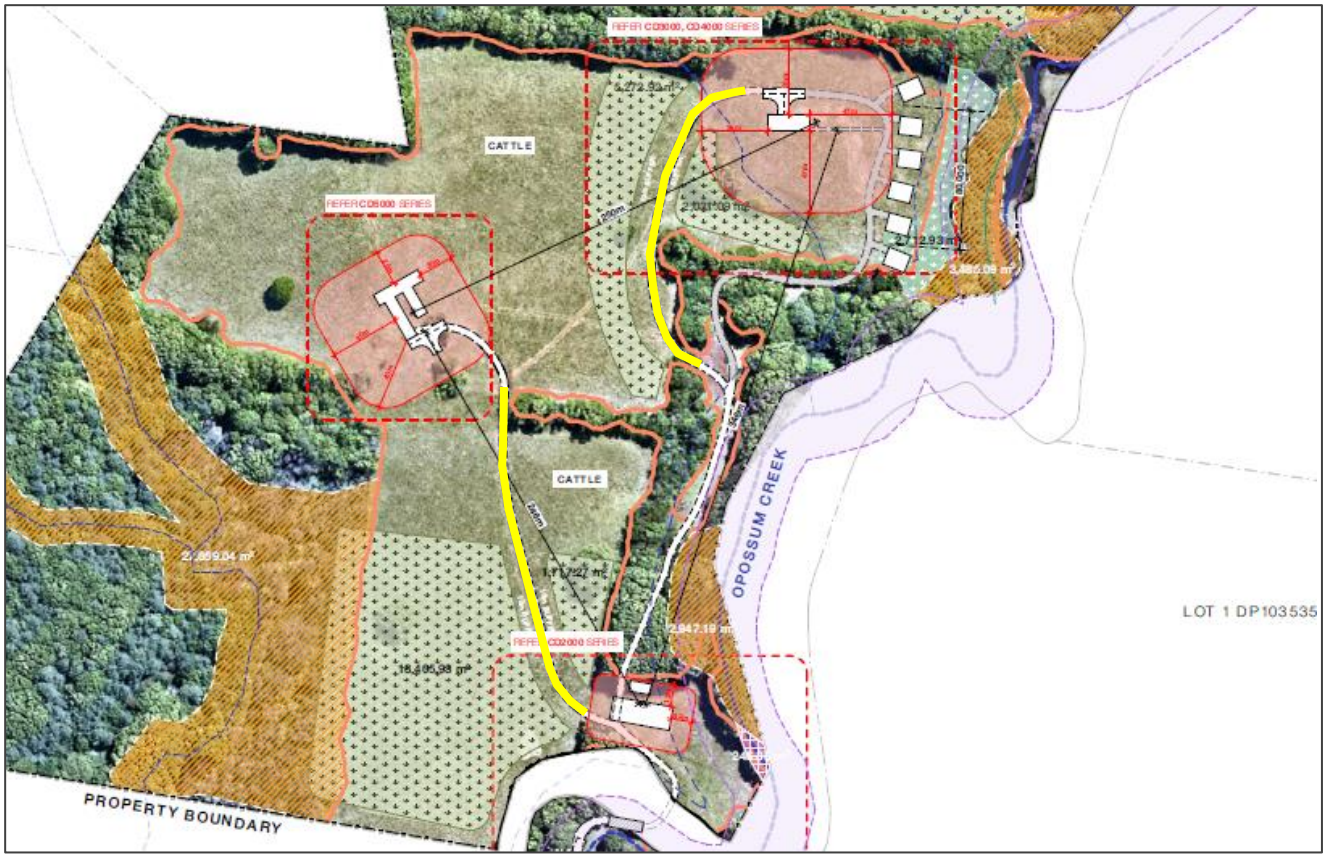

Figure 11: White shaded property access road to comply with bushfire access specification. Yellow lines are the section of property access road to the dwelling and refuge required to have 10m clearance to the proposed rainforest orchard.

Firefighting water supply and associate equipment

The report will recommend a 20,000 litre in water supply for firefighting purposes with a firefighter pump and associated hoses to the dwelling and ecotourism refuge. The water supply and hoses are provided to assist with preparations prior to the impact from the fire front and to extinguish embers prior and during the fire fronts impact. The water supply, pump and hoses will also be available post fire front impact to extinguish embers and any secondary fires that may occur.

Additional considerations to aid firefighting access

The report recommends 10 metres either side of the property access road to the dwelling and refuge building to be managed as grassland hazard (at worse) when passing through the proposed rainforest fruit orchard as shown in Figure 11, with no tree planting within this zone unless in accordance with Appendix 4 of Planning for Bushfire Protection 2019.

This will reduce the risk of this section of property access road being cut in a bushfire event by a fallen tree etc.

A summary of the additional measures is provided as followings –

- The proposed dwelling will have large APZs in accordance with BAL 12.5 and a construction level of BAL 19 AS 3959 2018 to increase the redundancy should occupants and firefighters need to shelter in the dwelling should the access road be blocked by fire or fallen trees until the fire passes. The dwelling however is not to be fully relied upon with evacuating early being the primary consideration and the evacuation plan.

- A Bush Fire Emergency Management and Evacuation Plan is required for the occupants to leave early if required so that firefighters are not required to enter the property for the purpose of saving life.

- The proposed property access roads have minimal bends with large sections being relatively flat and straight allowing for easier access to and from the dwelling and refuge.

- A fire fighter minimum 5hp or 3kW petrol or diesel-powered pump and hose and reel for firefighting will be recommended to be provided to the static 20,000L water supply at both the refuge and dwelling.

- A width of 10 metres either side of the property access road to the dwelling and refuge as shown in Figure 11 to be managed as grassland hazard (at worst) with no tree planting within this zone unless in accordance with Appendix 4 of Planning for Bushfire Protection 2019 except for the existing trees which may remain. A landscape plan is to be prepared reflecting the bushfire APZ and access management requirements and submitted with the development application.

- All other bushfire protection measures e.g. water, electricity etc. to comply with acceptable solutions.

Recommendations Specific to the Internal Property Access Road

The internal property access road is to comply with Section 7.4 and Table 7.4a of Planning for Bushfire Protection 2019 (including passing bays) except no alternative access road is required, the onsite access road is permitted to be greater than 200m from a public through road and a turning head is also to be provided in accordance with Section 3.3 and Figure 3.3 of PBP2019.

A width of 10 metres either side of the property access road to the dwelling and refuge as shown in Figure 10 to be managed as grassland hazard (at worst) with no tree planting within this zone unless in accordance with Appendix 4 of Planning for Bushfire Protection 2019 except for the existing trees which may remain.

The NSW RFS have advised a Vegetation Management Plan is to be prepared, reflecting the bushfire APZ and associated landscaping and the recommended access management requirements. This requirement has been included as a recommendation of the bushfire report.

7.0 WATER AND UTILITY SERVICES

7.1 WATER SERVICES

A 20,000-litre static water supply is required for both the proposed dwelling and refuge building and a 10,000-litre static water supply is required for the proposed farm building/office given access to a reticulated water system is not available.

The static water supplies (tanks) are to comply with Section 6.8.3 and Table 6.8c of PBP2019 as follows:

- reticulated water is to be provided to the development, where available, or a 10,000 litres minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available.
- all above-ground water service pipes external to the building are metal, including and up to any taps.
- a connection for firefighting purposes is located within the IPA or non-hazard side and away from the structure;
- a 65mm Storz outlet with a ball valve is fitted to the outlet; ball valve and pipes are adequate for water flow and are metal;
- supply pipes from tank to ball valve have the same bore size to ensure flow volume; underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank;
- a hardened ground surface for truck access is supplied within 4m of the access hole;
- above-ground tanks are manufactured from concrete or metal;
- raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959);
- unobstructed access is provided at all times;
- tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters;
- underground tanks are clearly marked,
- all exposed water pipes external to the building are metal, including any fittings;
- where pumps are provided, they are a minimum 5hp or 3kW petrol or diesel-powered pump, and are shielded against bush fire attack;
- Any hose and reel for firefighting connected to the pump shall be 19mm internal diameter;
- fire hose reels are constructed in accordance with AS/NZS 1221:1997 Fire hose reels, and installed in accordance with the relevant clauses of AS 2441:2005 Installation of fire hose reels.

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

New electrical transmission lines if required are to comply with Section 6.8.3 and Table 6.8c of PBP2019 as follows:

- where practicable, electrical transmission lines are underground;
- where overhead, electrical transmission lines are proposed as follow:

- 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 6.8.3 and Table 6.8c of PBP2019 should a gas service be considered:

- 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;
- if gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion;
- polymer-sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used; and
- above-ground gas service pipes external to the building are metal, including and up to any outlets.

Additionally, gas installations are to comply with Clause 5.8 of AS 3959-2018. External gas pipes and fittings above ground shall be of steel or copper construction having a minimum wall thickness in accordance with gas regulations or 0.9mm whichever is the greater. The metal pipe shall extend a minimum of 400mm within the building and 100mm below ground.

8.0 LANDSCAPING

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

It is recommended that landscaping is undertaken in accordance with Appendix 4 of PBP2019 (see attached Appendix D).

Fencing is to be constructed in accordance with Section 7.6 of PBP2019 with the following to apply:

- Fences and gates are to be made of either hardwood or non-combustible material. Where a fence or gate is constructed within 6m of a cabin/s it is to be made of non-combustible material only.

It is recommended that landscaping plans be assessed by the consent authority for compliance and must cross reference the VMP where applicable.

9.0 EMERGENCY AND EVACUATION PLANNING

Emergency and evacuation planning is a critical measure for a Special Fire Protection Purpose to provide a higher level of co-ordination and safety for the occupants in a bushfire event. It is extremely important that the emergency plan is constantly monitored and amended when required and that training of staff, participants and stakeholders is sustained at a high level.

An emergency evacuation procedure and detailed plans of all Emergency Assembly Areas (onsite and offsite) are to be prepared in accordance with Section 6.8.4 and Table 6.8d of PBP2019. In this regard a Bush Fire Emergency Management and Evacuation Plan is prepared consistent with:

- The NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan;

- Australian Standard AS 3745:2010 Planning for emergencies in facilities;

- The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants;

- An Emergency Planning Committee is to be established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual; and

- Detailed plans of all emergency assembly areas including on-site and off-site arrangements as stated in AS 3745:2010 are to be clearly displayed, and an annually emergency evacuation is to be conducted.

Note: A copy of the Bush Fire Emergency Management and Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.

10.0 CONCLUSION

This assessment demonstrates that the proposed eco-tourism development will be compliant with all aspects of *Planning for Bushfire Protection 2019* based on the recommendations contained in Section 1 of this report, and other considerations contained within the report.

A performance solution has been provided regarding access with concurrence received from the NSW Rural Fire Service via the bushfire design brief process. There are cabins shown to be potentially scarified in a bushfire event i.e. no specific construction level of asset protection zones, consistent with the acceptable solutions of Planning for Bushfire Protection 2019.

DISCLAIMER

This document has been prepared for the proposed eco-tourism and dwelling development 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. The report is not to be construed as providing protection to the sacrificial cabins and any financial loss to the development from adverse impact in a bushfire event.

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

NSW Rural Fire Service and Planning NSW (2019), *Planning for bushfire protection, A guide for councils planners fire authorities developers and homeowners.* Rural Fire Service NSW Australia.
Standards Australia, (2018), AS3959 *Construction of buildings in bushfire prone areas,* Australian Standards, Sydney.
National Fire Protection Association (2008) *The SFPE Handbook of Fire Protection Engineering 4th Edition 2008*, Quincy, Massachusetts.

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: NSW Rural Fire Service, email correspondence dated 02.11.2021

From: Alan Bawden <Alan.Bawden@rfs.nsw.gov.au>
Sent: Tuesday, 2 November 2021 11:32 AM
To: Peter Thornton <peter@bcacheck.com.au>
Subject: RFS pre DA advice: 184 Possum Creek Road Possum Creek - Bushfire Design Brief

Good morning Peter

The NSW RFS has received and reviewed the attached document.

In response the NSW RFS offers the following advice;-

- Minor bush fire hazard to the east and riparian corridor
- hazard is predominately exotic vegetation that is likely to be replaced with native species, upon more intense occupation of the land.
- proposed vegetation landscaping and forest fruit plantation should not provide fire pathways to refuge, residential buildings, access ways and pathways
- an access way needs to be constructed between the dwelling and the refuge building
- a VMP will be need to ensure plantation and landscaping do not creep towards refuge, residential buildings, access roads and pathways

Regards

Alan Bawden

Supervisor - Development Assessment and Planning

Planning and Environment Services (North)

NSW RURAL FIRE SERVICE

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Locked Bag 17 GRANVILLE NSW 2142

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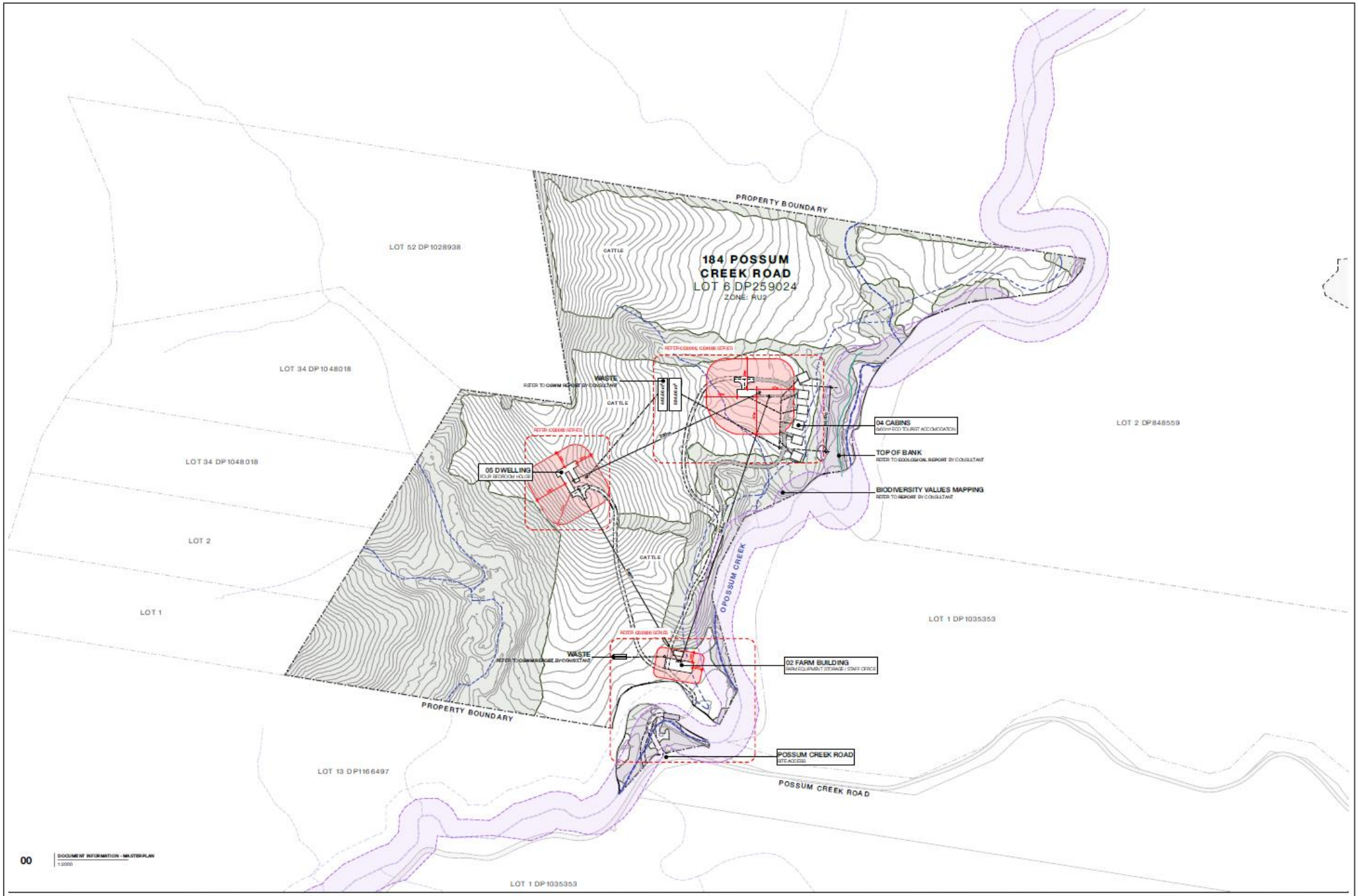
PREPARE.ACT.SURVIVE

APPENDIX B: Site plans



00 DOCUMENT INFORMATION - MASTERPLAN
1:2000

INDICATES TREE TO BE REMOVED

PROJECT: DFJ250184 POSSUM CREEK ROAD

CLIENT: MEGI TOMPKINS

PROJECT ADDRESS: 184 POSSUM CREEK ROAD POSSUM CREEK NSW 2479 AUSTRALIA

JOB NO.: DFJ250

SCALE AT A1: 1:2000
DRAWN: AP
CHECKED: DM

DRAWING TITLE: DOCUMENT INFORMATION
MASTERPLAN

PROJECT STATUS: DEVELOPMENT APPLICATION

REVISION NO. 06

DRAWING NO. CD0003

MAP KEY

BIODIVERSITY VALUES MAPPING: COUNCIL MAPPING

LANDSCAPE PLANTINGS: BETWEEN CABINS TO INTEGRATE WITH RIPARIAN CORRIDOR. AS PER DCP, 900 LOCAL NATIVE TREES/CABIN = 28,000m²

WEED CONTROL: REMOVAL OF WEEDS INCLUDING CAMPHOR LAUREL AND PRIVET ALONG CREEK LINES AND WITHIN BIODIVERSITY ZONES

RAINFOREST PLANTING: REVEGETATION OF RAINFOREST TREES WITHIN CLEARED AREAS UNDER BIODIVERSITY MAPPING

VEGETATION COMMUNITIES: RAINFOREST LOW (>90% CAMPHOR LAUREL)

PROPOSED NATIVE BUSH FRUIT PLANTATION: RAINFOREST

ASSET PROTECTION ZONES: REFER BUSHFIRE REPORT

1 DOCUMENT INFORMATION - VEGETATION MANAGEMENT PLAN
1:2000

INDICATES TREE TO BE REMOVED

PROJECT: DA2501/04 POSSUM CREEK ROAD
CLIENT: MOXI TOMPKINS
PROJECT ADDRESS: 184 POSSUM CREEK ROAD POSSUM CREEK NSW 2479 AUSTRALIA

JOB NO: DFJ250
SCALE AT A1: 1:2000
DRAWN: AP
CHECKED: DN

DRAWING TITLE: DOCUMENT INFORMATION
VEGETATION MANAGEMENT PLAN

PROJECT STATUS:
DEVELOPMENT APPLICATION

REVISION NO: 06
DRAWING NO: CD0004

APPENDIX C: Turning Head Requirements PBP 2019

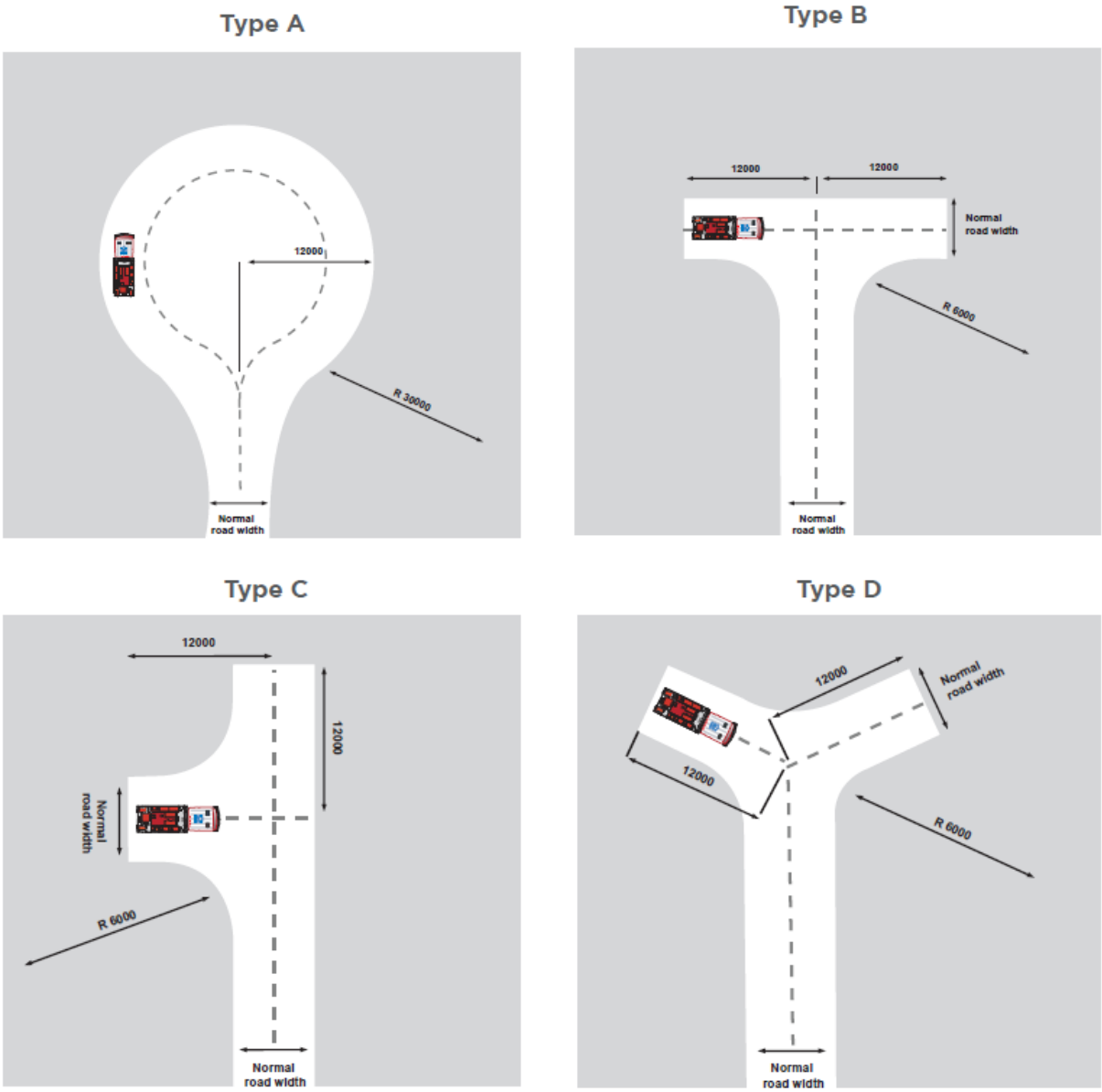
A3.3 Vehicle turning head requirements

Dead ends that are longer then 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: 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.

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 defendable 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.

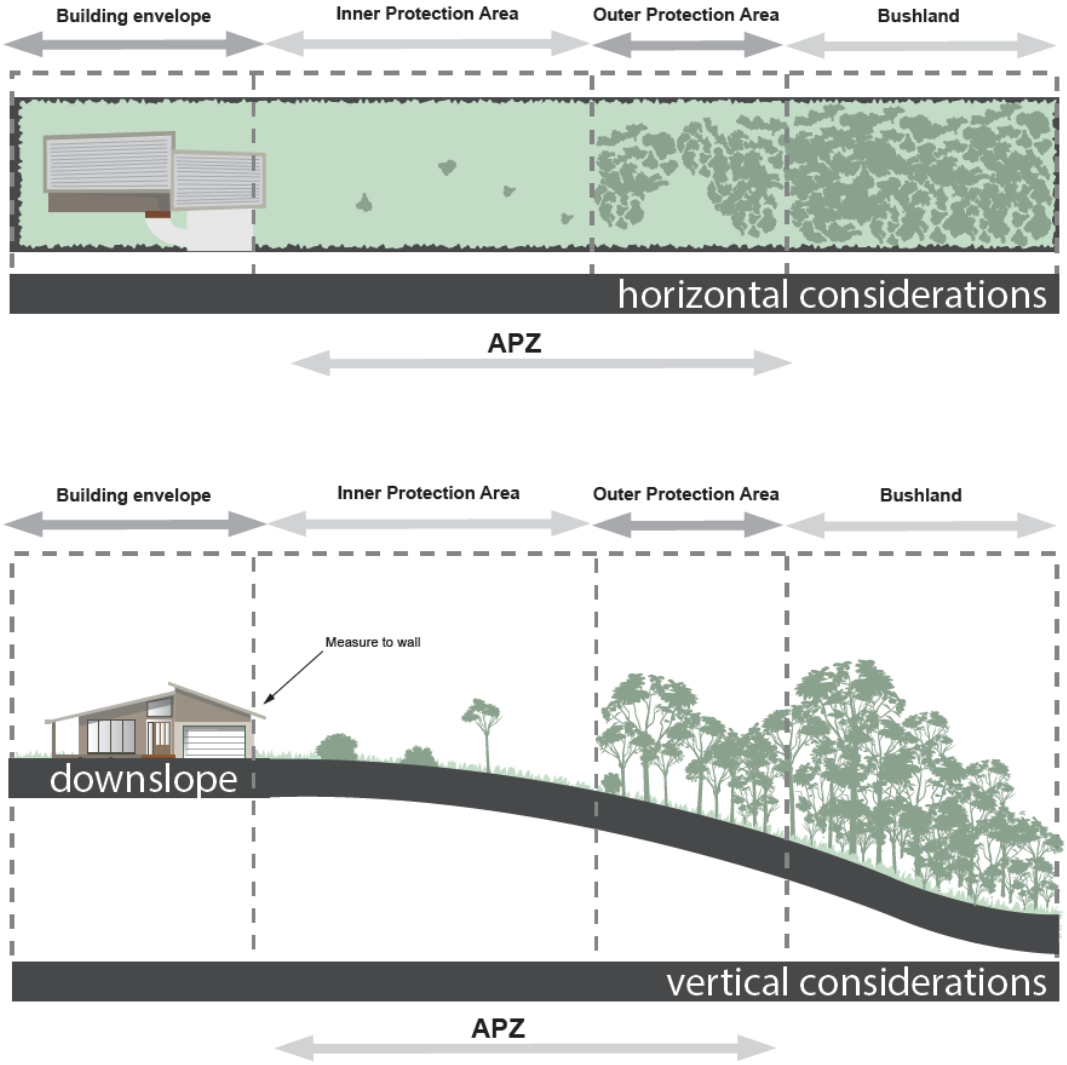
Grass

- 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

protection

NSW RURAL FIRE SERVICE

STANDARDS FOR ASSET PROTECTION ZONES

INTRODUCTION

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

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

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

WHAT IS AN ASSET PROTECTION ZONE?

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

An APZ provides:

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

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

WHAT WILL THE APZ DO?

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

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

WHERE SHOULD I PUT AN APZ?

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

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

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

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

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

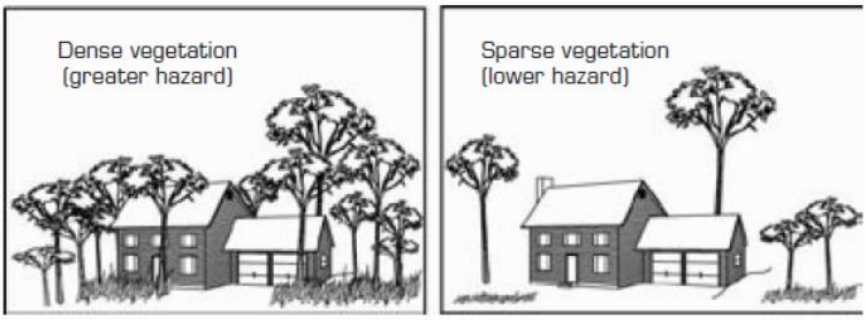
STEP 1. DETERMINE IF AN APZ IS REQUIRED

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

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

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

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



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

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

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

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

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

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

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

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

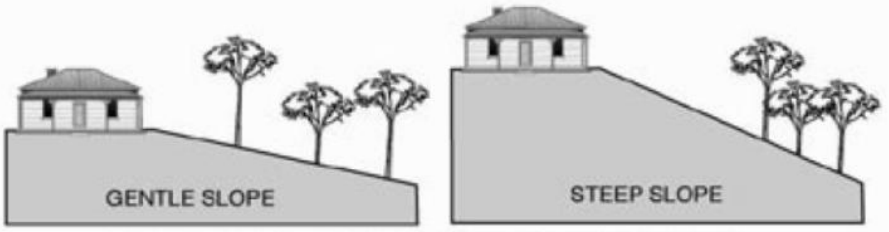
If your current development consent provides for an APZ, you do not need further approvals for works that are consistent with this consent.

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

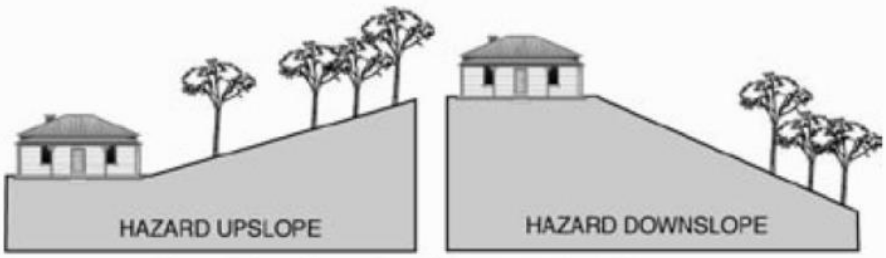
STEP 3. DETERMINE THE APZ WIDTH

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

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



Gentle slopes require a smaller APZ distance than steep slopes



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

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

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

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

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

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

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

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

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

Fuels can be controlled by:

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

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

2. mowing or grazing of grass
Grass needs to be kept short and, where possible, green.

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

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

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

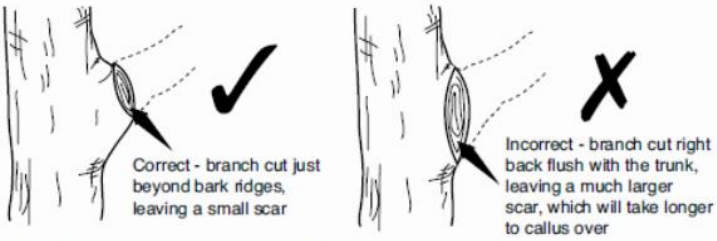
When choosing plants for removal, the following basic rules should be followed:

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

The removal of significant native species should be avoided.

Prune in acordance with the following standards:

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



There are three primary methods of pruning trees in APZs:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

STEP 5. TAKE MEASURES TO PREVENT SOIL EROSION

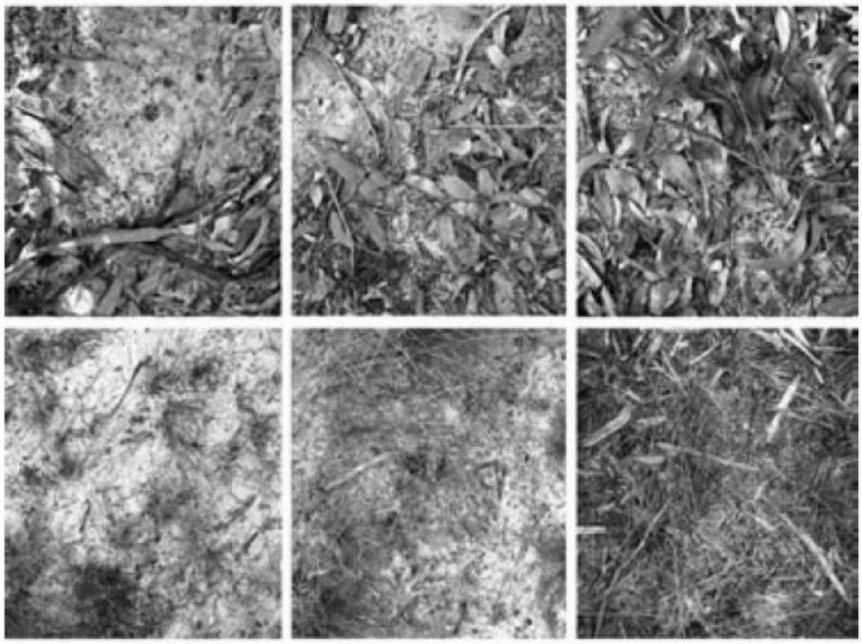
While the removal of fuel is necessary to reduce a bush fire hazard, you also need to consider soil stability, particularly on sloping areas.

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

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

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

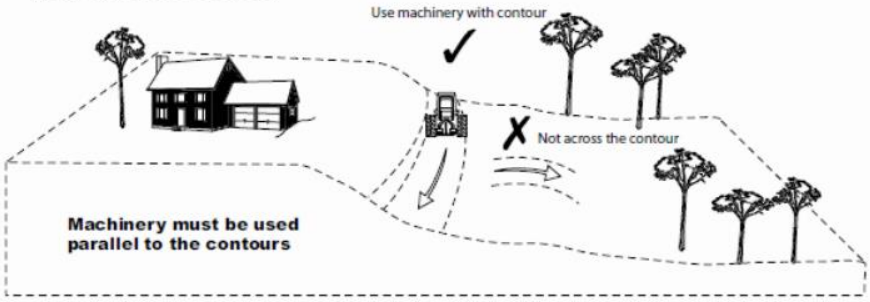
When using mechanical hazard reduction methods, you should retain a ground cover of at least 75% to prevent soil erosion. However, if your area is particularly susceptible to soil erosion, your Hazard Reduction Certificate may require that 90% ground cover be retained.



50% **75%** **100%**

Ground Cover

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

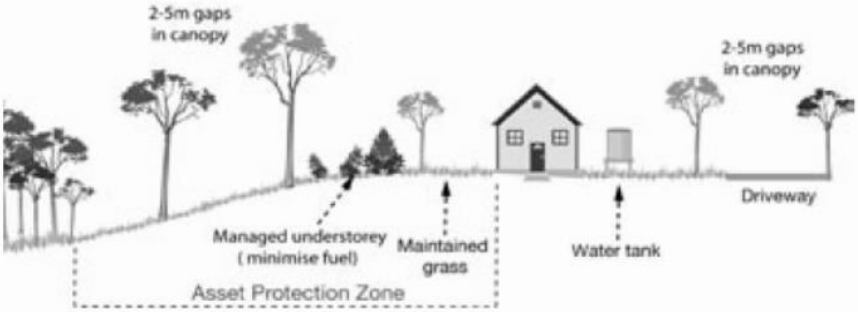


STEP 6. ONGOING MANAGEMENT AND LANDSCAPING

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

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

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



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

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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.*

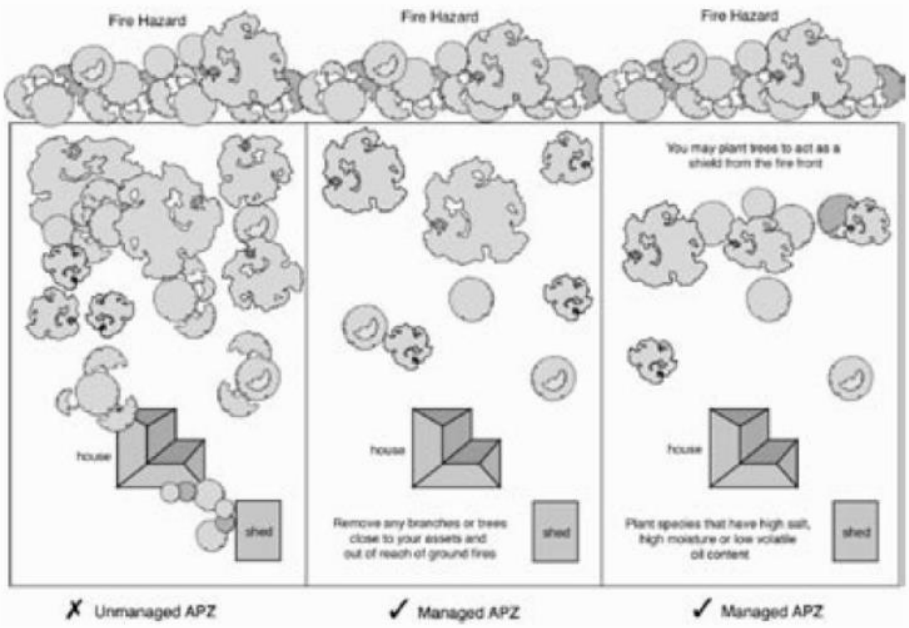
WIND BREAKS

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.**

- 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.**

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www.rfs.nsw.gov.au

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APPENDIX F: Owner's Statement – Sacrificial Cabins – Insurance

Catherine Mary Tomkins ATF Possum Creek Trust
PO Box 1087
Hamilton Central QLD 4007

Tuesday, 23 November 2021

Peter Thornton
Bushfire Certifiers
PO Box 375
Lennox Head NSW 2478

Dear Peter,

RE: 184 Possum Creek Road, Possum Creek NSW 2479

I am the property owner of 184 Possum Creek Road, Catherine Mary Tomkins as trustee for Possum Creek Trust.

I hereby acknowledge that by the nature of sacrificial eco-tourism development and subsequent bushfire classification. It is my responsibility as property owner to raise and understand insurance furthermore. (i.e unlikely to be insurable)

Regards,

C. Tomkins

Catherine Tomkins

DELIBERATELY BLANK