BEMC

Bushfire Environmental Management Consultancy

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

BUSH FIRE ASSESSMENT REPORT

Special Fire Protection Purpose

40 & 42 Gordon Street, Port Macquarie, NSW

Reference # 231186

FPA AUSTRALIA BRONZE MEMBER Fire Protection Association Australia

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Disclaimer

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Title	Bush Fire Assessment Report – Special Fire Protection Purpose			
Description	Special Fire Protection Purpose 40 & 42 Gordon Street, Port Macquarie, NSW			
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Abbreviations and Acronyms

AHIMS	Aboriginal Historic Information Management System
APZ	Asset Protection Zone
AS/NZS 1221:1997	Australian Standard – Fire hose reels
AS1596-2014	Australian Standard – The storage and handling of LP Gas
AS2419-2021	Australian Standard – Fire hydrant installations
AS2441:2005	Australian Standard – Fire hose reels installation
AS3745:2010	Australian Standard – Planning for emergencies in facilities
AS3959-2018	Australian Standard – Construction of buildings in bush fire prone areas
AS4083:2010	Planning for emergencies – Health care facilities
BAL	Bush fire Attack Level
BCA	Building Code of Australia
BFSS	Bush Fire Strategic Study
BPA	Bush fire Prone Area (Also Bush fire Prone Land)
BPL Map	Bush fire Prone Land Map
BPMs	Bush fire Protection Measures
BV	Biodiversity Values
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
FFDI	Forest Fire Danger Index
GFDI	Grass Fire Danger Index
ha	Hectare
HOC	Heat Of Combustion
IPA	Inner Protection Area
kJ/kg	Kilo Joules per Kilo gram
LGA	Local Government Area
LAT	Large Air Tanker
OPA	Outer Protection Area
PBP	Planning for Bush fire Protection
RF Act	*Rural Fires Act 1997*
RF Regs	*Rural Fires Regulations 2013*
RHG	Restricted Head Growth
SEED	Central Resource for Sharing and Enabling Environmental Data
SFR	Short Fire Run
SFPP	Special Fire Protection Purpose

1 EXECUTIVE SUMMARY

BEMC Pty Ltd was engaged by CO.OP Studio Pty Ltd to complete a Bush Fire Assessment Report (BFAR) on proposed Special Fire Protection Purpose at 40 & 42 Gordon Street, Port Macquarie, NSW **(Figure 1, page 6).** The proposed development is an public assembly (>500m^2) which includes aquatic facility containing indoor and outdoor pools, amenities, administration, and gym.

BEMC has used Method 1 assessment pathway from PBP 2019 to undertake this assessment and to prepare the Bush Fire Assessment Report (BFAR).

Based upon the assessment, perusal of the site plan prepared by CO.OP Studio **(Appendix 1, page 28)**, and a site visit, it is recommended that development consent be granted subject to the following conditions to comply with PBP 2019.

Only the carparking area is located within 100m of the classifiable vegetation that creates a bushfire treat, with all buildings located >100m from the vegetation that creates a bushfire threat.

The vegetation that creates a bushfire threat is restricted in size and fuel load due to riparian vegetation and narrow width, with limited continuity with surrounding forested areas.

The analysis completed indicates the proposed development is outside the 100m distance (Bushfire prone area 100m buffer) from classifiable vegetation in accordance with Planning for Bushfire Protection 2019. And in accordance with PBP2019 found the risk of bushfire to be low.

A Landscaping plan is required to illustrate vegetation will not be introduced within 100m of the buildings, and if provided will comply to the below standards:

- Compliance with APZ standards within Appendix 4 of PBP 2019,
- If fencing, retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed of non-combustible materials,
- A minimum 1-metre-wide area (or to the property boundary where the setbacks are less than 1 metre), suitable for pedestrian traffic, must be provided around the immediate curtilage of the building.
- Planting is limited in the immediate vicinity of the building.
- Planting does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters).
- Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do no touch or overhang buildings.
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies.
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown.
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter)
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building.
- Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and
- Low flammability vegetation species are used.

The bushfire risk to a building outside 100m distance from classifiable vegetation are considered low risk. **The risk of a bushfire to these buildings is so low that specific bushfire planning and construction requirements are not required in accordance with PBP 2019.**

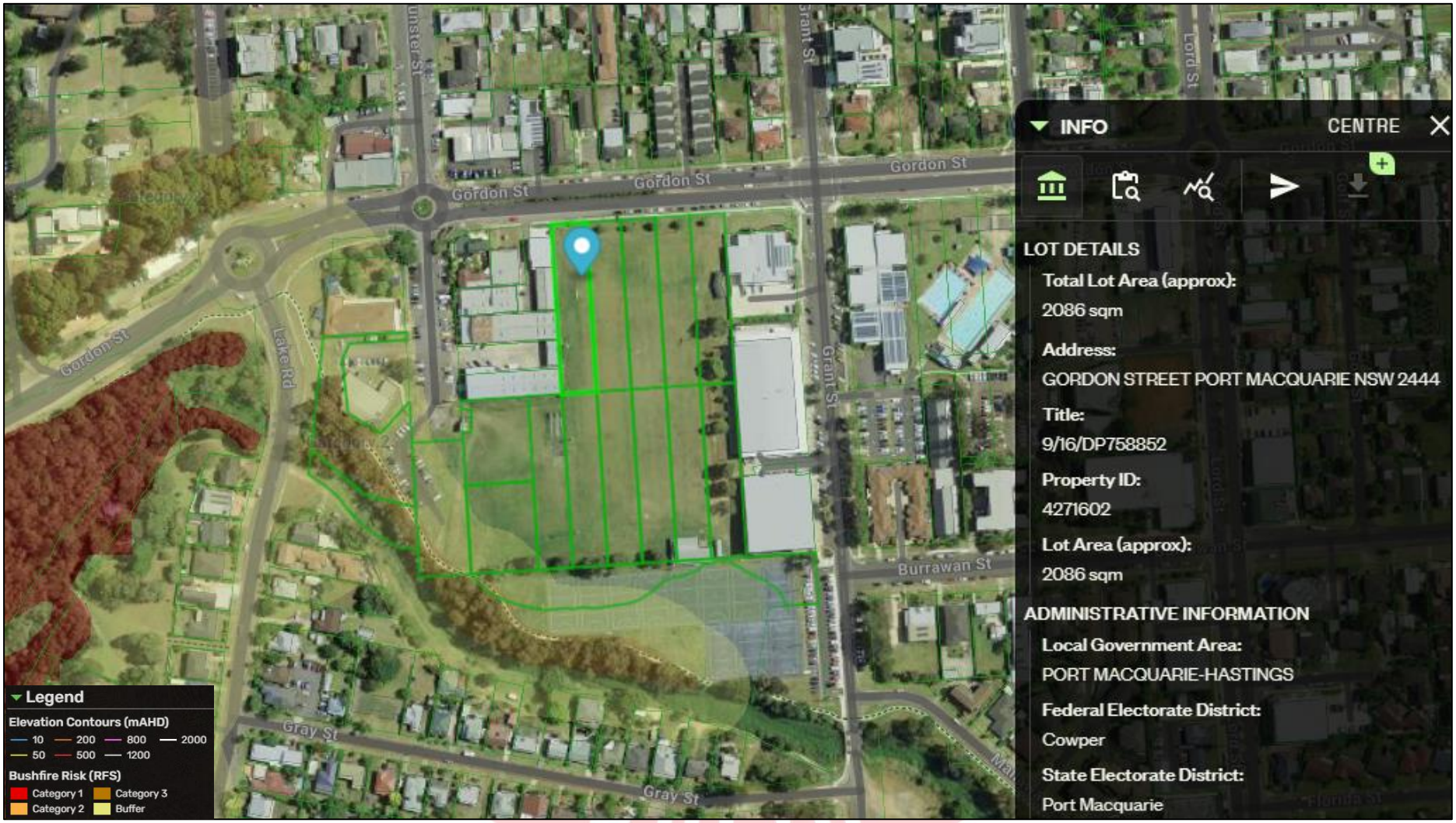

Figure 1 *Property Location of 40 & 42 Gordon Street, Port Macquarie, NSW (Mecone Mosaic, 2023)*

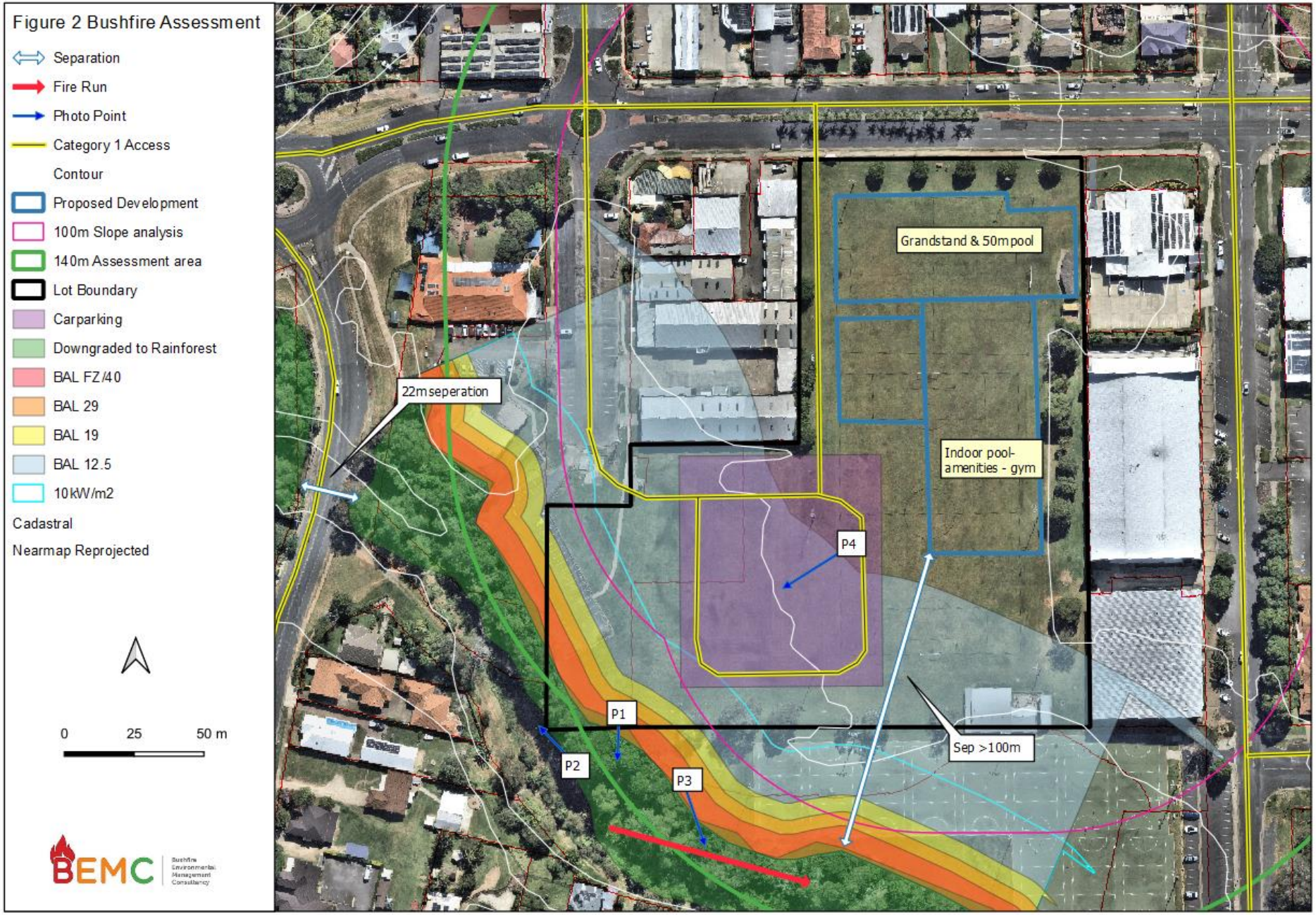
Figure 2 Bushfire Assessment
Separation
Fire Run
Photo Point
Category 1 Access
Contour
Proposed Development
100m Slope analysis
140m Assessment area
Lot Boundary
Carparking
Downgraded to Rainforest
BAL FZ/40
BAL 29
BAL 19
BAL 12.5
10kW/m2
Cadastral
Nearmap Reprojected
0
25
50 m
BEMC
Grandstand & 50m pool
Indoor pool- amenities - gym
22m seperation
P1
P2
P3
P4
Sep >100m

2 INTRODUCTION

BEMC Pty Ltd was engaged by CO.OP Studio Pty Ltd to complete a Bush Fire Assessment Report (BFAR) to accompany a Development Application for Special Fire Protection Purpose located at 40 & 42 Gordon Street, Port Macquarie, NSW (**Figure 1, page 6**).

The identification of bush fire prone lands (BPL Map) in NSW is required under s 10.3 of the *EP&A Act*. S. 4.14 of the *EP&A Act* requires development to compliance with Planning for Bushfire Protection, 2019 (PBP 2019) if any part of a development site is affected by bush fire hazard as indicated within the BPL Map.

It is clear from the investigation and assessment of proposal; the site is located within Bush fire Prone Land. This development falls within identified bush fire affected land within the Port Macquarie-Hastings Council bush fire prone land map and the applicant is required to submit a bush fire assessment consistent with PBP 2019.

If the applicant determines that the project is integrated through the Development Application process, this document can support an application for *General Terms of Agreement* via a *Bush Fire Safety Authority* (BFSA) from NSW Rural Fire Service (RFS) as the report adheres to the requirements of s 45 of the *Rural Fires Regulation* 2013 (RF Regs), Appendix 1, A2.1, A2.1.1 of PBP 2019. The proposed development is not listed under s 46 of the Rural Fire Regulation 2013 (*RF Regs*) excluded from requirements for BFSA. The proposed development is listed under s 47 of the RF Reg as an additional Special Fire Protection Purpose (SFPP) development requiring a BFSA.

Site Particulars are illustrated within **Table 1 below** and **Figure 1, page 6,** and subdivision plans in **Appendix 1, page 28.**

2.1 DESCRIPTION OF PROPOSED DEVELOPMENT

The proposed development is an aquatic facility containing indoor and outdoor pools, amenities, administration & gym. As a result, the required objectives for Special Fire Protection Purpose Development have been considered in this assessment.

Table 1 *Description of Proposed development*

Boundaries	Existing buildings east and west, Gordon Street north, sporadic vegetation south and west.
Topography	Flat
Type of development	SFPP – Aquatic Centre
Proposed buildings	Carpark, pools, office, amenities.
Landscaping plan provided	No
Current land-use	Football fields
Fire weather	Port Macquarie-Hastings - FFDI – 80

The proposed location of the development is provided in **Figure 1, page 6** with further development details provided in **Appendix 1, page 28**.

2.2 Objectives of Assessment

To assess the proposed development in consideration of s4.14 of the EP&A Act 1979, PBP 2019 and AS 3959:2018 to enable council to make a determination.

This report assesses whether the development meets the six objectives listed in section 1.1 of PBP 2019, which provide for the protection of human life and minimize impacts on property as follows:

1. Afford buildings and their occupants protection from exposure to a bush fire.
2. Provide for a defendable space to be located around buildings.
3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.
4. Ensure appropriate operation access and egress for emergency services personnel and residents is available.
5. Provide for ongoing management and maintenance of Bush fire Protection Measures (BPMs); and
6. Ensure the utility services are adequate to meet the needs of firefighters.

2.3 Specific Objectives of Special Fire Protection Purpose Developments

The aims and objectives listed in section 1.1 of PBP 2019 remain applicable to Special Fire Protection Purpose developments, however further consideration has been given to these types of developments to ensure Bush fire Protection Measures (BPMs) are fully incorporated at the design stage of the development. The specific objectives of Special Fire Protection Purpose developments outlined in section 6.2 of PBP 2019 are:

- Minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building
  design and siting.
- Provide 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.

3 BUSH FIRE STRATEGIC STUDY

Planning for Bushfire Protection (2019) is based on the worst-case scenarios for each of the bush fire behaviour elements of fire weather, vegetation, slope and assumes not human intervention. All development shall be assessed on an individual basis as broad-brush approaches of documents such as PBP 2019 may not be applicable in every instance.

A Bush Fire Risk Strategic Study (BFRSS) was prepared to inform the context of the Bush Fire Assessment Report (BFAR). The level of information gathered and analysis within the BFRSS depends upon the nature and scale of the development. The BFRSS provides a broad-brush approach to determine landscape wildfire risk in considerations of vegetation continuity, distribution, and proximity to development; human intervention; access and evacuation. This enables an assessment the *actual* bushfire risk, determine if strict adherence to PBP 2019 is warranted, and if a proposed development is appropriate in the bush fire hazard context.

Table 2 *Bush fire risk strategic study*

ELEMENT	Low Threat		Moderate Threat		High Threat		Extreme Threat	
Adjoining Lands	The proposed development and changing land use will have positive impacts on the ability of adjoining landowners to implement Bush fire Protection Measures		The proposed development and changing land use do not impact on the ability of adjoining landowners to implement Bush fire Protection Measures	√	The proposed development and changing land use do not impact on the ability of adjoining landowners to implement Bush fire Protection Measures		The proposed development will significantly impact on the wildfire risk profile of adjoining lands.	
Surrounding infrastructure	The proposed development does not significantly impact on community water, electricity, or gas services.		The proposed development is associated with community water, electricity, or gas services but will not have significant impact.	√	The proposed development impact on community water, electricity, or gas services.		The wildfire risk profile of significant infrastructure will increase due to this development.	
Emergency services	The proposed development does not significantly impact on the ability of emergency services to plan, prepare, respond, or recover prior, during or after a bush fire event.		The proposed development is located within 30-minute flight from a Large Air Tanker (LAT) airbase and within 30-minutes of multiple fire response units.	√	The proposed development is located more than 30-minute flight from a Large Air Tanker (LAT) airbase and only 1 or 2 fire response units within 30-minutes.		It is unlikely emergency services will respond to wildfire in this location during extreme and catastrophic events.	

ELEMENT	Low Threat		Moderate Threat		High Threat		Extreme Threat	
Access	Good, multiple route evacuation is possible and connects with the public road network in a direction away from the wildfire threat to shelter location.	√	More than one access or egress routes is provided from the property to a safer location which then can access the public road network with multiple access/egress routes o shelter location.		One access or egress routes is provided, which is <200m from the property to a safer location.		Only one access or egress route with no nearby safe location.	
Emergency egress	Seamless integration with existing settlement - no effect on evacuation.	√	Short bushland pinch points that may restrict access temporarily or carry fire across roads. Unlikely impact on evacuation.		Pinch points that are likely to restrict access along evacuation routes for short periods (15-30mins) and carry fire across roads.		Large areas of bushland or multiple pinch points along evacuation routes that could block evacuation routes for an extended time.	
Vegetation continuity	Forested vegetation beyond 140m form the site is scattered with low continuity due to built development.	√	Forested vegetation beyond 140m form the site is scattered and isolated, forming a dominate fast moving grassland and open woodland fire event.		Patches of forested vegetation associated riparian and isolated ridgelines beyond 140m from the site may result in localised fire event.		Continuous forested areas within mountainous terrain beyond 140m from the site will result in broadscale landscape emergency management operations.	
Vegetation connectiveness	Forested vegetation corridors beyond 140m are restricted and do not enable landscape fire to enter and move through the site by a continuous fire path.	√	Forested vegetation corridors beyond 140m from the site exist, although grasslands >100m provide separations between forested vegetation restricting the fire head progression of landscape fire.		Forested vegetation corridors beyond 140m from the site exist, although grasslands <100m provide separations between forested vegetation restricting the fire head progression of landscape fire.		Forested vegetation corridors beyond 140m from the site provide for passage of landscape fire to enter and move through the site.	
Vegetation Location	Wildfire can only approach from one direction surrounded by a suburban, township or urban area managed in a minimum fuel condition.		Wildfire can only approach from two directions and the site is within a suburban, township or urban area managed in a minimum fuel condition.	√	Wildfire can approach from several directions although gaps within forested vegetation or are present.		Wildfire can approach from several directions and have hours or days to grow and develop before impacting and/or site is surrounded by unmanaged vegetation.	
Separation	Hazard separation between extreme wildfire hazard and buildings of greater than 100m.		Hazard separation between extreme wildfire hazard and buildings of 50-100m	√	Hazard separation between extreme wildfire hazard and buildings of 30-50m		Hazard separation between extreme wildfire hazard and buildings of <30m	

ELEMENT	Low Threat		Moderate Threat		High Threat		Extreme Threat	
Vegetation flammability	Within the dominated fire direction, the fire fuel is restricted to surface, partially managed and separated through land use practises.	√	Within the dominated fire direction, the fire fuel is highly aerated, with significant separations (>50m) between these patches with partially managed vegetation between.		Within the dominated fire direction, the fire fuel is highly aerated, with <50m between these patches with partially managed vegetation between		Within the dominated fire direction, the fire fuel is highly aerated, continuous continuity vertically and horizontally with flammable species.	
Wildfire Behaviour	Extreme Wildfire behaviour at the site is not possible given the broader landscape.		Extreme Wildfire behaviour at the site is unlikely given the broader landscape.	√	Extreme Wildfire behaviour at the site is likely given the broader landscape.		Extreme Wildfire behaviour at the site is very likely given the broader landscape.	
TOTAL		√						
Overall Threat Rating:	Wildfire provides **LOW** threat to this proposal							

In this case, a **low** threat has been determined and strict compliance with PBP is not warranted due to:

- Forested vegetation beyond 140m form the site is scattered with low continuity due to built development.
- Within the dominated fire direction, the fire fuel is restricted to surface, partially managed and separated through land use practises.
- Extreme Wildfire behaviour at the site is unlikely given the broader landscape.

4 BUSH FIRE HAZARD ASSESSMENT

This section details the site assessment methodology in Appendix 1 of PBP2019 and includes the requirements of s44 of the RF Regs. It provides detailed analysis of the vegetation, slope, vegetation exclusions and downgrades to quantify the required Bush fire Protection Measures (BPMs).

4.1 FIRE DANGER INDEX

This assessment utilises Port Macquarie-Hastings Council area with a FFDI 80.

4.2 ASSESSMENT METHODOLOGY

The assessment of the vegetation, slope and other bush fire characteristics within and surrounding the site has been carried out with the aid of the following:

- Nearmap, sixmap aerial photograph interpretation.
- Kogan 6*25 laser distance finder.
- Photo theodolite application supported by contour and LiDAR DEMs terrain profiles.
- SEED Portal - Sharing and Enabling NSW Environmental Data portal.
- Reference to regional vegetation community mapping, and
- Site assessment in June 2023.

4.3 VEGETATION ASSESSMENT

In accordance with PBP 2019, an assessment of the vegetation over 140m in all directions from the building was undertaken. Consideration is provided to any clearing, re-vegetation or landscaping likely to occur to obtain the worst-case scenario and derived maximum fuel loads.

Vegetation that may be considered a bush fire hazard was identified and classification based on available fuel loads for sub-formations are provided through vegetation fuel monitoring project administered by the University of Wollongong, University of Melbourne and CSRO Ecosystems Science and Bush fire Dynamics and Applications. The results of this research are commonly referred to as the '*NSW Comprehensive Fuel Loads*'.

Stream order watercourses (Strahler system - *Water Management (General) Regulation 2018*) through the 140m assessment area have been identified. If this vegetation is proposed to be impacted the proposal is likely to require assessment and approval by the NSW Department of Primary Industries (DPI) Office of Water.

Vegetation within the 140m Assessment area is identified within the Biodiversity Values (BV) Map provided in **Appendix 4. page 32**. If this vegetation is proposed to be impacted by the application bushfire protection measures (such as APZ and access), ecological assessment will be required in accordance with the *Biodiversity Conservation Act* 2016.

The area is not identified within the Areas of Regional Koala Significance (ARKS).

SEED Portal - Sharing and Enabling NSW Environmental Data portal and regional vegetation community mapping has been analysed to determine the vegetation in and around the development, which is illustrated in **Figure 3, page 14**.

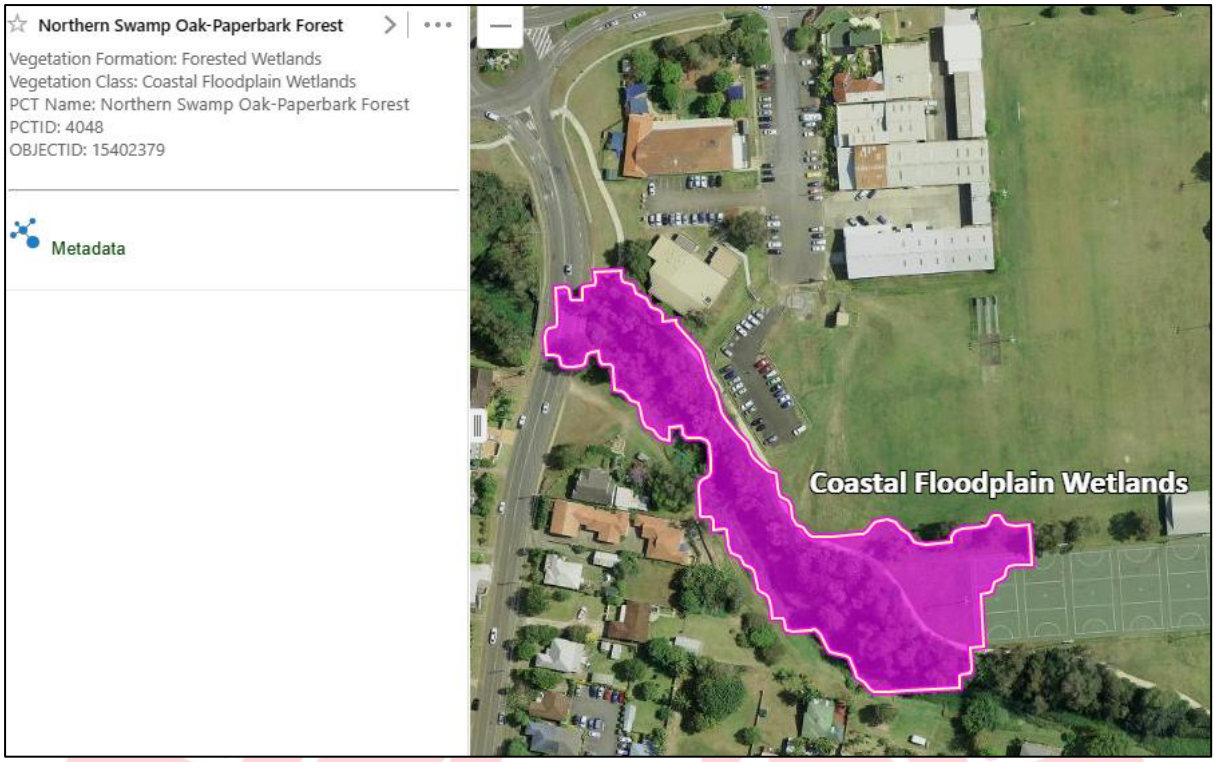

Figure 3 *Vegetation in and around the site (Extract from the SEED Portal)*

4.3.1 Vegetation classification, exclusions, and downgrades

An analysis of the vegetation in and around the site has determined that no vegetation exclusions or down grades are included in this assessment**.**

The size and shape of small areas of vegetation influences the behaviour of bush fires and the associated risk to the built environment. Section A1.10 of PBP 2019 determines small or narrow parcels of vegetation have less opportunity to support fully developed bush fires because of their limited size. Modified landscapes, coastal wetlands and riparian areas vary significantly in structure and composition, but are generally considered as bush fire hazards, except for saline wetlands. Non-hazard and non-vegetated areas are not required to be considered for the purposes of PBP 2019.

Anecdotal evidence obtained from previous fire events indicates that exotic vegetation species (weed species) support intense surface fires. Under adverse fire weather conditions these plants can contribute to the intensity of bush fires due to additional fuel loads. Exotic vegetation species display similar fire behaviour characteristics to some native vegetation classifications with lower fuel loads. Table A1.9 of PBP 2019 can be used to convert the exotic vegetation to native vegetation formations and fuel loads. Where a mixture of exotic and native vegetation exists, the native vegetation fuel loads will apply.

The vegetation to the south-west of the development, illustrated in **Appendix 2** has been downgraded through A1.9 of PBP due the dominance of exotic vegetation, high moisture levels, high disturbance regimes to fire fuel load comparable to *Rainforests*.

4.3.2 Predominant Vegetation Classification

Vegetation in and around the site is classified as Rainforest in accordance with PBP 2019.

4.4 Separation Assessment

The separation between the proposed building envelope and the classifiable vegetation that creates bush fire threat is one of the significant BPMs to reduce the risk of bush fire impacting on the development. The land within the separation must conform to the standards of an Asset Protection Zone (APZ) to be accepted within the separation areas.

The separations between the classifiable vegetation and the proposed dwellings are provided in **Table 3, page 16,** illustrated in **Figure 2, page 7.**

4.5 Slope Assessment

This section details the site assessment methodology in Appendix 1 of PBP2019 to assess the effective slope (under classified vegetation) and site slope (slope between the vegetation and proposed development) within 100m of the proposed building envelope.

The effective and site slopes used within this assessment are provided in **Table 3 page 16**, illustrated in **Figure 2, page 7**.

4.5.1 Effective and Site Slope Assessment

The slope of the land under the classified vegetation has a direct influence on the rate of fire spread, the intensity of the fire and the ultimate level of radiant heat flux.

The effective slope is the slope of the ground under the hazard (vegetation). The slope between the vegetation and the proposed building envelope is the site slope. When identifying the effective and site slopes, it may be found that there are a variety of slopes covering different distances. The effective slope is the slope under the vegetation which will most significantly influence the bush fire behaviour for each aspect.

4.6 Shielding

Where an elevation is shielded from direct radiant heat arising from bush fire attack, then the construction requirements for that elevation can be reduced to the next lower BAL rating. An elevation is deemed to be not exposed to the source of bush fire attack if all the straight lines between that elevation and the source of bush fire attack are obstructed by another part of the building.

The shielding of an elevation shall apply to all the elements of the wall but shall not apply to subfloors or roofs. The construction requirements for a shielded elevation shall not be less than that required for BAL-12.5 unless the building has been assessed as being BAL-LOW. The reduced construction requirements do not apply where any elevation is BAL-FZ.

Outcomes of the Bushfire Attack Level assessment are outlined in **Table 3, page 16**.

Table 3 *Outcomes for the property with respect to Bush fire Hazard Assessment (Method 1 PBP 2019)*

Elements	Method (unit)	Fire Run 1
Vegetation	NSW Comprehensive Fuel Loads	Rainforest
Provided Separation	Site -Laser finder (m)	>100m
Effective slope	Site visit – Theodolite (°)	Level
OUTPUTS (Table A1.12.6 of PBP 2019)		
	Separation to Achieve BALFZ/40	<-9m
	Separation to Achieve BAL29	9m < -14m
	Separation to Achieve BAL19	14m < - 20m
	Separation to Achieve BAL12.5	20m < -100m
	Separation to Achieve 10kW/m²	38m
	Bush fire Attack Level (BAL)	**BAL -LOW**

5 ADDITIONAL S. 45 REQUIREMENTS

S. 45 of the RF Reg indicates the assessment requirements for s 100B RF Act developments to obtain a bush Fire Safety Authority. This section illustrates the remaining elements identified within S. 45 of the RF Reg that are not covered within bush fire hazard assessment process (section 3 and 4 of this report) or within the performance criteria of PBP 2019 (section 6 of this report).

5.1 CL (2) (E) AND (F) S.45 RF REGS - THREATENED SPECIES, POPULATIONS AND COMMUNITIES

A search on the NSW Government Central Resource for Sharing and Enabling Environmental Data for significant environmental values was completed.

The search identified no Critical Endangered Ecological Communities (CEEC) or species listed under the *Biodiversity Conservation Act 2016* near or within the site.

The results of the Sharing and Enabling Environmental Data is provided in **Appendix 3, page 31.**

There will be no additional impacts on natural heritage values.

Vegetation within the 140m Assessment area is identified within the Biodiversity Values (BV) Map provided in **Appendix 4, page 32**. If this vegetation is proposed to be impacted by the application bushfire protection measures (such as APZ and access), ecological assessment will be required in accordance with the *Biodiversity Conservation Act* 2016.

A search of the Aboriginal Historic Information Management System (AHIMS) was completed on the 28th May 2023 which indicated no known areas of aboriginal significance within the development area.

The output of the search is provided in **Appendix 5, page 33.**

There will be no additional impacts on cultural heritage values**.**

5.2 CL (2) (G) ADDITIONAL BUSH FIRE ASSESSMENT

The capacity of nearby public roads to handle increased volumes of traffic when a bush fire emergency occurs.

The surrounding public road system is two-way, sealed with multiple routes to safer places away from the bush fire threat. This designed will be able to accommodate the elevated level of traffic created by this development.

Whether or not nearby public roads that link with the fire trail network have two-way access.

No linkages between the public road system and fire trails exist within the assessment area.

The adequacy of sprinkler systems and other fire protection measures to be incorporated into the development.

There are no bushfire spray systems or fire protection measure proposed outside the performance criteria for subdivisions.

Registered fire trails on the property.

No registered fire trails are located on the property.

5.3 PBP 2019 Addendum

The 2022 edition of the National Construction Code (NCC 2022) contains amendments to its bush fire protection provisions. This includes a suite of new provisions for Class 9 Buildings in bush fire prone areas that accommodate certain types of vulnerable occupants. This Addendum aligns Planning for Bush Fire Protection 2019 (PBP 2019) with NCC 2022.

The effective date of this Addendum is 1 May 2023 to coincide with adoption of the National Construction Code 2022.

Developments in bush fire prone areas must comply with both the requirements of PBP and the NCC.

NCC 2022 identifies additional bush fire provisions for the construction, separation and access requirements for certain Class 9 buildings accommodating vulnerable occupants on bush fire prone land.

Class 9 buildings include some Special Fire Protection Purpose (SFPP) developments under section 100B of the Rural Fires Act 1997, such as Class 9a hospitals, Class 9b schools and child care centres and Class 9c residential care buildings.

Additional Performance Criteria and Acceptable Solutions relevant to BPMs within PBP for SFPP Class 9 buildings are identified in Appendix B of this Addendum. These Acceptable Solutions are consistent with the relevant provisions of NCC 2022.

Consistent with section 100B of the Rural Fires Act 1997, proposed SFPP's that are Class 9 Buildings in bush fire prone areas may be required to have bush fire protection measures additional to those specified in NCC 2022.

For the purposes of PBP 2019 the follow SEEPs are considered:

- The Coastal Management SEPP has been repealed and consolidated into the State Environmental Planning Policy (Resilience and Hazards) 2021,
- SEPP 36 – Manufactured Home Estates has been repealed and consolidated into the State Environmental Planning Policy (Housing) 2021, and
- Clause 30 of the SEPP (Educational Establishments and Child Care Facilities) 2017 has been consolidated into Chapter 3 Educational establishments and childcare facilities of the State Environmental Planning Policy (Transport and Infrastructure) 2021.

6 BUSHFIRE ASSESSMENT AND PERFORMANCE MEASURES

This section assesses Bushfire Performance Measures (BPMs) for the proposed development at 40 & 42 Gordon Street, Port Macquarie, NSW in consideration of the acceptable solutions required for each performance criteria within PBP 2019. Outcomes are outlined in Table 4, below. Where acceptable solutions are not met details of the performance-based solution are provided.

Table 4 *Planning for bush fire protection compliance (PBP 2019*) – Chapter 6 - *Special Fire Protection Purpose (SFPP) developments on bush fire prone lands*

	PERFORMANCE CRITERIA	ACCEPTABLE SOLUTION	COMPLIANCE for 40 & 42 Gordon Street, Port Macquarie, NSW
APZs	Radiant heat levels of greater than 10kW/ m² (calculated at 1200K) will not be experienced on any part of the building.	• The building is provided with an APZ in accordance with Table A1.12.1 in Appendix 1.	**COMPLIES - ACCEPTABLE SOLUTION** A>38m APZ is provided in accordance with Table A1.12.1.
	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	• APZs are located on lands with a slope less than 18 degrees.	**COMPLIES - ACCEPTABLE SOLUTION** The APZ on this site is wholly within the site boundaries and is not located on land >18 degrees slope.
	APZs are managed and maintained to prevent the spread of fire to the building.	• The APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site.	**COMPLIES - ACCEPTABLE SOLUTION** The APZ on this site is wholly within the site boundaries.
	The APZ is provided in perpetuity.	• APZ are wholly within the boundaries of the development site; and • Other structures located within the APZ need to be located further than 6m from the refuge building. •	**COMPLIES - ACCEPTABLE SOLUTION** The APZ on this site is wholly within the site boundaries. No other structures within the lot are identified within 6m of the proposed development.
CONSTRUCTON	The proposed building can withstand bush fire attack in the form of wind, embers, radiant heat and flame contact.	• A construction level of BAL-12.5 or greater under AS 3959 and section 7.5 of PBP is applied.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire construction standards warranted).

ELECTRICITY	Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	• Where practicable, electrical transmission lines are underground; and • Where overhead, electrical transmission lines are proposed as follows: ○ Lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and ○ No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.	**COMPLIES - ACCEPTABLE SOLUTION** All electricity services are placed underground. OR The existing electrical supply to the local area is via overhead electrical transmission. Periodic inspection should be undertaken to ensure the lines into the private property are not fouled by the growth of trees. Landscaping and vegetation should be maintained to comply with Energy Australia 'Vegetation Safety Clearances' (NS179, April 2002).
GAS	Location and design 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/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 are not used; and • Above-ground gas service pipes are metal, including and up to any outlets	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire construction standards warranted)..
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 Appendix 4; and • Fencing is constructed in accordance with section 7.6.	**MADE CONDITION OF CONSENT** A Landscaping plan is required to illustrate: ▪ Compliance with APZ standards within Appendix 4 of PBP 2019, ▪ If fencing, retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed of non-combustible materials,

			▪ A minimum 1-metre-wide area (or to the property boundary where the setbacks are less than 1 metre), suitable for pedestrian traffic, must be provided around the immediate curtilage of the building. ▪ Planting is limited in the immediate vicinity of the building. ▪ Planting does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters). ▪ Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do no touch or overhang buildings. ▪ Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies. ▪ Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown. ▪ Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter) ▪ Avoid climbing species to walls and pergolas. ▪ Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building. ▪ Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and ▪ Low flammability vegetation species are used.
ACCESS (GENERAL)	Firefighting vehicles are provided with safe, all-weather access to structures and hazardous vegetation.	• SFPP access roads are two-wheel drive, all-weather roads. • Access is provided to all structures. • 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; and • One way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).

		these areas to ensure accessibility to reticulated water for fire suppression.	
	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.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	There is appropriate access to water supply	• hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression. • Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning; and • There is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
PERIMETER ROADS	Perimeter access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	• Are two-way sealed roads. • Minimum 8m carriageway width kerb to kerb. • Parking is provided outside of the carriageway width. • Hydrants are located clear of parking areas. • 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 degrees and average grade of not more than 10 degrees. • The road crossfall does not exceed 3 degrees; and • A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).

NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	• Minimum 5.5m carriageway width kerb to kerb. • Parking is provided outside of the carriageway width. • Hydrants are located clear of parking areas. • Roads 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 degrees and average grade of not more than 10 degrees. • The road crossfall does not exceed 3 degrees; and • A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
WATER SUPPLIES	Adequate water supplies is provided for firefighting purposes in installed and maintained.	• Reticulated water is to be provided to the development where available, OR • A 10,000 litres minimum static water for firefighting purposes is provided for each occupied building where no reticulated water is available.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	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 the relevant clauses of AS 2419.1:2021; • Hydrants are not located within any road carriageway; and • Reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	Flows and pressure are appropriate	• Fire hydrant flows and pressures comply with Table 2.2 of AS 2419.1:2017.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	The integrity of the water supply is maintained.	• All above-ground water service pipes are metal, including and up to any taps.	**COMPLIES - ACCEPTABLE SOLUTION**

			Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	Water supplies are adequate in areas where reticulated water is not available	• 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 always provided. • Tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; and • 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 2441:2017 Installation of fire hose reels.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).

EMERGENCY MANAGEMENT	A Bush Fire Emergency Management and Evacuation 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; ○ NSW RFS Schools Program Guide; ○ Australian Standard AS 3745:2010 Planning for emergencies in facilities; and ○ Australian Standard AS 4083:2010 Planning for emergencies – Health care facilities (where applicable). • The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants. *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*	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).
	Appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	• An Emergency Planning Committee is 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 clearly displayed, and an annually emergency evacuation is conducted.	**COMPLIES - ACCEPTABLE SOLUTION** Building construction is >100m from bushfire threat, BAL-LOW is applied (no specific bushfire planning standards warranted).

7 CONCLUSION AND RECOMMENDATIONS

It is clear from this investigation and assessment that the site is located within Bush fire Prone Land. An assessment in accordance with Appendix 1 of PBP2019 has been undertaken. This BFAR found only the carparking area is located within 100m of the classifiable vegetation that creates a bushfire treat, with all buildings located >100m from the vegetation that creates a bushfire threat.

The vegetation that creates a bushfire threat is restricted in size and fuel load due to riparian vegetation and narrow width, with limited continuity with surrounding forested areas.

The analysis completed indicates the proposed development is outside the 100m distance (Bushfire prone area 100m buffer) from classifiable vegetation in accordance with Planning for Bushfire Protection 2019.

The requirements for a bushfire assessment to accompany the Development Application is triggered by s4.14 of the EP&A Act is relevant, although an analysis in accordance with PBP2019 found the risk of bushfire to be low.

Compliance with the below recommendations can be achieved or practically implemented without substantial change to the proposed layout or construction methodology. It is recommended that development consent be granted subject to the following conditions:

A Landscaping plan is required to illustrate vegetation will not be introduces within 100m of the buildings, and if provided will be consistent with the below standards:

- Compliance with APZ standards within Appendix 4 of PBP 2019,
- If fencing, retaining wall, garden/path edging is within 6m of a building or in areas of BAL-29 or greater shall illustrate constructed of non-combustible materials,
- A minimum 1-metre-wide area (or to the property boundary where the setbacks are less than 1 metre), suitable for pedestrian traffic, must be provided around the immediate curtilage of the building.
- Planting is limited in the immediate vicinity of the building.
- Planting does not provide a continuous canopy to the building (i.e., trees or shrubs are isolated or located in small clusters).
- Landscape species are chosen to ensure tree canopy cover is less than 15% (IPA), and less than 30% (OPA) at maturity and trees do no touch or overhang buildings.
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies.
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown.
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e., leaf litter)
- Avoid climbing species to walls and pergolas.
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building.
- Locate combustible structures such as garden sheds, pergolas, and materials such as timber garden furniture away from the building, and
- Low flammability vegetation species are used.

The bushfire risk to a building outside 100m distance from classifiable vegetation are considered low risk. **The risk of a bushfire to these buildings is so low that specific bushfire planning and construction requirements are not required in accordance with PBP 2019.**

8 REFERENCES

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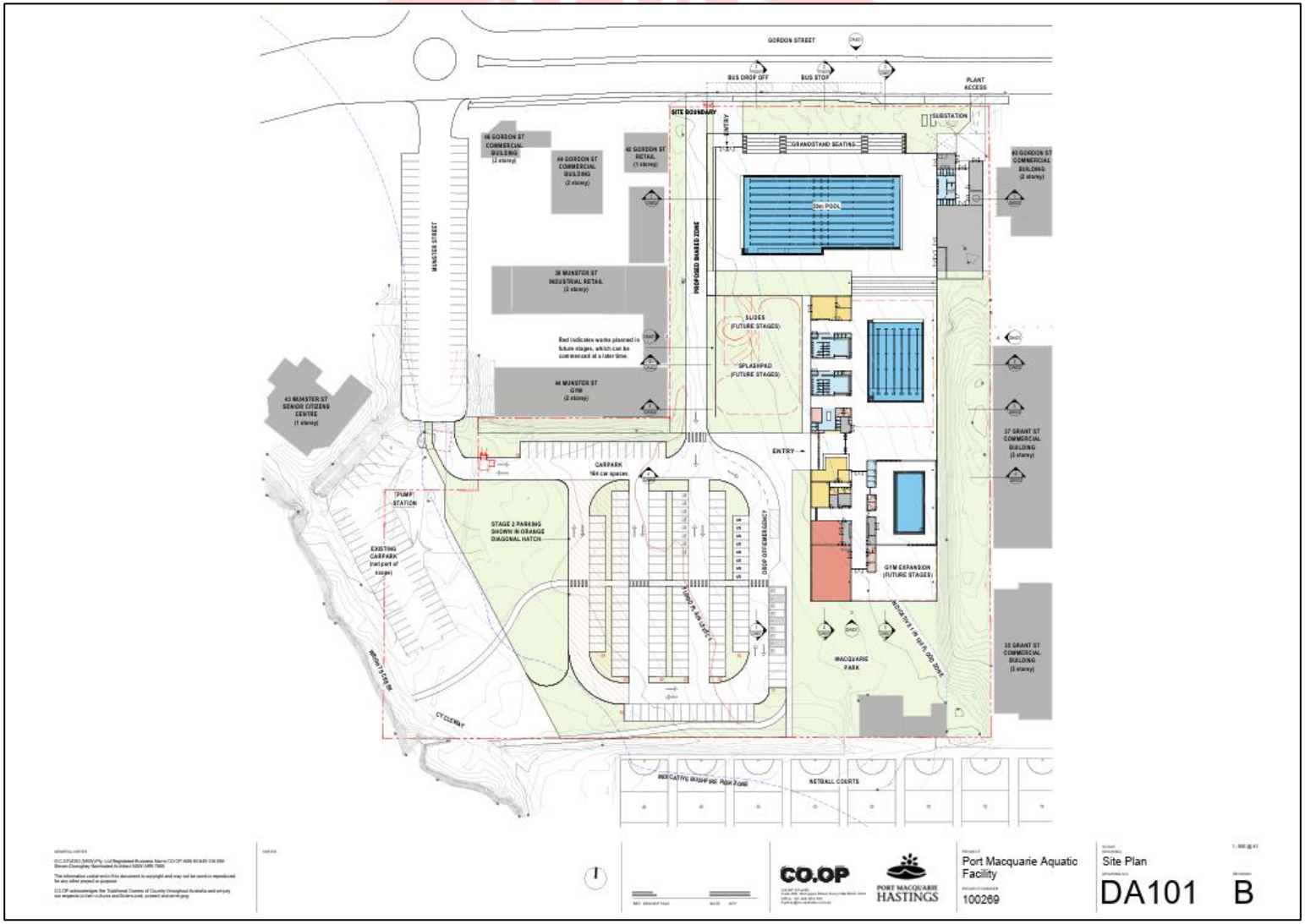
9 APPENDIX 1 DEVELOPMENT PLANS



10 APPENDIX 2 PLATES (PHOTOGRAPHS)

Plates 1 – 4 depict the elements in and around the site that are considered within the bush fire hazard assessment. The classified vegetation, separations, effective and site slope are identified in **Table 3, page 16** and displayed in **Figure 2, page 7**.

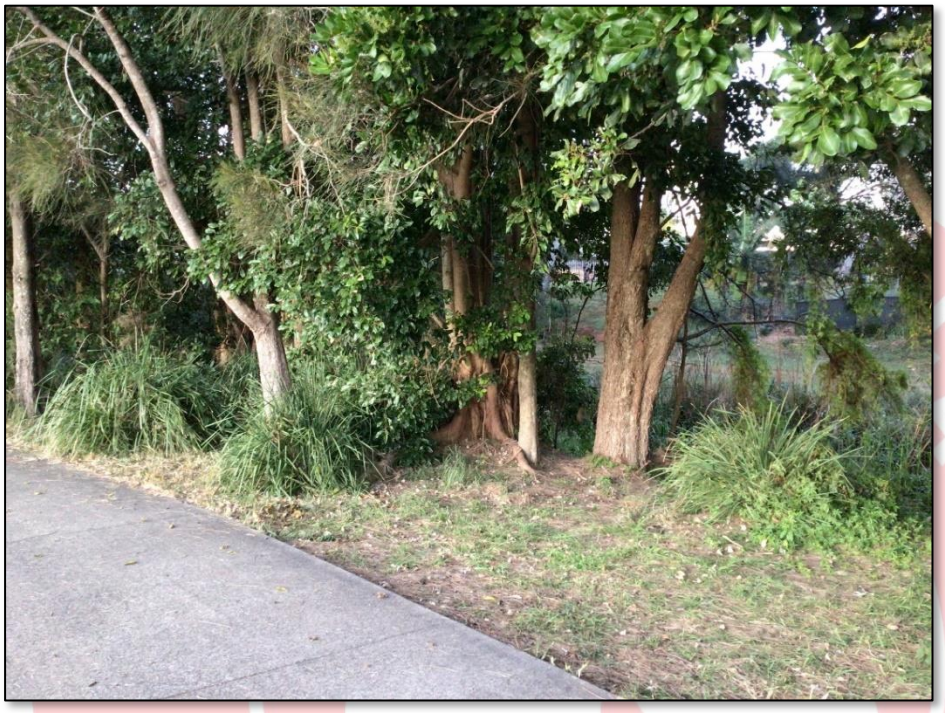


Plate 1 *(P1) Vegetation that creates the bushfire threat*

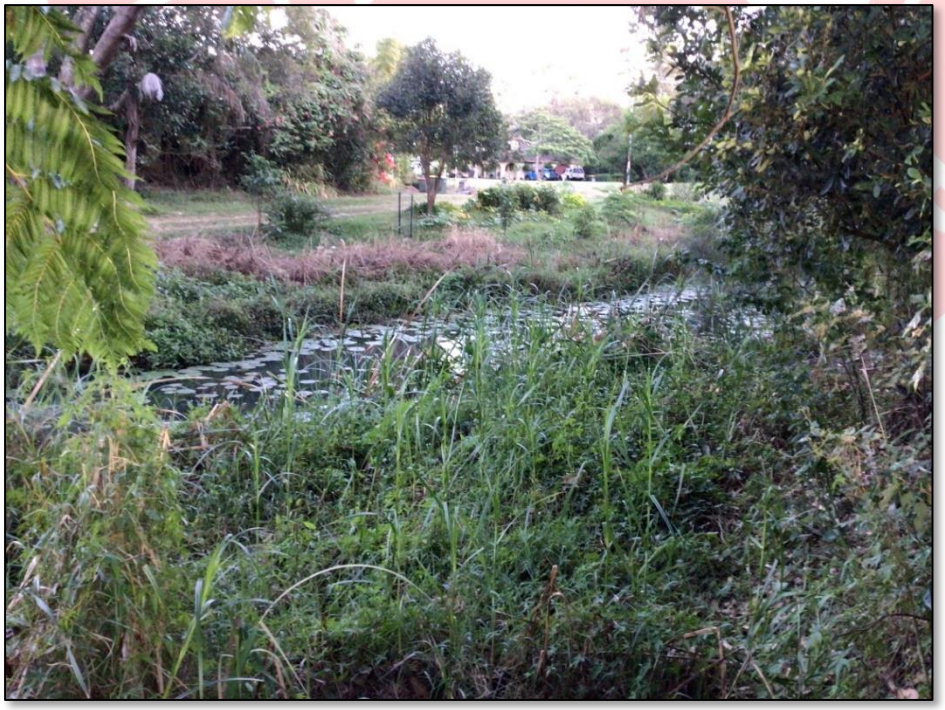


Plate 2 *(P2) Creek line within riparian vegetation*

Plate 3 *(P3) Patchy and disturbed understory*

Plate 4 *(P4) View of vegetation from development site*

11 APPENDIX 3 NSW SHARING AND ENABLING ENVIRONMENTAL DATA

12 APPENDIX 4 BIODIVERSITY MAP

Biodiversity Values Map and Threshold Tool

The Biodiversity Values (BV) Map and Threshold Tool identifies land with high biodiversity value, particularly sensitive to impacts from development and clearing.

The map forms part of the Biodiversity Offsets Scheme threshold, which is one of the factors for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. You can use the Threshold Tool in the map viewer to generate a BV Threshold Report for your nominated area. The report will calculate results for your proposed development footprint and determine whether or not you will need to engage an accredited assessor to prepare a Biodiversity Development Assessment Report (BDAR) for your development.

This report can be used as evidence for development applications submitted to councils, native vegetation clearing not requiring development consent in urban areas and areas zoned for environmental conservation under State Environmental Planning Policy (Biodiversity and Conservation) 2021 - Chapter 2 vegetation in non-rural areas.

What's new?

For more information about the latest updates to the Biodiversity Values Map and Threshold Tool go to the updates section on the Biodiversity Values Map webpage.

Map Review: Landholders can request a review of the BV Map where they consider there is an error in the mapping on their property. For more information about the map review process and an application form for a review go to the Biodiversity Values Map Review webpage.

If you need help using this map tool see our Biodiversity Values Map and Threshold Tool User Guide. or contact the Map Review Team at map.review@environment.nsw.gov.au or on 02 8000 0258.

13 APPENDIX 5 AHIMS SEARCH

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Port Maquarie
Client Service ID : 786007

Duncan Scott-Lawson

Date: 28 May 2023

PO Box 182
Salamander Bay New South Wales 2317

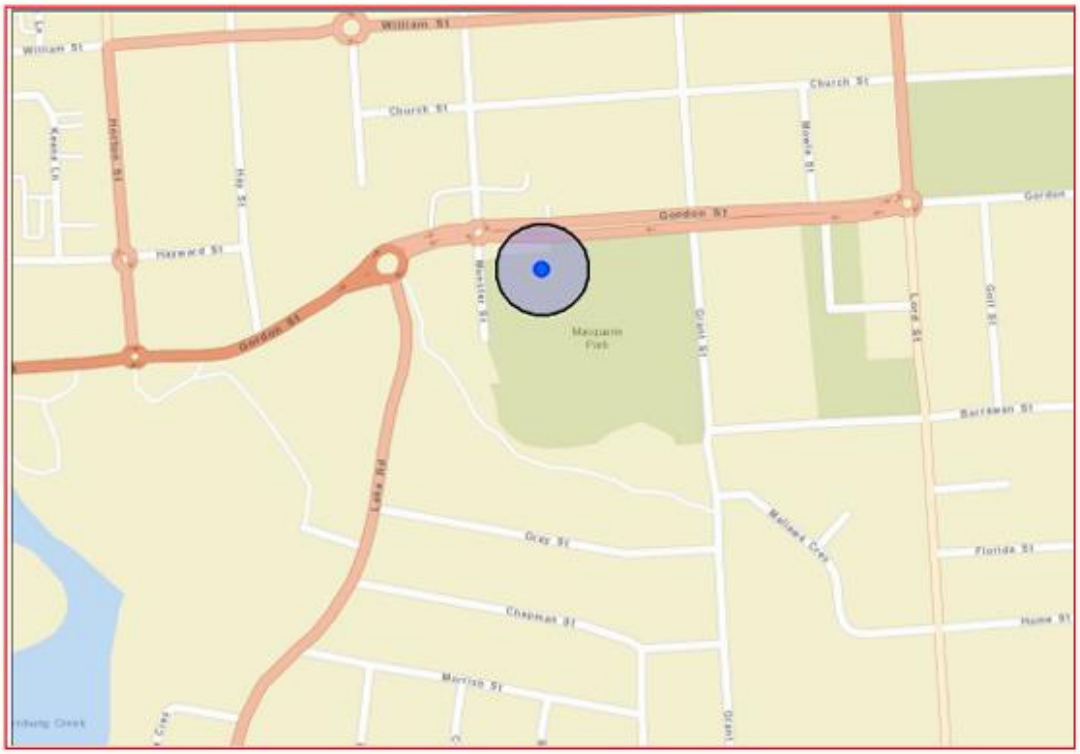
Attention: Duncan Scott-Lawson

Email: duncan@emconsultancy.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 42 GORDON STREET PORT MACQUARIE 2444 with a Buffer of 50 meters, conducted by Duncan Scott-Lawson on 28 May 2023.

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. *

14 APPENDIX 6 BUSHFIRE PROTECTION MEASURES AND INFORMATION

The following information on building survivability and the application of Bushfire Protection Measures should be considered continually for the life of the development. These measures facilitate meeting the aims and objectives of PBP 2019 and mitigating bushfire risk and are provided to inform the client.

Why do buildings burn during bush fires?

Research has been undertaken to over the last decades to analysis and determine the elements that determine the survivability of a building during a bush fire event. As the research is validated, these elements are incorporated into planning documentation that guides construction in bush fire prone areas, such as Australian Standard 3959 and NSW RFS Planning for Bushfire Protection.

Research has illustrated that there are three ways a bush fire impacts a building:

1. Direct flame contact,
2. Radiant heat from the bush fire, and
3. Embers generated by the bush fire.

Most people expect direct flame contact to be the biggest risk to homes in a bush fire, but this is not the case. Over 80% of house loss during bush fires occurs because of ember attack; the burning firebrands of bark, leaves and twigs with winds drive away from the main fire front. They find weaknesses in houses such as gaps, cracks to combustible construction materials and can quickly lead to ignition of the building. **Significantly, vegetation is established adjacent to the building and within the Asset Protection Zone following the construction of the building, which provides fuel for burning embers to ignite** and increase the ignitability of the building. It is critical that the Asset Protection Zone are maintained throughout the life of the property, so that wildfire is not encouraged closer to the building.

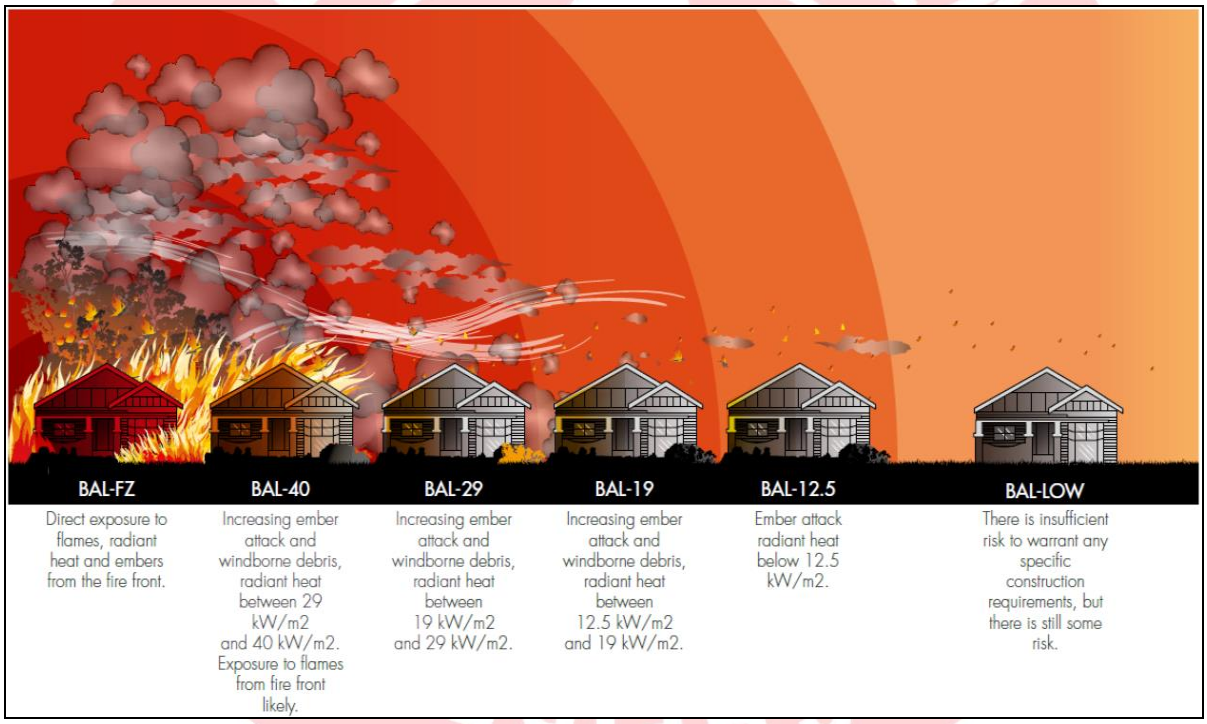
In terms of subdivision development, the research has illustrated maintaining the separations between the building and bush fire threat (known as the Asset Protection Zones (APZ)) to low flammability is critical. Elements within subdivision planning that can be incorporated are:

- **Restricted landscaping and gardens within the APZ.**
- **Delineate the edge of the APZ through fencing, bollarding and signage to mitigate vegetation creep over time.**
- **Registration of the APZ within the relevant bushfire risk management plan.**
- **Dedication of resources to ensure ongoing maintenance.**
- **Non-combustible fencing associated with the APZ.**
- **Ensure water provisions are provided on both the bushfire threat and building sides of roads.**

Australia Standard 3959 Construction of buildings in Bush fire prone areas and Bush fire Attack Level (BAL)

Bush fire Attack Level (BAL) ratings refer to the fire intensity your house is likely to be subjected to in a bush fire, expressed in terms of radiant heat. The BAL assessment forms the construction component of the bush fire assessment process. The other component is the Bush fire planning, which includes Asset Protection Zones (APZ), separation to provide defendable spaces, access, water, electricity, gas, landscaping and emergency management.

Furthermore, the measures contained in the *Australian Standard 3959 Construction of buildings in Bushfire Prone Areas* for each BAL construction level are not for fire resistance. The building will burn. The construction standards are aimed at slowing the ignition and fire spread of the building to provide adequate time to enable occupants to shelter within the building as the bushfire front passes. The degree of vegetation management within the APZ, the unpredictable nature of behaviour of fire, and extreme weather conditions make building adjacent to vegetation very dangerous.



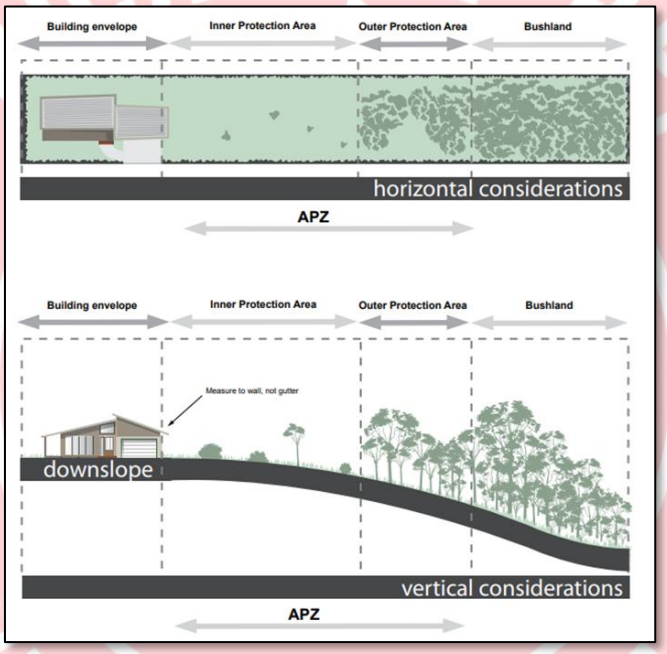
Relationship between fire behaviour and BAL (WA Guidelines for Planning in Bush fire Prone Areas, 2017)

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 should be maintained in perpetuity to ensure ongoing protection from the impact of bush fires. Maintenance to the below standards should be undertaken on an annual basis, in advance of the fire season, as a minimum.

For a complete guide to APZs and landscaping, download the NSW RFS document Standards for Asset Protection Zones at www.rfs.nsw.gov.au/resources/publications .

An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA) as indicated below.



Components of an APZ (Figure A4.1 - PBP 2019)

An APZ can include the following:

- Footpaths.
- Lawns.
- Discontinuous gardens.
- Swimming pools.
- Driveways.
- Unattached non-combustible garages with suitable separation from the dwelling.
- Open space / parkland; and
- Car parking.

Isolated areas of shrub and timbered vegetation are generally not a bush fire hazard as they are not large enough to produce fire of an intensity that will threaten dwellings. These areas include narrow strips of vegetation along road corridors.

Any areas that are designated Asset Protection Zones, should be delineated by rural fencing, signposted or bollards (whatever is practical in the circumstances) to ensure vegetation creep does not occur and further landowners and ground management are aware that the area is to be maintained for Bush fire protection purposes. Examples are provided below.

Inner Protection Area (IPA)

The IPA extends from the edge of the OPA to the development. The IPA is the area closest to the asset and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and be a defendable space. The intent of an IPA is to stop the transmission of flame and reduce the transmission of radiant heat by the elimination of available fire fuel. This area also allows airborne embers to fall safely without igniting further outbreaks and provides a safer firefighting position and is operationally important for implementation of clear fire control lines.

In practical terms the IPA is typically the curtilage around the dwelling, consisting of a mown lawn and well-maintained gardens. When establishing and maintaining an IPA the following requirements apply:

- Vegetation within the IPA should be kept to a minimum level. Litter fuels (leaves and vegetation debris) within the IPA should be continually removed and kept below 1cm in height and be discontinuous. There is minimal fine fuel at ground level which could be set alight by a bushfire.
- Canopy cover should be less than 15% (at maturity). Trees (at maturity) should not touch or overhang the building and should be separated by 2 to 5m.
- Lower limbs of canopy trees should be removed up to a height of 2m above ground.
- Preference should be given to smooth barked and evergreen trees.
- Large discontinuities or gaps in the shrub vegetation shall be established to slow down or break the progress of fire towards buildings.
- Shrubs should not be located under trees and not form more than 10% ground cover
- Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.
- Grasses should be kept mown (as a guide grass should be kept to no more than 100mm in height), and
- Woodpiles, wooden sheds, combustible material storage areas, large areas / quantities of garden mulch, stacked flammable building materials etc. are not permitted in the IPA.

Outer Protection Area (OPA)

An OPA is located between the IPA and the unmanaged vegetation. Vegetation within the OPA can be managed to a more moderate level. The reduction of fuel in this area substantially decreases the intensity of an approaching fire and restricts the pathways to crown fuels, 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.

In practical terms the OPA is an area where there is maintenance of the understorey and some

separation in the canopy. When establishing and maintaining an OPA the following requirements apply:

- Tree canopy cover should be less than 30%, canopies should be separated by 2 to 5m
- Shrubs should not form a continuous canopy and form no more than 20% of ground cover
- Grasses should be kept to no more than 100mm in height with leaf and other debris should be mown, slashed or mulched.

Furthermore, the edge of the APZ should be clearly delineated to ensure vegetation creep does not occur over time, reducing the separation between the bushfire hazard and building, as indicated below.

Gardens and vegetation within the APZ

All vegetation will burn under the right conditions.

In choosing plants for landscaping consideration should be given to plants that possess properties, which help to protect buildings. If the plants themselves can be prevented from ignition, they can improve the defence of buildings by:

- Filtering out wind-driven burning debris and embers.
- Acting as a barrier against radiation and flame, and
- Reducing wind forces.

Consequently, landscaping with vegetation of the site should consider the following:

- Meet the specifications of an Inner Protection Area (IPA) detailed in PBP 2019.
- Priority given to retaining or planting species which have a low flammability and high moisture content.
- Priority given to retaining or planting 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, and
- Create discontinuous or gaps in the vegetation to slow down or break the progress of fire towards the dwellings.
- Avoid gardens within 10m of the exterior building envelop.
- Trees and shrubs within 40m are not continuous, but instead arranged as discrete patches separated by a ground layer with low fuel hazard, such as mown grass.
- Position courtyards, gardens, and grassed areas in locations that facilitate the protection of the building.
- Install pebble/rock garden beds avoiding the use of mulch and wood chip.

Consideration should be given to vegetation fuel loads present on site. 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.**

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. The below list of well know ground fire-retardant plants is intended as a guide only, check with your local council for information more specific to your area.

- *Lomandra longifolia*
- *Lomandra hystrix*
- *Anigozanthos* hybrids
- *Agapanthus orientalis*
- *Liriope muscari*
- *Carpobrotus glaucescens*
- *Casuarina glauca*
- *Ajuga*
- *Brachyscome*
- *Dampiera*
- *Scaevola aemula*
- *Succulents (most)*
- *Carpobrotus (Pigface)*
- *Cotyledon*
- *Ajuga australis*
- *Myroporum*
- *Nepeta* (catmint)
- *Mesembryanthemum*
- *Arctotis*

Strategically positioned elevated vegetation (fire-retardant tree and shrub species) can act as 'windbreaks' and 'ember filter', reducing wind velocities and suppressing the density of embers attacking a building. It is critical that this vegetation is:

- On flat ground place >30m from the building (ideally 40m forming the outer perimeter of the IPA).
- >20m separation from the hazardous vegetation.
- Located on the side of the bush fire hazard.
- No gardens of shrubs under the trees.
- Shrub patches no greater than $10m^2$.

The below list of well know fire-retardant trees and shrubs is intended as a guide only, check with your local council for information more specific to your area:

- *Melia azederach* (Cape Lilac)
- *Brachychiton aecerifolius* (Flame tree)
- *Magnolia grandiflora*
- *Pyrus* (most ornamental pears)
- *Magnolia* Little Gem
- *Ulmus chinensis* (Chinese Elm)
- Acacia howitii
- *Cercis* (Judus Tree)
- *Acmena smithii* (Lilypily)
- *Prunus* (all including ornamental)
- *Cupaniopsis anacardiopsis* (Tuckeroo)
- *Malus* (apple trees)
- *Eleocarpus*

- *Mullbery*
- *Citrus* trees
- *Loquot*
- *Arbutus Quercus* (only the deciduous oak trees)
- *Feijoa*
- *Gleditzia*
- *Ficus* (all including edible)
- *Aloe* (all)
- *Correa*
- *Acacia iteaphyla*
- *Scaevola crassifolia*
- *Viburnum tinus*
- *Atriplex* (saltbush)
- *Escallonia*
- *Maireana* (Cottonbush)
- *Acacia Cyclops*
- *Eremophila* (Emu bush)
- *Melaleuca nodosa*
- *Syzygium* (lilypilly)
- *Photinia*
- *Rhagodia* (saltbush)
- *Strelitzia*
- *Coprosma*
- *Santolina*
- *Plectranthus*
- *Leucophyta brownii*
- *Senna* (Silver Cassia)

Recent post-fire research from the 2019/20 bushfire season suggests greenness factor (the extent to which plants are actively growing) had an impact on building survivability to a bushfire, indicating that maintained green grasses and landscape watering features are beneficial during a bushfire.

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

Landscaping features within the APZ

A combination of hard (materials) and soft (design) landscaping will benefit the survivability of a building during a bushfire event. The type, quantity and condition of fuel has a very important effect on bushfire behaviour in proximity to a building. Poorly located vegetation that burns readily may expose a house to increased levels of radiant heat and flame contact.

- Non-flammable features such as tennis courts, swimming pools, dams, patios, driveways or paths should be incorporated into the proposal, especially on the northern and western sides of the proposed building.
- Remove other flammable objects from around the house. These include sheds, caravans, outdoor furniture, barbeques, gas bottles, wood piles and organic mulch.
- Avoid flammable mulches within the APZ. Alternatives include gravel, scoria, pebbles, shells or recycled crushed bricks.
- Use non-combustible, moveable containers and pots that can be relocated in the summer.
- Restrict the use of door mats and place firewood stacks >10m from building.
- Restrict the use of timber and use materials such as brick, earth, stone, concrete and galvanised iron
- Metal screens can help to shield your house from radiant heat, direct flame contact and ember attack.
- An intensive area of planting centred on a contoured garden mound provide an effective screening.
- Fencing in BAL 29 or within 6m of a building should be of non-combustible materials.
- Establish a path immediately around the external wall of the building. Do not place garden beds adjacent to the external fabric of the building and under windows.
- Clumping shrubs and trees so they do not form a continuous canopy and are separated by areas of low fuel (maintained green grass lawn).

Further information can be found here - Landscaping for bushfires