BUSHFIRE PLANNING AUSTRALIA

BUSHFIRE ASSESSMENT REPORT

Manufactured Home Estate

40-80 & 82 Chapmans Road, Tuncurry

Prepared for Allam MHE Developments No.2 Pty Ltd

Bushfire Planning Australia

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Reference: 2197 Tuncurry Stage 2

Prepared for Allams MHE Developments
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Disclaimer and Limitation

This report is prepared solely for Allam MHE Developments No.2 Pty Ltd (the 'Client') for the specific purposes of only for which it is supplied (the 'Purpose'). This report is not for the benefit of any other person; either directly or indirectly and is strictly limited to the purpose and the facts and matters stated in it and will not be used for any other application.

This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Document Status: 2197 - SFPP Manufactured Home Estate

Version	Status	Purpose	Author	Review Date
1	Draft	Draft for Review	Katrina Greville	10 November 2024
2	Draft	Draft for Client Review	Stuart Greville	26 November 2024
3	Final	Final for Submission	Stuart Greville	26 November 2024
4	Final	Updated with text changes	Stuart Greville	10 December 2024

Certification

As the author of this Bushfire Threat Assessment (BAR), I certify this BAR provides the detailed information required by the NSW Rural Fire Service under Clause 45 of the Rural Fires Regulation 2022 and Appendix 1 of Planning for Bushfire Protection 2019 for the purposes of an application for a bush fire safety authority under section 100B(4) of the Rural Fires Act 1997.

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

Stuart Greville

Accredited Bushfire Practitioner

BPAD-26202

Date: 10 December 2024

In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue.

Executive Summary

Bushfire Planning Australia (BPA) has been engaged by Allam MHE Developments No.2 Pty Ltd to undertake a Bushfire Assessment Report (BAR) for the proposed development of a manufactured home estate located at 40-80 & 82 Chapmans Road, Tuncurry, legally known as Lot 100 DP1286524 and Lot 11 DP615229.

A manufactured home estate is defined as a Special Fire Protection Purpose (SFPP) under the NSW Rural Fire Service (RFS) document Planning for Bushfire Protection 2019 (PBP 2019).

This BAR found the site was exposed to a medium bushfire hazard located primarily to the south of the site which is mapped as Category 1 Vegetation in the Mid Coast Council Bush Fire Prone Land Map.

This Bushfire Assessment Report (BAR) has been prepared in accordance with the submission requirements detailed in Appendix 2 of PBP 2019 and has demonstrated the proposed expansion satisfies the Aims and Objectives of PBP 2019, including the Specific Objectives for SFPP developments.

The following key recommendations have been designed to enable the proposed development to achieve Performance Criteria for SFPP developments detailed in Section 6.8 of PBP 2019:

1. The areas within the site identified as an Asset Protection Zone in **Figure 12** shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document *Standards for asset protection zones*;
2. All future buildings to be constructed on the proposed sites shall have due regard to the specific considerations given in the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;
3. Where the new dwellings are not required to be comply with the BCA, each dwelling shall be constructed in accordance with the relevant Bushfire Attack Level (BAL) identified on **Figure 12** and shown in **Table 4**. An updated Approval to Operate (issued under Section 68 of the Local Government Act 1993) shall include the BAL Contour Plan and require each new dwelling to be constructed to the nominated BAL rating. Furthermore, a suitably worded instrument(s) must be created pursuant to section 88 of the Conveyancing Act 1917 clearly outlining the require BAL ratings for each dwelling;
4. All new sites are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 6.8.3 of PBP 2019;
5. The internal access road is to be designed and constructed in accordance with section 6.8.2 of PBP 2019 **or** as shown in the plans contained in **Appendix A**;
6. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
7. A Bushfire Emergency Management and Evacuation Plan (BEMEP) shall be prepared that is consistent with the RFS Guidelines 'Development Planning – A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014'.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (December 2024).

Should the above recommendations be implemented, the proposed modification to the approved development will result in a better bushfire outcome as the existing bushfire risk should be suitably

mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

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Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2005	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAR	Bushfire Assessment Report
BCA	Building Code of Australia
BC Act	NSW Biodiversity Act 2016
BDAR	Biodiversity Development Assessment Report
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
NPWS	NSW National Parks and Wildlife Service
MCC	MidCoast Council
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
PBP 2019	Planning for Bushfire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RFS	NSW Rural Fire Service
VMP	Vegetation Management Plan

1. Introduction

Bushfire Planning Australia (BPA) has been engaged by Allam MHE Developments No.2 Pty Ltd to undertake a Bushfire Assessment Report (BAR) for the proposed manufactured homes estate at 40-80 & 82 Chapmans Road, Tuncurry, legally known as Lot 100 DP1286524 and Lot 11 DP615229 and hereafter known as 'the site'.

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) that has been released and adopted through the *Environmental Planning and Assessment Amendment* (Planning for Bushfire Protection) *Regulation 2007* and the *Rural Fires Regulation 2022*.

2. Site Description

Table 1: Site Details

Address	40-80 Chapmans Road & 82 Chapmans Road, Tuncurry
Title	Lot 100 DP1286524 & Lot 11 DP615229
LGA	MidCoast Council
Site Area	22.4 ha
Land Use Zone	R2 Low Density Residential and C2 Environmental Conservation (**Figure 1**)
Context	The rural site currently includes a single ancillary building in the northern corner of Lot 11 whilst the previous dwelling on Lot 100 has been cleared. Both lots are largely managed with minimal vegetation present with exception of the south-west corner of Lot 11 and the eastern boundary of Lot 1 both of which will be retained as part of the proposed development. Rural properties exist to the north and the immediate east of the site whilst vegetation surrounds the site to the south and west.
Fire History	The site lies within a local government area with a Fire Danger Index (FDI) rating of 80.

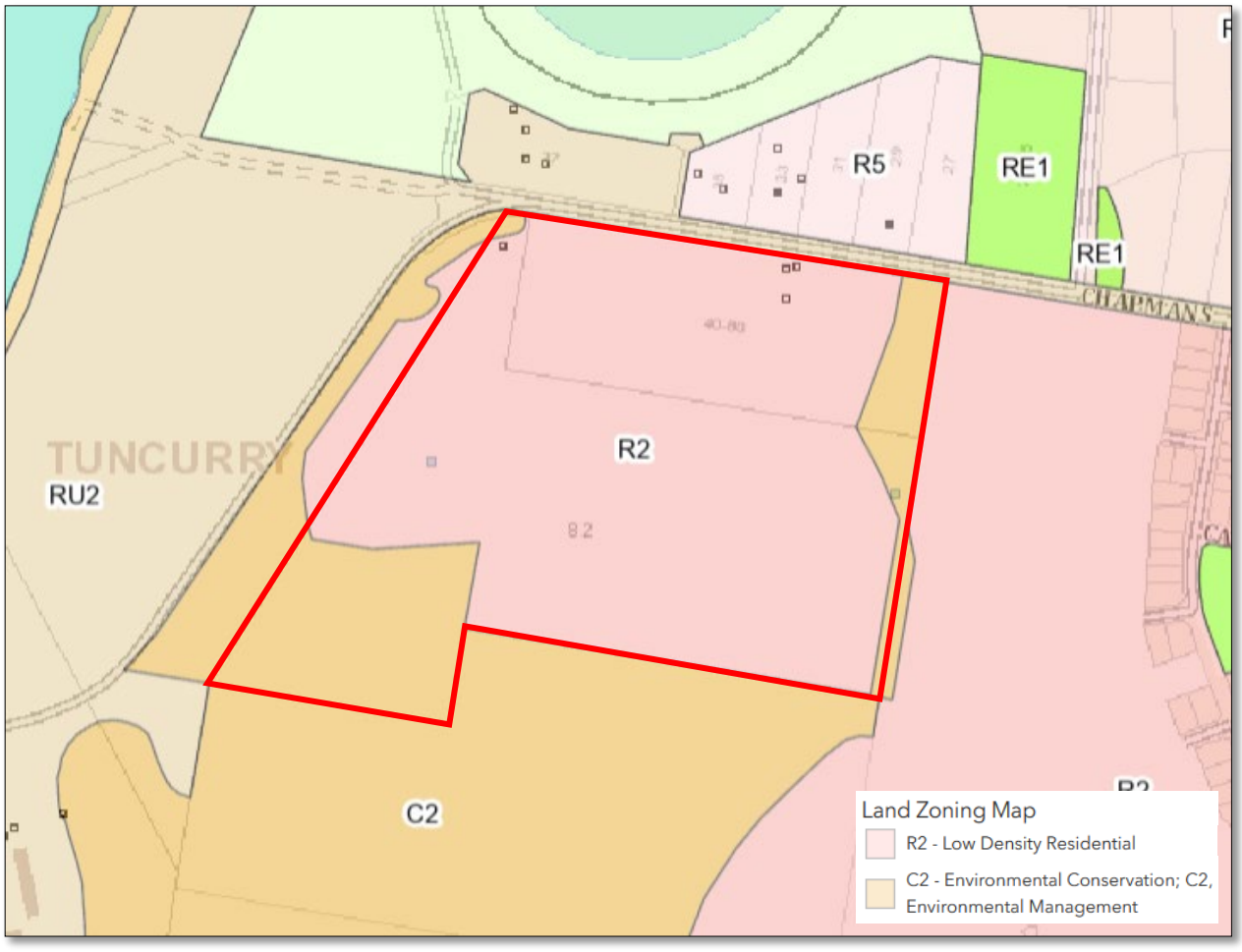

Figure 1: Great Lakes Local Environmental Plan 2014 (Land Zoning Map Sheet)

Project: 40-80 & 82 Chapmans Road, Tuncurry
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Figure 2

Site Location

BUSHFIRE PLANNING AUSTRALIA

Subject site

100m Buffer

140m Buffer

SOURCE:
Base Map © Department of Customer Service 2020

N
W E
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0 100 200 300 400 500
Meters

A3 Scale: 1:10,000

File:2197-Tuncurry-Fig1-SiteLocation-230328 Date: 28/03/2023

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2.1. Bushfire Prone Land

Bushfire activity is prevalent in landscapes that carry fuel and the two predominant bushfire types are grassland and forest fires. Factors such as topographic characteristics and quantity of fuel loads influence the intensity and spread of fire. The scale of a bushfire hazard is tailored to the characteristics of the hazard, the size and characteristics of the affected population, types of land use exposed to bushfire, predicted development growth pressures and other factors affecting bushfire risk.

Figure 3 demonstrates the entire site is mapped as Vegetation Category 3 bushfire prone land with exception of the south-western corner of the site which is mapped as Vegetation Category 1 bushfire prone land. Vegetation Category 1 bushfire prone land exists in the south-west corner of the site and extends within and beyond 140m of the site in a southern and western direction. This is identified as the primary bushfire hazard.

To the immediate north of the site there is a narrow corridor of Vegetation Category 3 bushfire prone land before transitioning to Vegetation Buffer on the northern side of Chapmans Road. To the east and south-east of the site within 140m, Vegetation Category 3 bushfire prone land exists.

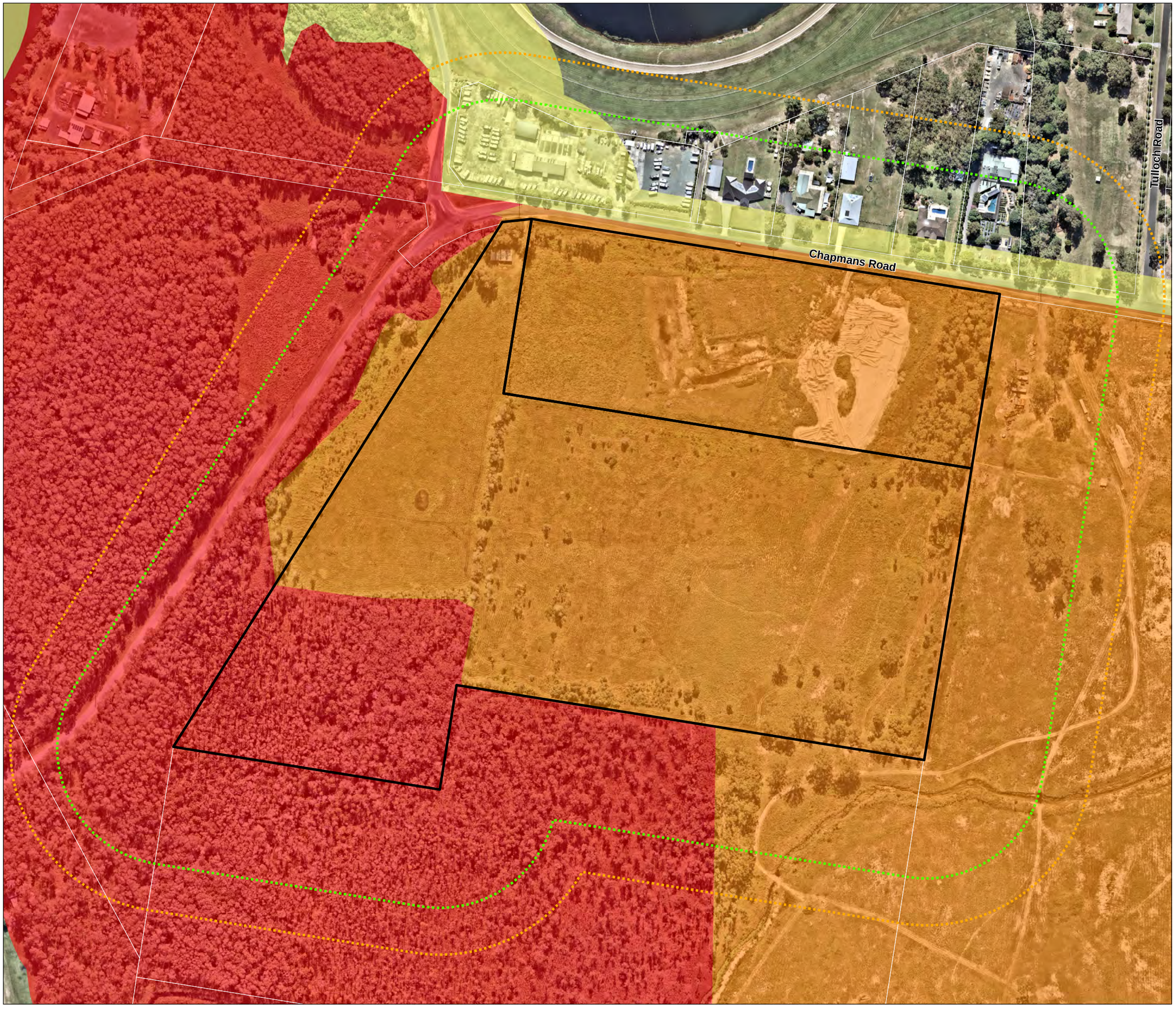

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Figure 3

NSW Bush Fire Prone Land

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- 140m Buffer
- 100m Buffer
- Contour (2m)
- Contour (0.5m)

Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 3
- Buffer

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024
Aerial photo: NearMap 14/04/2024
NSW Bush Fire Prone Land: NSW Rural Fire Service 2024

N
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0 25 50 75 100 125 150
Meters

A3 Scale: 1:3,000

File:2197-Tuncurry-Fig2-BFPL-241118 Date: 18/11/2024

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2.2. Proposed Development

The proposed four-stage development seeks to construct a new manufactured home estate (**Figure 4**) including:

- 283 sites for long-term occupation,
- Recreational facilities located in the centre of the development; and
- Ancillary services including a number of detention basins, caravan parking, and multiple carparking areas scattered throughout the proposed development.

The construction of a new site perimeter road and interconnecting non-perimeter roads will provide safe access and egress for emergency personnel and occupants, in addition to a dedicated emergency access only road is located in the north-eastern corner of the site (Road No.2).

The development includes the retention of vegetation in the north-eastern and south-western corners of the subject site, although this is separated by proposed roads and basins.

Plans of the proposed development are contained in **Appendix A** and shown in **Figure 4**.

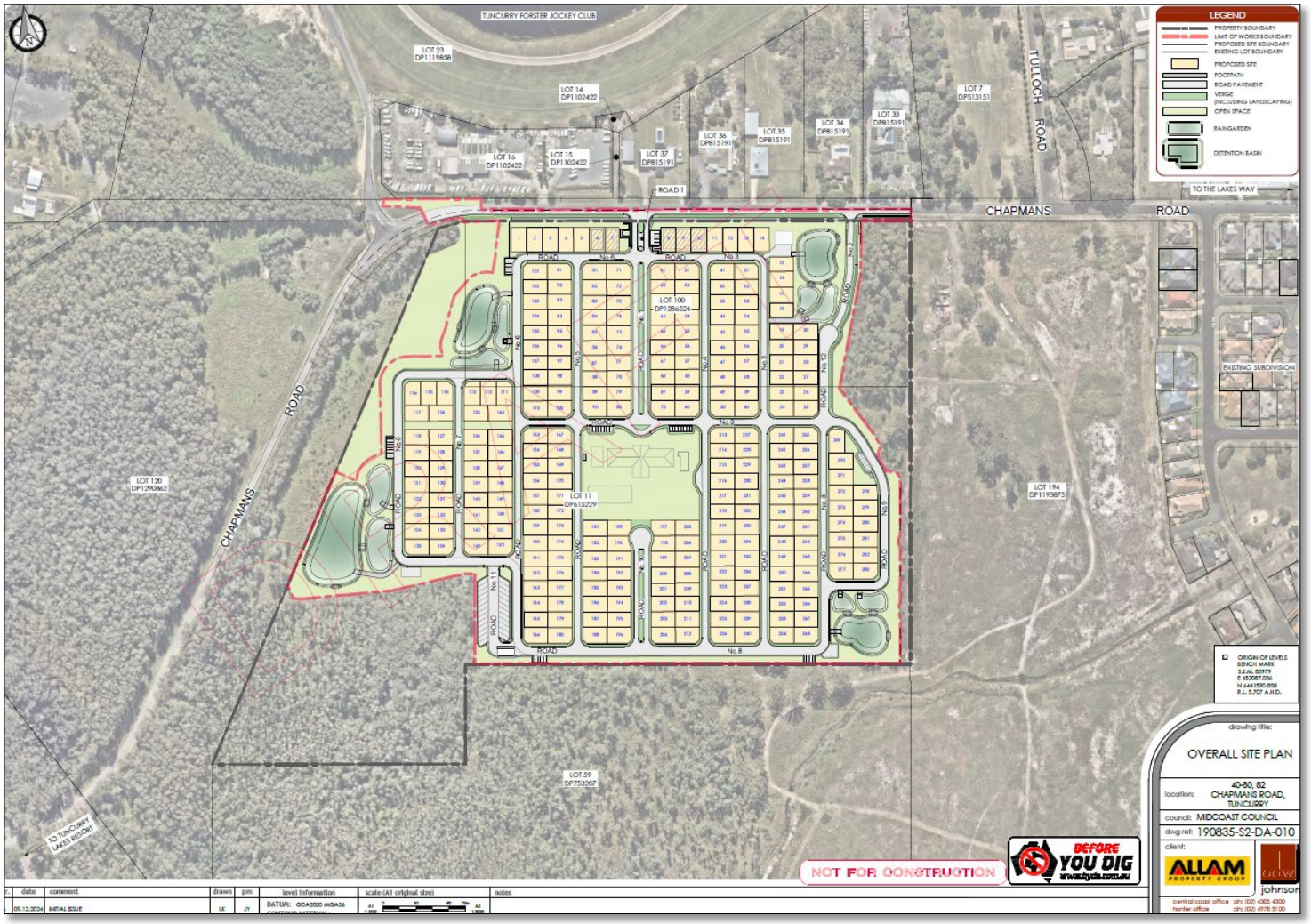

Figure 4: Proposed Development

2.3. Aims and Objectives

The assessment aims to consider and assess the bushfire hazard and associated potential bushfire threat relevant to the proposed development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the New South Wales Rural Fire Service (RFS) publication *Planning for Bushfire Protection 2019* (PBP 2019) and the *Rural Fires Regulation 2022.*

This assessment has been undertaken in accordance with clause 45 of the Rural Fires Regulation 2022. This BAR also addresses the aims and objectives of PBP 2019, being:

- Afford buildings and their occupants protection from exposure to a bushfire;
- Provide a defendable space to be located around buildings;
- Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- Ensure that appropriate operational access and egress for emergency service personnel and occupants is available;
- Provide for ongoing management and maintenance of bushfire protection measures (BPMs); and
- Ensure that utility services are adequate to meet the needs of firefighters.

A compliance table demonstrating compliance with PBP 2019 is provided in **Appendix B**.

2.4. Specific Objectives for Special Fire Protection Purposes

The aims and objectives listed in section 1.1 of PBP 2019 remain applicable to Special Fire Protection Purposes (SFPP) developments, however further consideration has been given to SFPP developments due to the nature of these environments and the occupants they accommodate. Occupants of SFPP developments are generally more vulnerable to bushfire attack therefore specific objectives have been put in place to ensure greater protection is provided (section 6.2 PBP 2019). Specific objectives include:

- Minimise levels of radiant heat, localised smoke and ember attach through increased APZ, building design and siting;
- Provide for an appropriate operational environment for emergency service personnel during firefighting and emergency management;
- Ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- Ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

As the manufactured home estate is classified as a SFPP development, the specific objectives and acceptable solutions for a SFPP development have been considered.

2.4.1. Specific Residential-Based SFPP

Whilst manufactured home estates can be built to achieve all levels of construction required under the National Construction Code (NCC) manufactured homes are not required to obtain separate development consent for each dwelling. Instead, dwellings must comply with the design, construction and installation requirements of Part 2, Division 4 of the *Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation* 2011 ('the Regulation'). A Notice of Completion of Installation is required by Clause 68 of the Regulation and can be used to require evidence of construction standards, including BAL and AS3959-2018.

The acceptable solution for manufactured housing is the provision of an APZ which achieves 10kW/m^2; being commensurate with the SFPP development.

However, evidence can be provided with the Notice of Completion of Installation, which confirms that all dwellings have been constructed to the appropriate construction standards under AS3959-2018 or NASH standard, and an APZ has been established which meets 29kW/m^2, being for a standard residential dwelling.

3. Bushfire Hazard Assessment

3.1. Vegetation Assessment

Vegetation classification over the site and surrounding area has been carried out as follows:

- Aerial Photograph Interpretation to map the vegetation classification
- Reference to NSW State Vegetation Type, Department of Planning and Environment 2022 (**Figure 5**)
- Site inspection completed by Bushfire Planning Australia - Stuart Greville on 7 July 2023

In accordance with PBP 2019, an assessment of the vegetation over a distance of 100m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the development footprint. The vegetation classification is based on the revised Table 2.3 in AS3959-2018 and Appendix 1 of PBP 2019. The unmanaged fuel loads detailed in the *RFS Comprehensive Fuel Loads Fact Sheet* (March 2019) have been adopted for the purpose of assessing the bushfire hazard. The findings of the site inspection were compared to the available vegetation mapping. The inconsistencies between the mapping sources and hazardous vegetation mapped on the NSW RFS Bushfire Prone Land maps were quantified during the site inspection.

3.1.1. Reliability Assessment

Although the bushfire prone land mapping is intended to be regularly updated, land use and vegetation cover that contribute to bushfire hazards are subject to change. A reliability assessment was undertaken for the subject site and all land within 140m. In this instance the bushfire prone land mapping is mostly consistent with existing vegetation present within the site.

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Figure 5

NSW State Vegetation Type (Class)

BUSHFIRE PLANNING AUSTRALIA

Subject Site

100m Buffer

140m Buffer

Vegetation Class

- Wallum Sand Heaths
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Mangrove Swamps
- Coastal Swamp Forests
- Coastal Dune Dry Sclerophyll Forests

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024
NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2024
Aerial photo: NearMap 14/04/2024

N W E S

0 25 50 75 100 125 150
Meters

A3 Scale: 1:3,000

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Date: 18/11/2024

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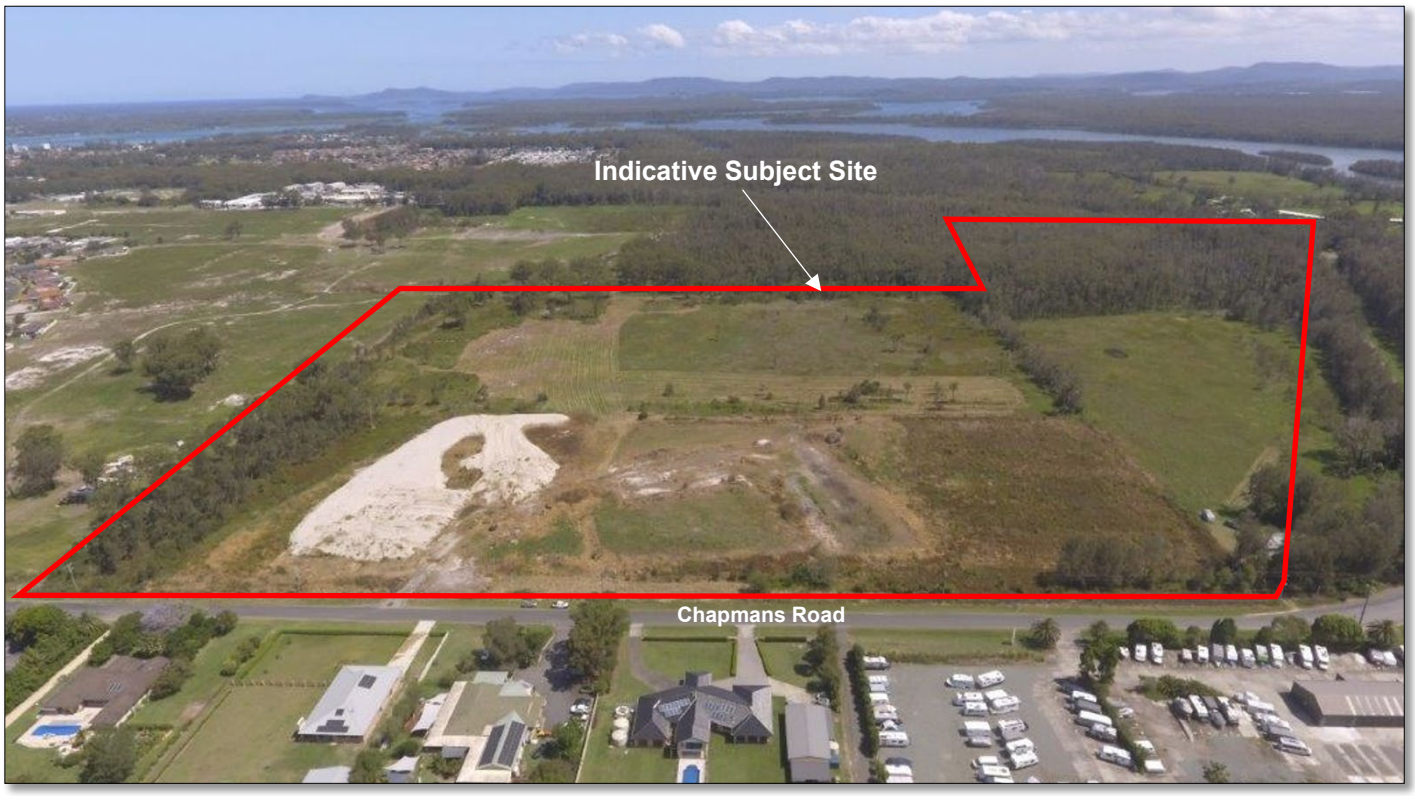

Plate 1: Subject site looking south

Plate 2: Subject site looking east

Plate 3: Subject site looking west

Plate 4: Subject site looking south-west

3.2. Slope Assessment

The slope assessment was undertaken as follows:

- Review of LiDAR point cloud data – including DEM (NSW LPI);
- Detail survey of existing and design contours.
- Site inspection completed by Bushfire Planning Australia - Stuart Greville on 7 July 2023.

An assessment of the slope over a distance of 140m in the hazard direction from the site boundary was undertaken. The effective slope was then calculated under the classified vegetation where there was a fire run greater than 50m. The topography of the site has been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The effective slope in all directions is shown in **Figure 6, Figure 7** and **Table 2.**

The final bushfire hazard assessment defining vegetation classifications and effective slope is shown in **Figure 8.**

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Chapmans Road, Tuncurry
Job No: 2197

Figure 6

Digital Elevation Model

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Chapmans Road

Tulloch Road

Subject Site

140m Buffer

100m Buffer

Contour (1m)

Contour (0.5m)

Elevation (AHD)

High : 7m

Low : 0m

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Surface analysis: Derived from LiDAR - BULAHDELAH, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

N W E S

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Meters

A3 Scale: 1:3,000

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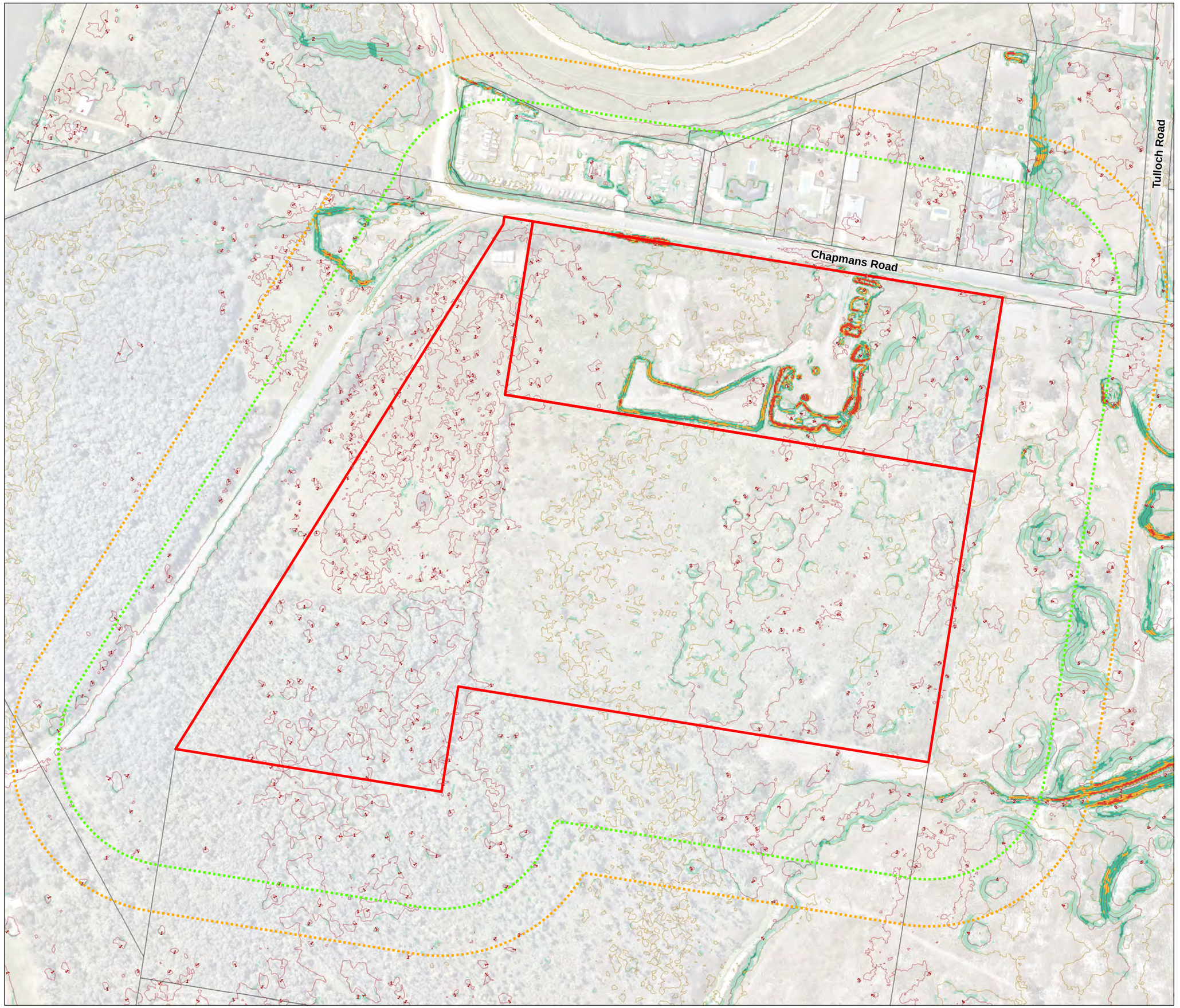

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Figure 7

Slope Analysis: LiDAR

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- 140m Buffer
- 100m Buffer
- Contour (1m)
- Contour (0.5m)

Slope

- 0° - 5°
- 5° - 10°
- 10° - 15°
- 15° - 20°
- >20°

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2021
Surface analysis: Derived from LiDAR - BULAHDELAH, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
Aerial photo: NearMap 12/02/2023

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0 20 40 60 80 100 120 140 160
Meters

A3 Scale: 1:3,000

File:2197-Tuncurry-Fig5-SlopeLiDAR-230328 Date: 28/03/2023

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3.3. Significant Environmental Features

The recommended bushfire protection measures have been designed to minimise any unacceptable impacts on a significant environmental feature.

3.4. Threatened Species, populations or ecological communities

The area of the site to be affected by the proposed development has been identified to minimise impact on any threatened species, population or EEC. A Biodiversity Development Assessment Report has been completed by MJD Environmental (dated November 2024).

All bushfire mitigation measures; including APZs will consider the existing and potential biodiversity values to minimise impact where possible.

3.5. Aboriginal Objects

A search of the AHIMS database (results contained in **Appendix C**) revealed there are no Aboriginal sites or places recorded in or near the subject site. All bushfire mitigation measures, such as APZs, have also been designed to minimise disturbing any artefacts should they exist.

3.6. Slope & Vegetation Assessment Results

All vegetation identified within the current Bush Fire Prone Land map was confirmed during the site inspection.

To the north of the site, and separated by Chapmans Road, rural and industrial properties exist. Isolated sections of *forest* namely *Coastal Swamp Forest* exists in the north-eastern corner of the site and a *forest* ecotone identified as *Coastal Swamp Forest* and *Coastal Dune Dry Sclerophyll Forest* and beyond the site's boundary, again, separated by Chapmans Road. The same ecotone *forest* vegetation continues to the east and south within and beyond 140m of the site of which the forest located to the south of the site is identified as the primary bushfire hazard.

Vegetation located within the site's south-western corner was confirmed as a *forest*, namely *Coastal Swamp Forest* and will be retained as part of the proposed development. The *forest* vegetation continues to the south-west and also to the immediate west within and beyond 140m of the site. A small, isolated portion of *Freshwater Wetlands* (*Coastal Freshwater Lagoons*) also exists within and marginally external to the site's western boundary.

There are a number of detention basins located in each corner of the proposed development which will be vegetated as *Freshwater Wetlands*.

The results of hazard assessment are detailed in **Table 2** and shown in **Figure 8**.

Table 2: Slope and Vegetation Assessment Results

Transect	Vegetation or Other Infrastructure	Vegetation Classification (PBP 2019)	Slope
T1 North	Rural residential property north of the site and separated by Chapmans Road	Excluded (Managed land)	-0.9° Upslope
T2 North-east	Forest vegetation from the north-eastern site boundary separated by Chapmans Road	*Forest* (Coastal Swamp Forest)	-0.9° Upslope
T3 On-site	Retained forest vegetation within the sites north-eastern corner	*Forest* (Coastal Swamp Forest)	-0.2° Upslope
T4 East	Vegetation within the southern corner of the C2 zoned land within the site, extending to the sites eastern adjoining lot	*Forest* (Coastal Dune Dry Sclerophyll Forest)	-0.5° Upslope
T5 South-east	Ecotone of forest vegetation from the site's eastern boundary	*Forest* (Coastal Dune Dry Sclerophyll Forest)	-0.5° Upslope
T6 On-site	Proposed road within the proposed development to the site's southern boundary	Excluded (Proposed Road)	0.0° Flat
T7 South	Forest vegetation south of the site identified as the primary bushfire hazard	*Forest* (Coastal Swamp Forest)	0.1° Downslope
T8 South-west	Forest vegetation south of the site identified as the primary bushfire hazard	*Forest* (Coastal Swamp Forest)	-0.1° Upslope
T9 On-site	Forest vegetation within the sites south-western corner identified as the primary bushfire hazard	*Forest* (Coastal Swamp Forest)	-0.1° Upslope
T10 West	Proposed detention basin within the site transitioning to freshwater wetland west of the site's boundary	*Freshwater Wetlands* (Coastal Freshwater Lagoon)	0.2° Downslope
T11 West	A corridor of forest vegetation from the site's north-eastern boundary transitioning to managed land	*Forest* (Coastal Swamp Forest)	0.0° Flat

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Figure 8

Slope & Vegetation Assessment

BUSHFIRE PLANNING AUSTRALIA

- Subject Site
- 140m Buffer
- 100m Buffer
- Limit of Works
- Zone Boundary
- Contour (1m)
- Contour (0.5m)

Vegetation Class

- Grassland
- Wallum Sand Heaths
- Coastal Freshwater Lagoons
- Mangrove Swamps
- Coastal Swamp Forests
- Coastal Dune Dry Sclerophyll Forests
- Not native vegetation

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024
Surface analysis: Derived from LiDAR - BULAHDELAH, 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012
NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2024
Aerial photo: NearMap 14/04/2024
Zoning: Department of Planning, Industry and Environment 2021

N W E S

0 20 40 60 80 100 120 140 160
Meters

A3 Scale: 1:3,000

File:2197-Tuncurry-Fig6-SlopeVeg-241125 Date: 25/11/2024

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4. Bushfire Protection Measures

This BAR has adopted the methodology to determine the appropriate Bushfire Protection Measures (BPMs) detailed in PBP 2019. As part of the BAR, the recommended BPMs demonstrate the aims and objectives of PBP 2019 have been satisified; including the matters considered by the RFS necessary to protect persons, property and the environment from the danger that may arise from a bushfire.

- Asset Protection Zones;
- Landscaping;
- Construction Standards;
- Access;
- Services - Water, gas and electricity; and
- Emergency Management Planning.

4.1. Asset Protection Zones

An APZ is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an inner protection area (IPA) and an outer protection area (OPA) as seen in **Figure 9** & **Figure 10**.

An APZ can include the following:

- Lawns;
- Discontinuous gardens;
- Swimming pools;
- Roads, driveways and managed verges;
- Unattached non-combustible garages with suitable separation from the dwelling;
- Open space / parkland; and
- Car parking.

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

- Do not touch or overhang any buildings;
- Are well spread out and do not form a continuous canopy;
- Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc. are not recommended in the APZ.

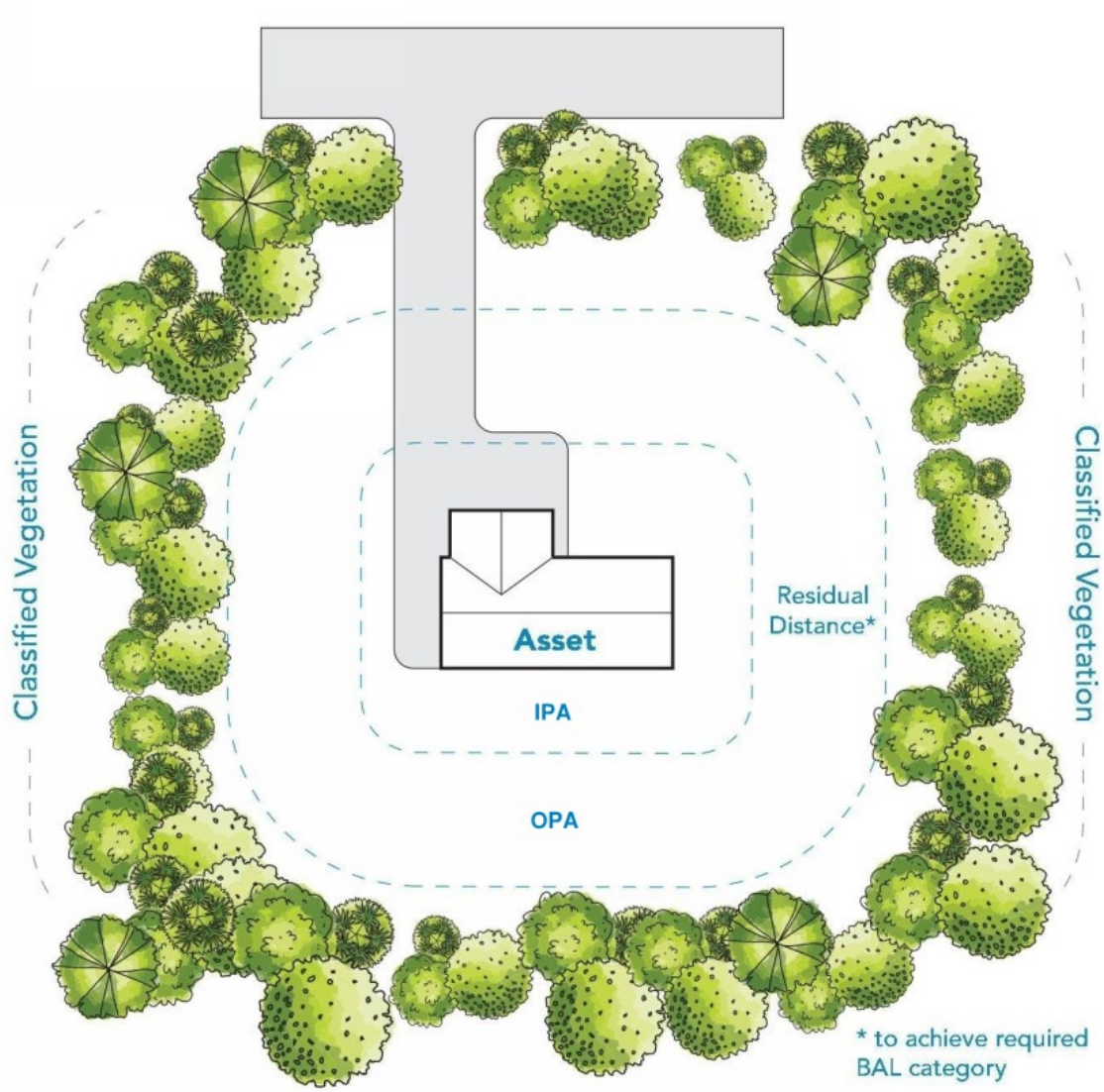

Figure 9: Inner and Outer Asset Protection Zone

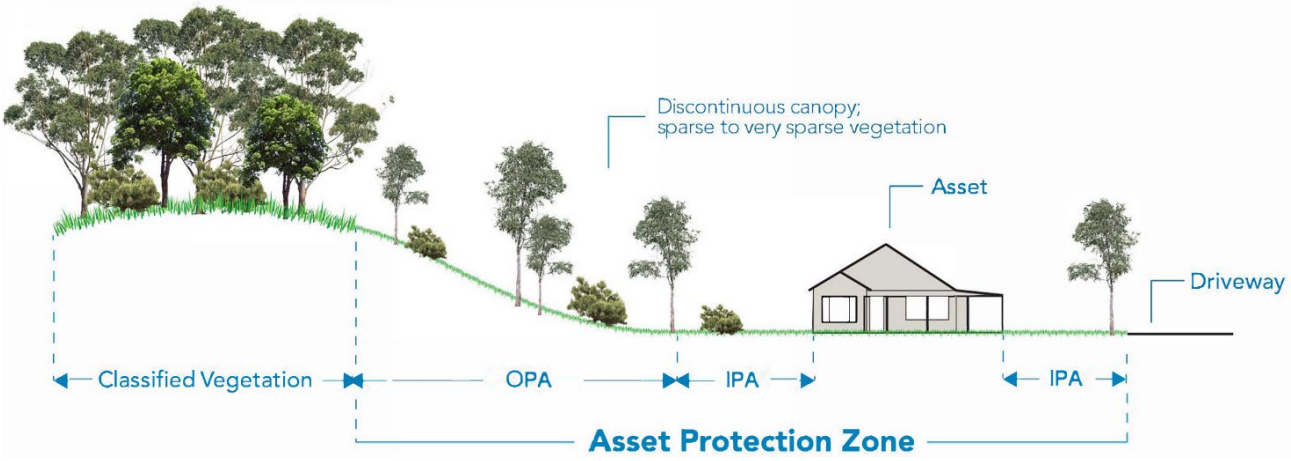

Figure 10: Example of the APZ profile

4.1.1. Special Fire Protection Purposes

SFPP developments mean the occupants of the proposed development may be more vulnerable to bush fire attack and therefore may require greater protection from such threats as well as assisted evacuation. SFPPs include schools, seniors housing, childcare centres, hospitals and tourist accommodation.

Section 6.8 of PBP 2019 provides protection measures for SFPP developments. In comparison to a standard residential development where radiant heat levels of no greater than 29kW/m^2 are acceptable, radiant heat levels of greater than 10kW/m^2 must not be experienced by on any part of the buildings. To achieve radiant heat levels of less than 10kW/m^2, APZs of 67m or greater are typically required (based on Table A1.12.1 of PBP 2019) for a *forest* vegetation formation.

Objectives for SFPP developments place emphasis on the space surrounding buildings (as defendable space and APZs) and less reliance on construction standards. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bush fire threats.

4.1.2. Determining the Appropriate Setbacks

To achieve compliance with the performance criteria for APZs (Table 6.3a), the Acceptable Solutions outlined in Table A1.12.1 of PBP 2019 may be adopted as a deemed-to-satisify solution.

Alternatively, the appropriate APZ setback may be determined to achieve the Performance Criteria by adopting a performance-based solution. Based on the unique site characteristics identified by the BAR, the intensity of a bushfire event presented as the radiant heat exposure was calculated at several locations throughout the development site using the NBC Bushfire Attack Assessor V4.1. The nominated fuel loads for the respective vegetation classifications as published by the RFS in March 2019 have been used to determine the APZs and the effective slope obtained from the Digital Elevation Model (DEM) for each transect.

As the site lies within the Mid Coast Coast Council LGA, it is assessed under a FDI rating of 80. The Detailed Method (Method 2) outlined in Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas* was used to calculate the potential level of radiant heat flux generated at the nominated locations (see transects T1-T11). To ensure the APZs achieve the intent of Section 6.3 of PBP 2019, the APZs have been determined to ensure all lots are able to accomomodate a dwelling that will not be exposed to radiant heat levels exceeding 29kW/m^2. The NBC Bushfire Attack Assessor report detailing the inputs used is contained in **Appendix D**.

4.1.2.1. Specific Residential-based SFPP: Manufactured Home Estates

Although the proposed development does not include the construction of any dwellings, each future dwelling shall be constructed in accordance with the relevant Bushfire Attack Level (BAL) identified on **Figure 12** and shown in **Table 4**. The Approval to Operate shall include the BAL Contour Plan and require each dwelling to be constructed to the nominated BAL rating (maximum BAL-29). Furthermore, a suitably worded instrument(s) will be created pursuant to section 88B of the *Conveyancing Act 1917* clearly outlining the require BAL ratings for each dwelling. In this regard, each new dwelling will be sited to ensure radiant heat levels do not exceed 29kW/m^2.

Refer to **Table 3** and **Figure 12** for the required APZs.

Table 3: Required APZ setbacks

Transect	Vegetation Classification (PBP 2019)	Slope	APZ Table A1.12.1	APZ Table A1.12.3	APZ Provided (29kW/m^2)
T1 North	Excluded (Managed land)	-0.9° Upslope	N/A	N/A	N/A
T2 North-east	*Forest* (Coastal Swamp Forest)	-0.9° Upslope	67m	24m	20m
T3 On-site	*Forest* (Coastal Swamp Forest)	-0.2° Upslope	67m	24m	20m
T4 East	*Forest* (Coastal Dune Dry Sclerophyll Forest)	-0.5° Upslope	67m	24m	18m
T5 South-east	*Forest* (Coastal Dune Dry Sclerophyll Forest)	-0.5° Upslope	67m	24m	18m
T6 On-site	Excluded (Proposed Road)	0.0° Flat	N/A	N/A	N/A
T7 South	*Forest* (Coastal Swamp Forest)	Flat* (0.1° Downslope)	67m	24m	20m
T8 South-west	*Forest* (Coastal Swamp Forest)	-0.1° Upslope	67m	24m	20m
T9 On-site	*Forest* (Coastal Swamp Forest)	-0.1° Upslope	67m	24m	20m
T10 West	*Freshwater Wetlands* (Coastal Freshwater Lagoon)	Flat* (0.2° Downslope)	19m	5m	5m
T11 West	*Forest* (Coastal Swamp Forest)	0.0° Flat	67m	24m	20m

* Slope less than 1 degree are considered ineligible and therefore assessed as Flat

4.2. Landscaping and Vegetation Management

In APZs and IPAs, the design and management of the landscaped areas in the vicinity of buildings have the potential to improve the chances of survival of people and buildings. Reduction of fuel does not require the removal of all vegetation. Trees and plants can provide some bushfire protection from strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns.

Generally landscaping in and around a bushfire hazard should consider the following:

- Priority given to retaining species that have a low flammability;
- Priority given to retaining species which do not drop much litter in the bushfire season and which do not drop litter that persists as ground fuel in the bush fire season;
- Priority given to retaining smooth barked species over stringy bark; and
- Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.

Landscaping within APZs and IPAs should give due regard to fire retardant plants and ensure that fuel loads do not accumulate as a result of the selected plant varieties.

The principles of landscaping for bushfire protection aim to:

- Prevent flame impingement on dwellings;
- Provide a defendable space for property protection;
- Reduce fire spread and wind speed;
- Deflect and filter embers; and
- Provide shelter from radiant heat.

Plants that are less flammable have the following features;

- High moisture content and 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.

Avoiding understorey planting and regular trimming of the lower limbs of trees also assists in reducing fire penetration into the canopy. Rainforest species such as Syzygium and figs are preferred to species with high fine fuel and/or oil content. Trees with loose, fibrous or stringy bark should be avoided. These trees can easily ignite and encourage ground fire to spread up to, and then through the crown of trees.

Consideration should be given to vegetation fuel loads present on site with particular attention to APZs. Careful thought must be given to the type and physical location of any proposed site landscaping. Inappropriately selected and positioned vegetation has the potential to ‘replace’ any previously removed fuel load.

Bearing in mind the desired aesthetic and environment sought by site landscaping, some basic principles have been recommended to help minimise the chance of such works contributing to the potential hazard on site.

Whilst it is recognised that fire-retardant plant species are not always the most aesthetically pleasing choice for site landscaping, the need for adequate protection of life and property requires that a suitable balance between visual and safety concerns be considered.

It is reiterated again that it is essential that any landscaped areas and surrounds are subject to ongoing fuel management and reduction to ensure that fine fuels do not build up.

4.3. Construction Standards - Bushfire Attack Level

All buildings, including single dwellings (Class 1a buildings), constructed within the site are required to satisfy the Performance Requirements of the National Construction Code: Building Code of Australia (BCA). However, the moveable dwellings that will be installed in the MHE are not considered a building under the BCA. Consequently, standards and building solutions required by the BCA do not apply to moveable dwellings.

Regardless of the statutory requirement to comply with the BCA, building design and the materials used for construction of future dwellings should be chosen based on the information contained within AS3959-2018, and accordingly the designer/architect should be made aware of this recommendation.

The determinations of the appropriate bushfire attack level (BAL) is based on the maximum potential radiant heat exposure. BALs are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the BAL is derived by assessing the:

- Relevant FDI = *80*;
- Flame temperature = *1090K*;
- Slope = *upslope or flat*;
- Vegetation classification = *forest* and *forested wetland*; and
- Building location.

The Detailed Method (Method 2) outlined in AS3959-2018 was used to calculate the Bushfire Attack Level (BAL) for the development. The NBC Bushfire Attack Assessor V4.1 was used to model the bushfire radiant heat exposure which determined the applicable BAL. All sites with the development layout are exposed to BAL-29 or less.

The greatest bushfire hazard was found to the south of the site being a *forest*.

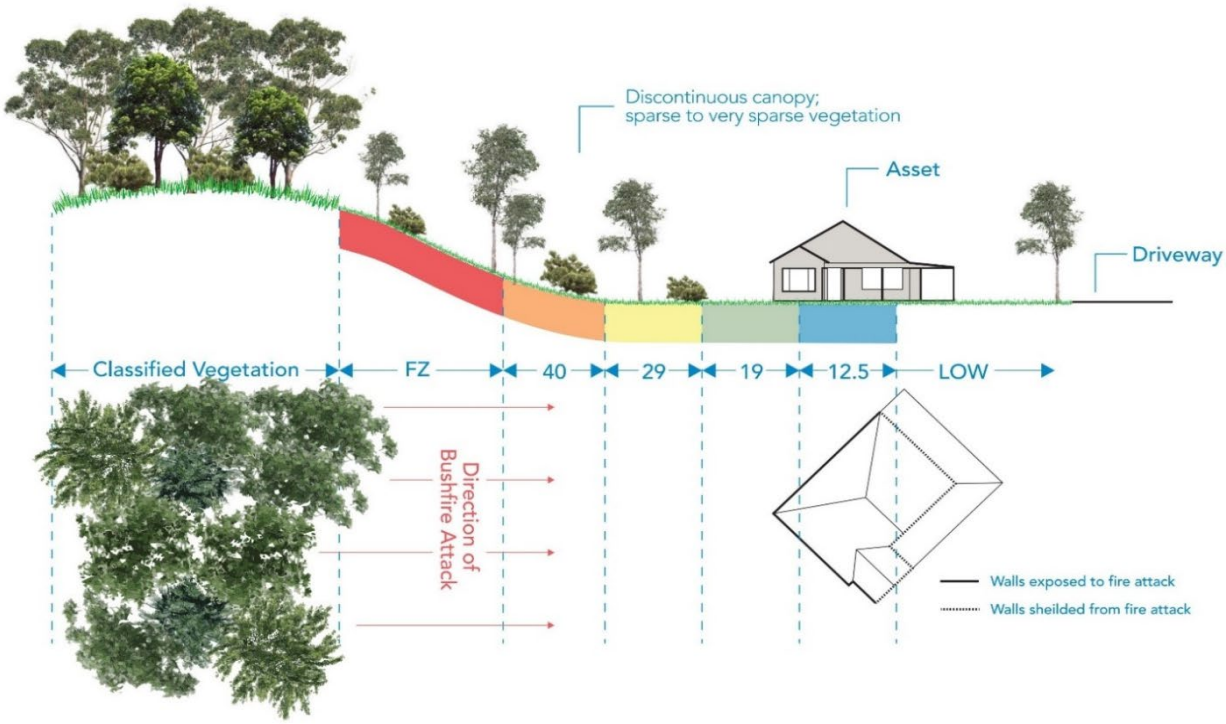

Figure 11: BAL example

Table 4: Bushfire Attack Levels

Transect	Vegetation Classification (PBP 2019)	Slope	APZ (29kW/m²)	Distance from Hazard	Bushfire Attack Level (BAL)
T1 & T6	Excluded	Flat or Upslope	N/A	N/A	BAL-LOW
T2	*Forest* (Coastal Swamp Forest)	-0.9° Upslope	20m	0m-<18m	BAL-FZ
				18m-<20m	BAL-40
				20m-<28m	BAL-29
				28m-<38m	BAL-19
				38m-<100m	BAL-12.5
				58m	10kW/m²
T3, T7-T9 & T11	*Forest* (Coastal Swamp Forest)	Flat or Upslope	20m	0m-<18m	BAL-FZ
				18m-<20m	BAL-40
				20m-<28m	BAL-29
				28m-<39m	BAL-19
				39m-<100m	BAL-12.5
				60m	10kW/m²
T4 & T5	*Forest* (Coastal Dune Dry Sclerophyll Forest)	-0.5° Upslope	18m	0m-<17m	BAL-FZ
				17m-<18m	BAL-40
				18m-<26m	BAL-29
				26m-<36m	BAL-19
				36m-<100m	BAL-12.5
				56m	10kW/m²
T10	*Freshwater Wetlands* (Coastal Freshwater Lagoons)	Flat* (0.2° Downslope)	5m	0m-<4m	BAL-FZ
				4m-<5m	BAL-40
				5m-<7m	BAL-29
				7m-<11m	BAL-19
				11m-<100m	BAL-12.5
				19m	10kW/m²

* Slope less than 1 degree are considered ineligible and therefore assessed as Flat

Project: 40-80 & 82 Chapmans Road, Tuncurry
Job No: 2197

Figure 12

BAL Contour Plan

BUSHFIRE PLANNING AUSTRALIA

Subject Site
Limit of Works
Asset Protection Zone (APZ)
10mkW/m²

Required Bushfire Attack Levels (AS3959-2018)

- BAL - FZ
- BAL - 40
- BAL - 29
- BAL - 19
- BAL - 12.5

Vegetation Class

- Grassland
- Coastal Freshwater Lagoons
- Coastal Swamp Forests
- Coastal Dune Dry Sclerophyll Forests
- Not native vegetation

SOURCE:
Cadastral Boundary: NSW Department of Finance, Services and Innovation 2024
Aerial photo: Nearmap14/04/2024

N W E S

0 25 50 75 100
Meters

A3 Scale: 1:2,000

File:2197-Tuncurry-Fig7-BALs-241125 Date: 25/11/2024

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4.5. Access

In the unlikely event of a serious bushfire, it will be essential to ensure that adequate ingress / egress and the provision of defendable space are afforded in the layout. The following design specifications detailed in PBP 2019 are relevant to the proposed development:

- Internal roads are two-wheel drive all weather roads;
- internal perimeter roads are provided with a minimum carriageway width of 8m;
- be through roads, but if unavoidable then dead ends should be not more than 100 metres in length, incorporate a minimum 12 metres turning circle (either in cul-de-sac or T-head formation) and should be clearly sign posted as dead ends;
- the capacity of road surfaces is sufficient to carry fully loaded fire fighting vehicles (15 tonnes);
- curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres and minimal in number, to allow for rapid access and egress;
- maximum grade for sealed roads do not exceed 12.5^{o};
- have a minimum vertical clearance to a height of four metres at all times;

The proposed development provides internal non-perimeter roads with a minimum carriageway of 6m wide and new perimeter roads with a minimum carriageway of 8m wide.

There will be two access points provided from Chapmans Road. The main entrance and exit is located towards the mid-section of the site along the northern site boundary and the other located in the north-eastern corner of the development site is dedicated to emergencies. The internal road network will include a combination of perimeter and multiple non-perimeter roads providing access to each site and offer safe access and egress for emergency services and residents.

All perimeter roads are 8.0m wide and all internal non-perimeter roads are a minimum 6m wide. Parking for visitors is provided in several locations throughout the site; including the near the front entrance. All dwelling sites are provided with a minimum 1 off-street parking space.

In this instance the proposed access arrangements are considered to be acceptable and complies with the relevant Performance Criteria and Acceptable Solutions.

Refer to **Appendix A** for proposed development showing access.

4.6. Services - Water, gas and electricity

4.6.1. Water Supply

Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 – 2005. Hydrants are not to be located within any road carriageway.

All lots within the proposed development will be connected to the internal reticulated water supply.

4.6.2. Electricity Services

All new electricity services will be located underground.

4.6.3. Gas Services

Any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596-2002. It is expected that the location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.

5. Conclusion and Recommendations

Bushfire Planning Australia has been engaged by Allam MHE Developments No.2 Pty Ltd to undertake a Bushfire Assessment Report (BAR) for the proposed development of a manufactured home estate at 40-80 & 82 Chapmans Road, Tuncurry (the 'site').

This BAR found the site was exposed to a medium bushfire hazard located primarily to the south of the site which is mapped as Category 1 Vegetation in the Mid Coast Council Bush Fire Prone Land Map.

The following key recommendations have been designed to enable the proposed development to achieve Performance Criteria for SFPP developments detailed in Section 6.8 of PBP 2019:

1. The areas within the site identified as an Asset Protection Zone in **Figure 12** shall be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the RFS document *Standards for asset protection zones*;
2. All future buildings to be constructed on the proposed sites shall have due regard to the specific considerations given in the National Construction Code: Building Code of Australia (BCA) which makes specific reference to Australian Standard AS3959-2018 Construction of buildings in bushfire prone areas (AS3959-2018) and the NASH Standard Steel Framed Construction in Bushfire Prone Areas;
3. Where the new dwellings are not required to be comply with the BCA, each dwelling shall be constructed in accordance with the relevant Bushfire Attack Level (BAL) identified on **Figure 12** and shown in **Table 4**. An updated Approval to Operate (issued under Section 68 of the Local Government Act 1993) shall include the BAL Contour Plan and require each new dwelling to be constructed to the nominated BAL rating. Furthermore, a suitably worded instrument(s) must be created pursuant to section 88 of the Conveyancing Act 1917 clearly outlining the require BAL ratings for each dwelling;
4. All new sites are to be connected to a reliable water supply network and that suitable fire hydrants are located throughout the development site that are clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure shall comply with AS2419.1 2005 and section 6.8.3 of PBP 2019;
5. The internal access road is to be designed and constructed in accordance with section 6.8.2 of PBP 2019 **or** as shown in the plans contained in **Appendix A**;
6. Consideration should be given to landscaping and fuel loads on site to decrease potential fire hazards on site; and
7. A Bushfire Emergency Management and Evacuation Plan (BEMEP) shall be prepared that is consistent with the RFS Guidelines 'Development Planning – A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan December 2014'.

This assessment has been made based on the bushfire hazards observed in and around the site at the time of inspection and production (December 2024).

Should the above recommendations be implemented, the proposed modification to the approved development will result in a better bushfire outcome as the existing bushfire risk should be suitably mitigated to offer an acceptable level of protection to life and property for those persons and assets occupying the site but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

6. References

- Keith, D. (2004) Oceans Shores to Desert Dunes - The Native Vegetation of New South Wales and the ACT.
- NSW Rural Fire Service (2005). Standards for Asset Protection Zones. NSW Rural Fire Service.
- NSW Rural Fire Service (2019). Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners.
- Ramsay, GC and Dawkins, D (1993). Building in Bushfire-prone Areas – Information and Advice. CSIRO and Standards Australia.
- Rural Fires and Environmental Assessment Legislation Amendment Act 2002.
- Standards Australia (2018). AS 3959 – 2018: Construction of Buildings in Bushfire-prone Areas.

Appendix A: Proposed Layout of Manufactured Home Estate

190835-S2-MP

LOT 23 DP1119858
LOT 16 DP1102422
LOT 15 DP1102422
LOT 37 DP815191
LOT 36 DP815191
LOT 35 DP815191
LOT 34 DP815191
LOT 33 DP815191
LOT 7 DP513151
LOT 120 DP1290862
LOT 100 DP1286524
LOT 11 DP615229
LOT 59 DP753207
LOT 194 DP1193875

ROAD 1
CHAPMANS ROAD
TEMPORARY COMMUNITY CENTRE
ENTRY SIGN
TEMP OPEN SPACE
ELECTRONIC SLIDING VEHICLE ACCESS GATE
CARPARK 8
PEDESTRIAN GATE
SALES OFFICE AND 2 DISPLAYS
MAINTENANCE SHED
HALF ROAD CONSTRUCTION AND FOOTPATH UPGRADES
TO THE LAKES WAY
PROPOSED GATE
DETENTION BASIN
RAINGARDEN
EMERGENCY ACCESS ONLY
CARPARK 1
CARPARK 2
CARPARK 3
CARPARK 4
CARPARK 5
CARPARK 6
CARPARK 7
CARPARK 8
PICKLEBALL COURT
INDICATIVE SUBSTATION LOCATION
SWIMMING POOL
BOWLING GREEN
BUS PARKING
SPS
CARAVAN PARKING
DUMP POINT
WASH DOWN BAY
TO TUNCURRY LAKES RESORT
C2

ROAD No.1 (LOT 100 DP1286524)
ROAD No.2
ROAD No.3
ROAD No.4
ROAD No.5
ROAD No.6
ROAD No.7
ROAD No.8
ROAD No.9
ROAD No.10
ROAD No.11
ROAD No.12

1 313m² | 2 313m² | 3 313m² | 4 313m² | 5 313m² | 6 313m² | 7 284m²
8 284m² | 9 313m² | 10 313m² | 11 313m² | 12 313m² | 13 313m² | 14 313m²
15 284m² | 16 313m² | 17 313m² | 18 284m²
19 313m² | 20 313m² | 21 313m² | 22 284m² | 23 313m² | 24 311m² | 25 311m² | 26 313m² | 27 284m² | 28 313m² | 29 313m² | 30 313m²
41 313m² | 42 313m² | 43 284m² | 44 313m² | 45 313m² | 46 284m² | 47 313m² | 48 313m² | 49 284m² | 50 312m² | 31 313m² | 32 313m² | 33 284m² | 34 313m² | 35 313m² | 36 284m² | 37 313m² | 38 313m² | 39 284m² | 40 312m²
61 313m² | 62 284m² | 63 313m² | 64 313m² | 65 284m² | 66 313m² | 67 284m² | 68 313m² | 69 313m² | 70 312m² | 51 313m² | 52 284m² | 53 313m² | 54 313m² | 55 284m² | 56 313m² | 57 284m² | 58 313m² | 59 313m² | 60 312m²
81 313m² | 82 313m² | 83 284m² | 84 313m² | 85 313m² | 86 284m² | 87 313m² | 88 313m² | 89 284m² | 90 312m² | 71 313m² | 72 313m² | 73 284m² | 74 313m² | 75 313m² | 76 284m² | 77 313m² | 78 313m² | 79 284m² | 80 312m²
101 313m² | 102 284m² | 103 313m² | 104 313m² | 105 284m² | 106 313m² | 107 284m² | 108 313m² | 109 313m² | 110 312m² | 91 313m² | 92 284m² | 93 313m² | 94 313m² | 95 284m² | 96 313m² | 97 284m² | 98 313m² | 99 313m² | 100 312m²
113 315m² | 112 321m² | 111 315m² | 135 313m² | 144 313m² | 136 313m² | 145 313m² | 137 313m² | 146 313m² | 138 313m² | 147 313m² | 139 313m² | 148 313m² | 140 313m² | 149 313m² | 141 313m² | 150 313m² | 142 313m² | 151 313m² | 143 310m² | 152 310m²
116 315m² | 115 321m² | 114 315m² | 117 313m² | 126 313m² | 118 313m² | 127 313m² | 119 313m² | 128 313m² | 120 313m² | 129 313m² | 121 313m² | 130 313m² | 122 313m² | 131 313m² | 123 313m² | 132 313m² | 124 313m² | 133 313m² | 125 310m² | 134 310m²
153 310m² | 154 284m² | 155 313m² | 156 313m² | 157 313m² | 158 284m² | 159 313m² | 160 313m² | 161 313m² | 162 284m² | 163 313m² | 164 313m² | 165 313m² | 166 313m² | 167 310m² | 168 284m² | 169 313m² | 170 313m² | 171 313m² | 172 284m² | 173 313m² | 174 313m² | 175 313m² | 176 284m² | 177 313m² | 178 313m² | 179 313m² | 180 313m²
181 313m² | 182 313m² | 183 313m² | 184 264m² | 185 313m² | 186 313m² | 187 313m² | 188 313m² | 189 304m² | 190 293m² | 191 313m² | 192 264m² | 193 313m² | 194 313m² | 195 313m² | 196 313m²
197 304m² | 198 293m² | 199 313m² | 200 313m² | 201 264m² | 202 313m² | 203 313m² | 204 313m² | 205 313m² | 206 313m² | 207 313m² | 208 313m² | 209 264m² | 210 313m² | 211 313m² | 212 313m²
213 310m² | 214 284m² | 215 313m² | 216 313m² | 217 313m² | 218 284m² | 219 313m² | 220 313m² | 221 313m² | 222 284m² | 223 313m² | 224 313m² | 225 313m² | 226 313m² | 227 310m² | 228 284m² | 229 313m² | 230 313m² | 231 313m² | 232 284m² | 233 313m² | 234 313m² | 235 313m² | 236 284m² | 237 313m² | 238 313m² | 239 313m² | 240 313m²
241 310m² | 242 313m² | 243 313m² | 244 284m² | 245 313m² | 246 313m² | 247 313m² | 248 284m² | 249 313m² | 250 313m² | 251 313m² | 252 284m² | 253 313m² | 254 313m² | 255 310m² | 256 313m² | 257 313m² | 258 284m² | 259 313m² | 260 313m² | 261 313m² | 262 284m² | 263 313m² | 264 313m² | 265 313m² | 266 284m² | 267 313m² | 268 313m²
269 307m² | 270 313m² | 271 313m² | 272 313m² | 273 313m² | 274 313m² | 275 313m² | 276 313m² | 277 313m² | 278 309m² | 279 313m² | 280 313m² | 281 313m² | 282 313m² | 283 313m²

LEGEND

- PROPERTY BOUNDARY
- LIMIT OF WORKS BOUNDARY
- C2 ZONING BOUNDARY
- STAGE BOUNDARY
- 1 STAGE NUMBER
- PROPOSED SITE BOUNDARY
- EXISTING LOT BOUNDARY
- PROPOSED KERB
- EXTENTS OF BATTER
- PROPOSED SWALE DRAIN
- OVERLAND FLOW PATH
- PROPOSED SITE
- FOOTPATH
- ROAD PAVEMENT
- VERGE (INCLUDING LANDSCAPING)
- OPEN SPACE
- RAINGARDEN
- DETENTION BASIN

CARPARKS

CARPARK 1	SPACES 1-6 (6 IN TOTAL)
CARPARK 2	SPACES 7-13 + 1 ACCESSIBLE SPACE & 1 SHARED AREA (7 IN TOTAL)
CARPARK 3	SPACES 14-18 (5 IN TOTAL)
CARPARK 4	SPACES 19-22 (4 IN TOTAL)
CARPARK 5	SPACES 23-29 (7 IN TOTAL)
CARPARK 6	SPACES 30-36 + 2 ACCESSIBLE SPACES & 1 SHARED AREA (7 IN TOTAL)
CARPARK 7	SPACES 37-44 (8 IN TOTAL)
CARPARK 8	SPACES 45-48 + 1 ACCESSIBLE SPACES & 1 SHARED AREA (4 IN TOTAL)

	PROPOSED
STANDARD	44
ACCESSIBLE	4
TOTAL	48

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ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
K	09.12.2024	LAYOUT AMENDMENTS	LK	ME	DATUM: N/A CONTOUR INTERVAL: N/A	A1 1:1000 — 0 25 50m — A3 1:2000	

• project management • civil engineering • infrastructure • superintendency • social impact • town planning • surveying • development feasibility • visualisation • urban design

drawing title:

SORRENTO MASTERPLAN

location: LOT 100 DP1286524 & LOT 11 DP615229, 40-80, 82 CHAPMANS ROAD, TUNCURRY

council: MIDCOAST COUNCIL

dwg ref: 190835-S2-MP

client: ALLAM PROPERTY GROUP

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Appendix B: Planning for Bushfire Protection 2019 Compliance Tables

Table 1: Aims and Objectives of Planning for Bushfire Protection 2019

Objectives	Satisfied	Comment
➢ Afford buildings and their occupants protection from exposure to a bush fire	✓	APZs along the interface with the vegetation within the site is provided by perimeter roads that separate the sites from the primary threat and adequate setbacks provide defendable space from areas of reduced vegetation. Consequently, there will be no dwellings exposed to radiant heat levels greater than 29kW/m^2.
➢ Provide for a defendable space to be located around buildings	✓	Where required, each site is provided with an APZ that accommodates a building footprint that will not be exposed to radiant heat levels exceeding 29kW/m^2. The APZ provides a defendable space that is capable of providing an environment in which a person can undertake property protection after the passage of bushfire with some level of safety.
➢ Provide appropriate separation between a hazard and buildings, which, in combination with other measures, prevent the likely fire spread to buildings	✓	The APZs have been calculated to provide a suitable buffer between any future dwellings and the bushfire hazard; commensurate with the vegetation formation and slope.
➢ Ensure that safe operational access and egress for emergency service personnel and residents is available	✓	All residents have direct access to multiple internal roads that lead in the opposite direction to the bushfire hazard. Due to the proposed road widths and road layout within the development site, emergency service personnel will continue to have unobstructed access to the site whilst residents are evacuating in the opposite direction.
➢ Provide for ongoing management and maintenance of BPMs	✓	All APZs are contained with common property or within land owned by operator and will be maintained by the operator of the MHE in accordance with Appendix 4 of the PBP 2019 and Standards for APZs.
➢ Ensure that utility services are adequate to meet the needs of firefighters	✓	The development includes all essential utility services to meet the needs of firefighters; including a reliable water supply.

Table 2: Performance Criteria and Acceptable Solutions for SFPP Developments (Chapter 6 PBP 2019)

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
6.8.1 ASSET PROTECTION ZONES Table 6.8a To provide suitable building design, construction and sufficient space to ensure that radiant heat levels at buildings does not exceed critical limits for firefighters and other emergency services personnel undertaking operations, including supporting or evacuating occupants.	Radiant heat levels of greater than 10kW/m^2 (1200K) are not experienced at any part of the building.	The building is provided with an APZ in accordance with Table A1.12.1. in Appendix 1.	✓	The proposed MHE has been designed to ensure APZs are provided to achieve the Performance Criteria for residential infill development.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	The APZ is not located on lands with a slope exceeding 18°	✓	All APZs are located on land with slopes 5° or less.
	APZs are managed and maintained to prevent the spread of a fire towards the building. The APZ is provided in perpetuity.	The APZ is managed in accordance with the requirements of Appendix 4 of PBP 2019 and is wholly within the boundaries of the development site.	✓	The APZ will be required to be maintained in accordance with Appendix 4 of the PBP 2019 and Standards for APZs by the operator of the MHE.
		Mechanisms are in place to provide for the maintenance of the APZ over the life of the development.	✓	
		Other structures located within the APZ need to be located further than 6m from the refuge building.	✓	Any ancillary structures will be greater than 6m from the primary structure.
	VARIATIONS: Manufactured Home Estates	An APZ in accordance with Table A1.12.1 in Appendix 1 of this document is provided to all new dwellings; or	✓	The site layout has been designed to ensure all sites are provided with sufficient area to provide a dwelling exposed to 29kW/m^2 or less. Whilst the proposed development does not seek consent for the construction of any new dwellings, the Community Management Statement shall include the BAL Contour Plan (**Figure 12**) and require each dwelling to be constructed to the nominated BAL rating. Furthermore, a suitably worded instrument(s) must be created pursuant to section 88 of the Conveyancing Act 1917 clearly outlining the require BAL ratings for each dwelling.
		An APZ in accordance with Table A1.12.2 in Appendix 1 of this document is provided where it is demonstrated that all new dwellings will be constructed in accordance with BAL-29.		
LANDSCAPING	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with APZ standards (see Appendix 4). Fencing is constructed in accordance with section 7.6.	✓	All new landscaping will be designed and planted in accordance with the guidelines relevant at the time of planting.

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
CONSTRUCTION	The proposed building can withstand bush fire attack in the form of wind, smoke, embers, radiant heat and flame contact.	A construction level of BAL-12.5 under AS3959 or NASH and Table 6.8a is applied	✓	Whilst the proposed development does not seek consent for the construction of any new dwellings, the Community Management Statement shall include the BAL Contour Plan (**Figure 12**) and require each dwelling to be constructed to the nominated BAL rating. Furthermore, a suitably worded instrument(s) must be created pursuant to section 88 of the Conveyancing Act 1917 clearly outlining the require BAL ratings for each dwelling.
	VARIATIONS: Manufactured Home Estates	Where an APZ in accordance with Table A1.12.1 in Appendix 1 of this document the construction standards for BAL-12.5 shall apply; or		
		Where an APZ in accordance with Table A1.12.2 in Appendix 1 of this document the construction standards for BAL-29 shall apply.		
6.8.2 **ACCESS** **Table 6.8b** To provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area. **FIREFIGHTING VEHICLES**	Firefighting vehicles are provided with safe all weather access to structures and hazard vegetation.	SFPP access roads are two-wheel drive, all-weather roads	✓	All roads are all-weather, sealed roads allowing safe and direct access for fire fighting vehicles to all lots.
		Access is provided to all structures and hazard vegetation.	✓	
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	✓	
		Access roads must provide suitable turning areas in accordance with Appendix 3.	✓	
ACCESS ROAD CAPACITY	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	✓	All new roads will have sufficient capacity to carry fully loaded fire fighting vehicles.
ACCESS TO WATER	There is appropriate access to water supply.	Hydrants ae located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	✓	A new water supply main will be located within the defendable space and multiple hydrants will be located directly to the north of the proposed ASB.
		Hydrants are provided in accordance with AS2419.1:2005	✓	
		There is suitable access for Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	✓	The proposed internal road network provides 8m wide perimeter roads and a secondary egress to Chapmans Road.
		8m carriageway width kerb to kerb.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches.	✓	
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating.	Minimum 5.5m width kerb to kerb.	✓	The proposed 6m wide non-perimeter roads provide safe circulation throughout the MHE offering multiple egress routes from every site.
		Parking is provided outside of the carriageway.	✓	
		Hydrants are to be located clear of parking areas.	✓	
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	✓	
		Curves of roads have a minimum inner radius of 6m.	✓	
		The maximum grade road is 15° and average grade is 10°.	✓	
		The road crossfall does not exceed 3°.	✓	
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches.	✓	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
6.8.3 SERVICES Table 6.8c To provide adequate services for water for the protection of buildings during and after the passage of a bushfire, and not to locate gas and electricity so as not to contribute to the risk of fire to a building. **WATER**	A water supply is provided for firefighting purposes	Reticulated water is to be provided to the development, where available	✓	A reticulated water supply is provided.
		A static water supply is provided where no reticulated water is available	**N/A**	
	Water supplies are located at regular intervals The water supply is accessible and reliable for firefighting operations	Fire hydrant spacing, design and sizing comply with AS2419.1:2005;	✓	A series of fire hydrants will be located throughout the MHE.
		Hydrants are not located within any road carriageway;	✓	
		Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.	✓	A new water supply ring main will be provided throughout the new component of the MHE.
	Flows and pressures are appropriate	Fire hydrant flows and pressures comply with AS2419.1:2005.	✓	
	The integrity of the water supply is maintained	All above ground water service pipes are metal, including and up to any taps.	**N/A**	
ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	✓	All transmission lines will be located underground.
		Where overhead electrical transmission lines are proposed as follows: - lines are installed with short pole spacing (30 metres), 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	**N/A**	

Intent of Measure	Performance Criteria	Acceptable Solution	Complies	Comment
GAS	Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas is installed and maintained in accordance with AS 1596:2014 and the requirements of relevant authorities, metal piping is to be used.	✓ **Able to comply**	
		All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side;	✓	All tanked gas stored on site will be sited and secured with appropriate shielded from the bushfire hazard.
		Connections to and from gas cylinders are metal:	✓	
		Polymer-sheathed flexible gas supply lines are not used; and	✓	
		Above-ground gas service pipes are metal, including and up to any outlets.	✓	
6.8.4 EMERGENCY MANAGEMENT PLANNING **Table 6.8d** To provide suitable emergency and evacuation arrangements for occupants of SFPP developments	A bush fire emergency and evacuation management plan is prepared.	Bush fire emergency management and evacuation plan is prepared consistent with the: ❑ the NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan; and ❑ AS3745:2010 Planning for emergencies in facilities.	✓ **Able to comply**	A Bushfire Management Plan is recommended to be prepared for the MHE.
		The emergency and evacuation management plan should include a mechanism for the early relocation of occupants.	✓ **Able to comply**	
	Appropriate and adequate management arrangements are established for consultation and implementation of the bush fire emergency and evacuation management plan.	An Emergency Planning Committee is established to consult with residents and staff in developing and implementing an Emergency Procedures Manual.	✓ **Able to comply**	Where required, consultation with staff and residents will be undertaken during the preparation of the Bushfire Management Plan.
		Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as started in AS3745 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	✓ **Able to comply**	

Appendix C: AHIMS Report

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2197 Tuncurry MHE S2

Client Service ID : 951400

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

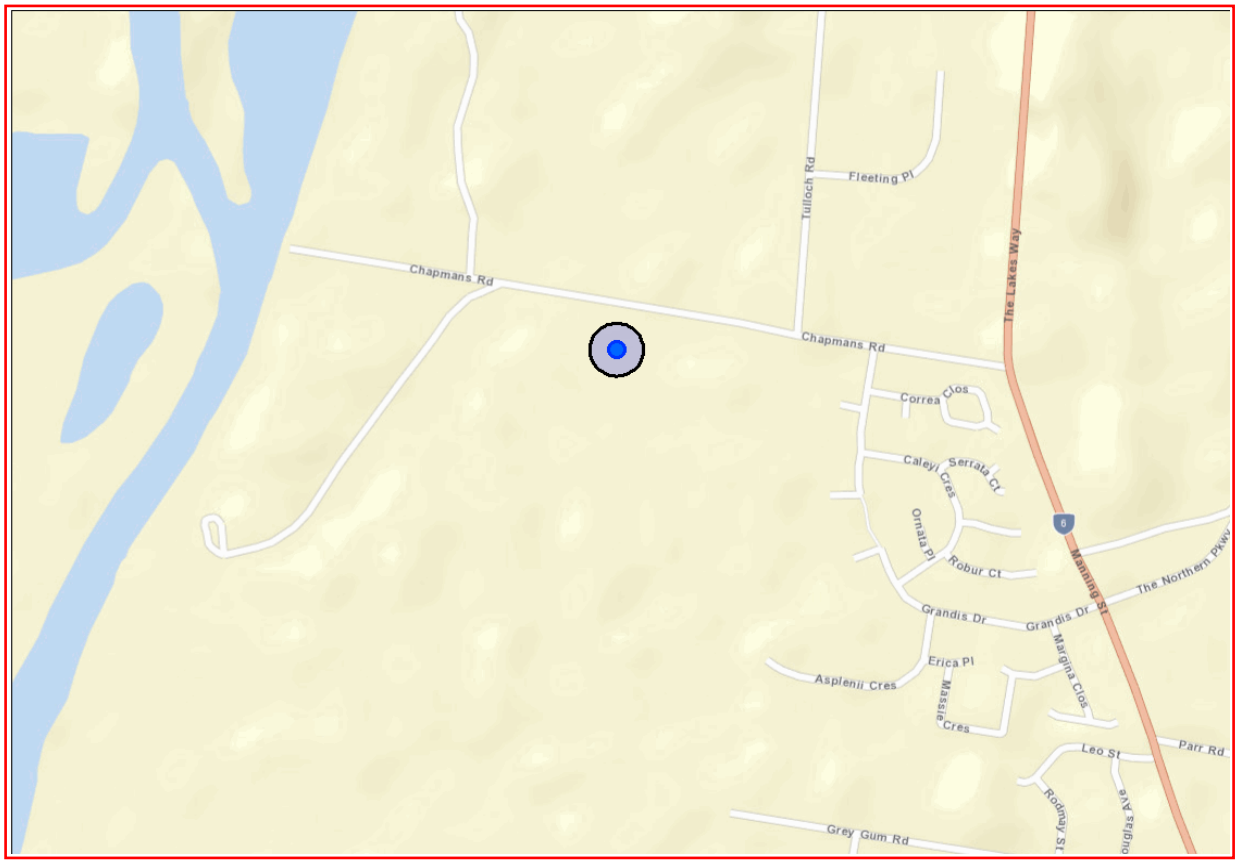
Email: klmukevski@bigpond.com

Date: 18 November 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 40-80 CHAPMANS ROAD TUNCURRY 2428 with a Buffer of 50 meters, conducted by Katrina Greville on 18 November 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : 2197 Tuncurry

Client Service ID : 951402

Katrina Greville

21 Costata Crescent
Adamstown New South Wales 2289

Attention: Katrina Greville

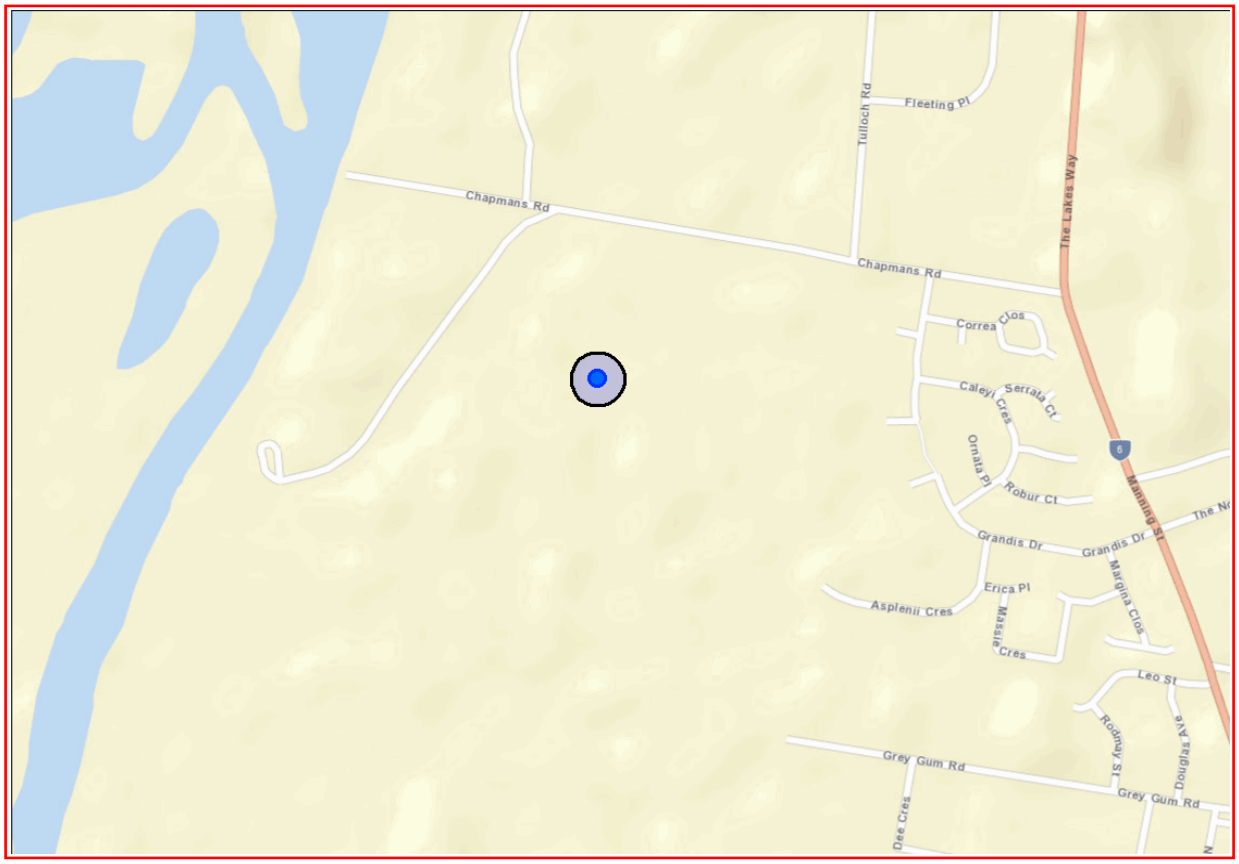
Email: klmukevski@bigpond.com

Date: 18 November 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 82 CHAPMANS ROAD TUNCURRY 2428 with a Buffer of 50 meters, conducted by Katrina Greville on 18 November 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

Appendix D: NBC Bushfire Attack Assessor V4.1 - Modelling Results

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 25/11/2024 **Assessment Date:** 25/11/2024

Site Street Address: 2197 40-82 Chapmans Road MHE Stage 2, Tuncurry

Assessor: Stuart Greville; Bushfire Planning Australia

Local Government Area: Mid-Coast **Alpine Area:** No

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: T1 North - Managed Land

Vegetation Information

Vegetation Type: Non-Hazard
Vegetation Group: Non-Hazard
Vegetation Slope: 0.9 Degrees **Vegetation Slope Type:** Upslope
Surface Fuel Load(t/ha): 0 **Overall Fuel Load(t/ha):** 0
Vegetation Height(m): 0 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees **Site Slope Type:** Downslope
Elevation of Receiver(m): Default **APZ/Separation(m):** 1

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 29 **Peak Elevation of Receiver(m):** 0
Radiant Heat(kW/m2): 29 **Flame Angle (degrees):** 0
Flame Length(m): 0 **Maximum View Factor:** 0
Rate Of Spread (km/h): 0 **Inner Protection Area(m):** 1
Transmissivity: 0.905 **Outer Protection Area(m):** 0
Fire Intensity(kW/m): 0

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	0	0	0	0	0	6

Run Description:	T10 West		
Vegetation Information			
Vegetation Type:	Coastal Freshwater Lagoons		
Vegetation Group:	Freshwater Wetlands		
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	4.4	**Overall Fuel Load(t/ha):**	4.4
Vegetation Height(m):	1	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	5
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 29	**Peak Elevation of Receiver(m):**	1.8
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	65
Flame Length(m):	3.98	**Maximum View Factor:**	0.429
Rate Of Spread (km/h):	2.3	**Inner Protection Area(m):**	0
Transmissivity:	0.888	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	5233		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	0	0	0	0	0	0

Run Description:	T11 West		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	8.03
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	18.2	**Maximum View Factor:**	0.452
Rate Of Spread (km/h):	2.17	**Inner Protection Area(m):**	0
Transmissivity:	0.845	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	38225		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	29	40	60	6

Run Description:	T2 North-east		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0.9 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	7.66
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	17.35	**Maximum View Factor:**	0.45
Rate Of Spread (km/h):	2.04	**Inner Protection Area(m):**	0
Transmissivity:	0.847	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	35923		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	19	28	38	58	6

Run Description:	T3 Onsite NE corner		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0.2 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	7.95
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	18	**Maximum View Factor:**	0.451
Rate Of Spread (km/h):	2.14	**Inner Protection Area(m):**	0
Transmissivity:	0.845	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	37701		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	28	39	60	6

Run Description:	T4 East		
Vegetation Information			
Vegetation Type:	Coastal Dune DSF		
Vegetation Group:	Dry Sclerophyll Forests (Shrubby)		
Vegetation Slope:	0.5 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	20.5	**Overall Fuel Load(t/ha):**	31.1
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	18
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 29	**Peak Elevation of Receiver(m):**	7.1
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	16.08	**Maximum View Factor:**	0.449
Rate Of Spread (km/h):	1.9	**Inner Protection Area(m):**	0
Transmissivity:	0.85	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	30550		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	14	18	26	36	56	6

Run Description: T5 South-east

Vegetation Information

Vegetation Type: Coastal Dune DSF

Vegetation Group: Dry Sclerophyll Forests (Shrubby)

Vegetation Slope: 0.5 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 20.5

Overall Fuel Load(t/ha): 31.1

Vegetation Height(m): 2 Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 18

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 29

Peak Elevation of Receiver(m): 7.1

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 62

Flame Length(m): 16.08

Maximum View Factor: 0.449

Rate Of Spread (km/h): 1.9

Inner Protection Area(m): 0

Transmissivity: 0.85

Outer Protection Area(m): 0

Fire Intensity(kW/m): 30550

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	14	18	26	36	56	6

Run Description: T6 On-site Proposed Road

Vegetation Information

Vegetation Type: Non-Hazard

Vegetation Group: Non-Hazard

Vegetation Slope: 0 Degrees

Vegetation Slope Type: Level

Surface Fuel Load(t/ha): 0

Overall Fuel Load(t/ha): 0

Vegetation Height(m): 0

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 1

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 29

Peak Elevation of Receiver(m): 0

Radiant Heat(kW/m2): 29

Flame Angle (degrees): 0

Flame Length(m): 0

Maximum View Factor: 0

Rate Of Spread (km/h): 0

Inner Protection Area(m): 0

Transmissivity: 0.905

Outer Protection Area(m): 0

Fire Intensity(kW/m): 0

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	0	0	0	0	0	6

Run Description:	T7 South		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	8.03
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	18.2	**Maximum View Factor:**	0.452
Rate Of Spread (km/h):	2.17	**Inner Protection Area(m):**	0
Transmissivity:	0.845	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	38225		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	29	40	60	6

Run Description:	T8 South-west		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0.1 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	7.98
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	18.07	**Maximum View Factor:**	0.452
Rate Of Spread (km/h):	2.15	**Inner Protection Area(m):**	0
Transmissivity:	0.845	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	37962		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	29	39	60	6

Run Description:	T9 Onsite Retained veg in South-west corner		
Vegetation Information			
Vegetation Type:	Coastal Swamp Forests		
Vegetation Group:	Forested Wetlands		
Vegetation Slope:	0.1 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	22.6	**Overall Fuel Load(t/ha):**	34.1
Vegetation Height(m):	1.4	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
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 29	**Peak Elevation of Receiver(m):**	7.98
Radiant Heat(kW/m2):	29	**Flame Angle (degrees):**	62
Flame Length(m):	18.07	**Maximum View Factor:**	0.452
Rate Of Spread (km/h):	2.15	**Inner Protection Area(m):**	0
Transmissivity:	0.845	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	37962		

BAL Thresholds

	BAL-40:	BAL-29:	BAL-19:	BAL-12.5:	10 kw/m2:	Elevation of Receiver:
Asset Protection Zone(m):	15	20	29	39	60	6