STRATEGIC BUSH FIRE STUDY

FOR
A PLANNING PROPOSAL
AT
LOTS 30 & 31, DP 270043,
CAMS WHARF NSW 2281

Prepared by:

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Site Details:	Lot 30 & 31, DP 270043, Cams Wharf NSW 2281
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Prepared for:	Iris Capital
Reference No.	Cams Wharf – Iris Capital – March 2022
Document Status & Date:	V1: 09/03/2022
	V2: 28/06/2022
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Disclaimer

Not withstanding the precautions adopted within this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains, and although the standard is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

Executive Summary

A Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of Iris Capital for a proposed amendment to the Lake Macquarie Local Environmental Plan 2014 (LMLEP) at Lots 30 & 31, DP 270043, Cams Wharf NSW 2281. The report forms part of the supporting documentation for a Planning Proposal to be submitted to Lake Macquarie City Council (LMC).

The site is 1.2 hectares of land at Cams Wharf. The site is located at Wild Duck Drive, Cams Wharf and sits within the Rafferty's Resort development, in the Lake Macquarie City Council (LMC) local government area. It is situated on the eastern side of Lake Macquarie between the suburbs of Nords Wharf and Murrays Beach.

The site is known as Lot 30 and 31 in Deposited Plan 270043, Cams Wharf NSW 2281. The site is part of a Community Title Scheme.

The current zoning, being SP3 Tourist, together with Clause 7.14 -Development on certain land near Rafferty's Road, Cams Wharf, in the Lake Macquarie LEP 2014, permits a range of uses including dwellings, tourist and visitor accommodation and food and drink premises.

A planning proposal is required to amend the height of buildings map in Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014) in accordance with the Environmental Planning and Assessment Act 1979 (EP&A) (Division 3.2). This amendment will facilitate the future development of a new 8 storey hotel and two 4-storey residential flat buildings by increasing the maximum building height from 8.5 metres to 36.5 metres and 16 metres respectively.

The planning proposal is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection. Council will refer the SFBS to the NSW RFS to elicit feedback which may inform the gateway determination for the proposal.

This Report demonstrates how the planning proposal conforms with the document titled 'Planning for Bushfire Protection' (PBP). The aim of PBP is to provide for the protection of human life and minimise the impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment (p.10).

Council and the NSW RFS must be satisfied that the development conforms to the Bushfire Protection Measures (BPM)s listed within PBP under the EP&A ACT 1979 (s4.14 – Consultation and development consent – certain bush fire prone land). The BPMs identified for the development are:

1. **Asset Protection Zone (APZ)** – The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.

   The APZ is the distance from the external wall of the habitable building or building

envelope to the unmanaged vegetation line to the North. The shortest distance from the building envelope to the unmanaged vegetation line has been identified to be 38m from the Northern vegetation.

In order to achieve a Bushfire Attack Level (BAL) of BAL-12.5 or less for future Buildings. An APZ is to be managed in accordance with 'Planning for Bushfire Protection (Appendix 4 – Asset Protect Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'. The APZ is entirely within the boundaries of the site. No native vegetation is required to be cleared for the implementation of this APZ.

2. **Property Access Roads** – Access standards provide for emergency evacuation and firefighting operations.
All property access roads are to be consistent with the following requirements:

a. SFPP access roads are two-wheel drive, all-weather roads;
b. Access is provided to all structures
c. Traffic management devices are constructed to not prohibit access by emergency service vehicles;
d. Access roads must provide suitable turning areas in accordance with Appendix 3; and
e. One way only public access roads are no less than 3.5m wifde and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
f. 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.
g. hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;
h. hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and
i. there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.

3. Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

All perimeter roads on the site are existing and they comply with the following:

a. there are two-way sealed roads;
b. minimum 8m carriageway width kerb to kerb;
c. parking is provided outside of the carriageway width;
d. hydrants are to be located clear of parking areas;
e. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
f. curves of roads have a minimum inner radius of 6m;
g. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
h. the road crossfall does not exceed 3 degrees; and
i. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

j. minimum 5.5m carriageway width kerb to kerb;
k. parking is provided outside of the carriageway width;
l. hydrants are located clear of parking areas;
m. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
n. curves of roads have a minimum inner radius of 6m;
o. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
p. the road crossfall does not exceed 3 degrees; and
q. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

4. Non-Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

The non-perimeter roads are existing and they comply with the following:

a. minimum 5.5m carriageway width kerb to kerb;
b. parking is provided outside of the carriageway width;
c. hydrants are located clear of parking areas;
d. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
e. curves of roads have a minimum inner radius of 6m;
f. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
g. the road crossfall does not exceed 3 degrees; and
h. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

5. Water Supplies – A water supply is required for firefighting operations.

An assessment of the Master Plan (Apppendix A) has identified reticulated water and an associated water hydrant will be provided within 70m of future buildings because of the construction of local roads. This reticulated water supply is to be designed and constructed in accordance with the following requirements:

a. reticulated water is to be provided to the development, where available; or
b. a 10,000 litre minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available
c. fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005;
d. hydrants are not located within any road carriageway; and
e. reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.
f. fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
g. all above-ground water service pipes external to the building are metal, including and up to any taps.

6. Electricity Services – The installation of new electricity seeks to limit the possibility of igniting the surrounding bushland. Transmission lines are to be placed underground. If placing them underground is not practical, then overhead transmission lines are to:

a. Be installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas, and
b. No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 – Guideline for Managing Vegetation Near Power Lines.

7. Gas Services – The location and design of gas services will not lead to the ignition of surrounding buildings or the fabric of buildings. The provision of gas requires that:
a. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities,
b. Metal piping is used,
c. All fixed gas cylinders are kept clear of all flammable materials to 10m and shielded on the hazard side,
d. Connections to and from gas cylinders are metal,
e. Polymer-sheathed flexible gas supply lines are not used, and
f. Above-gas service pipes are metal including and up to any outlets.

8. Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire. The shorter the APZ (distance between the external wall of the habitable building and the unmanaged vegetation), then the higher the construction standard, which is referred to as the BAL.

Based on the APZ provided above, we understand that future development may be sited to achieve <10kW/m^2, which would result in BAL-12.5. However, all future buildings situated in Bushfire Prone Land will be subject to a separate Bushfire Assessment Report (BAR) at a future point in time.

9. Landscaping – The type, location and ongoing maintenance of landscaping is considered a necessary BPM.

a. The identified APZ is to be managed in accordance with PBP (Appendix 4);
b. A clear area of low-cut lawn or pavement is maintained adjacent to the development;
c. Fencing details in accordance with PBP (7.6 – Fences and gates);
d. The branches will not overhang the roof;
e. The tree canopy is not continuous; and
f. Any proposed windbreak is located on the elevation from which fires are likely to approach.

10. Emergency Evacuation – An emergency management plan will be prepared for the proposed development at the Development Application stage which will further address emergency evacuation access and procedures subject to the amendment to height of buildings map in Lake Macquarie Local Environmental Plan 2014 being approved.

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Ecologist / Bushfire Planner

Terms & 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
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BFPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BFSA	Bush Fire Safety Authority
CC	Construction Certificate
LMC	Lake Macquarie City Council
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
FFDI	Forest Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2019
PoM	Plan of Management
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

A Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of Iris Capital for a proposed rezoning of land at Lots 30 & 31, DP 270043, Cams Wharf NSW 2281, hereafter referred to as the "site" (refer to Figure 1-1 for site locality). Refer to Appendix A for Proposed Site Plans.

This SBFS is suitable for submission with a Planning Proposal (i.e., rezoning) and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2019) and AS3959-2018 Construction of Buildings in Bush Fire Prone Areas, the development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal.

This report aims to consider and assess the amendment of Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014) to enable the development of an 8 storey hotel which exceeds the current 8.5 metre Maximum Height of Buildings; and identify the bushfire hazard and associated potential threats relevant to such a proposal and to outline the minimum mitigative measures which would be required in accordance with the abovementioned provisions of legislation.

1.1 Site Particulars

Locality: The site is located at Lots 30 & 31 in Deposited Plan 270043, Wild Duck Drive, Cams Wharf NSW 2281 and sits within the Rafferty's Resort development. It is situated on the eastern side of Lake Macquarie between the suburbs of Nords Wharf and Murrays Beach.

LGA: Lake Macquarie City Council

Current Land Use: The current zoning, being SP3 Tourist, together with Clause 7.14 – Development on certain land near Raffertys Resort, Cams Wharf, in the Lake Macquarie LEP 2014, permits a range of uses including dwellings, tourist and visitor accommodation and food and drink premises. The current maximum Height of Buildings is 8.5 metres.

Forest Danger Index: 100 FFDI

Total Area: 1.2 hectares (Approximate)

Significant Features: Cams Wharf is characterised by its frontage to the shore of Lake Macquarie. It predominantly features Raffertys Resort as well as a boat ramp.

Bushfire Prone Land Map: The site is in close proximity to land mapped as Category 2 Vegetation on Bushfire Prone Land.

Climate / Fire History: The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds.

Environmental Features: The site is not mapped as containing Biodiversity Values under the Biodiversity Conservation Act 2016.

1.2 Scope

The scope of this SBFS is to support a planning proposal to enable an increase in the maximum building height from 8.5 metres to allow for the construction of a new 8 storey hotel and 4 storey residential flat buildings. The bushfire hazard and associated potential threats relevant to such a proposal and to outline the minimum mitigative measures which would be required for the land and development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2019), AS3959-2018 Construction of Buildings in Bush Fire Prone Areas, the development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal.

1.3 Background

Raffertys Resort has been recently purchased by Iris Capital, with a view to redeveloping and reinvigorating the site to provide a distinctive village centre to be enjoyed by visitors and residents alike, and a landmark tourist facility for Lake Macquarie.

To drive and shape this vision a Concept Master Plan has been prepared to articulate the anticipated land uses and built form envisaged on the site.

The Concept Master Plan has at the heart of the village, a new Tavern (pub) and Function Centre incorporating a new pool resort facilities overlooking the lake, complimented by a new Hotel. Additional residential accommodation is proposed in the form of both residential apartments and multi dwelling housing to create a diversity of accommodation, providing alternative options to the current villas on the site.

The new buildings will be a uniquely "contemporary lakeside architecture", incorporating generous folding metal roofs, Australian hardwood timber structures, cladding and natural stone finishes. Buildings are sited to create view corridors and allow physical connections for the entire village to access and enjoy the foreshore reserve.

The proposed planning proposal will facilitate the development of this broader Concept Master Plan.

1.4 Proposal

Several proposed buildings significantly exceed the 8.5 metre building height limit that currently applies to the site. Consequently, a Planning Proposal is required to amend the Height of Buildings Map within Lake Macquarie Local Environmental Plan 2014.

The development of a new 8 storey hotel is proposed on Lot 31, consisting of approximately 141 rooms, business centre, basement Car Parking (2 Levels) with 118 car parking spaces and hotel pool, landscaped areas.

Also proposed as part of the Concept Master Plan is two apartment buildings, as follows:

- Construction of two four storey residential flat buildings containing 25 units with shared a basement carpark with 40 spaces, pool and the pool terrace, landscaping etc.
- Construction of a four storey residential flat building containing 21 units with shared a basement carpark with 36 spaces, driveway and Landscaping.

The Planning Proposal to amend the maximum height limit will facilitate the development of the new hotel and apartment buildings.

Figure 1-1: Site Location

Figure 1-2: Site Map

2 SITE ASSESSMENT

The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2019). Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent
- Confirmation of the vegetation assemblage typology present.

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 2m (Spatial Map Viewer).

2.1 Vegetation & Slope Assessment

In accordance with PBP (RFS 2019), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site. This assessment is depicted in Table 2-1 and Figure 2-1 that shows the vegetation post development.

In accordance with PBP (RFS 2019), an assessment of the slope that the vegetation considered a bushfire hazard was undertaken and the results are presented in Table 2-1 below.

Table 2-1: Vegetation and Slope Classification

Change to Maximum Height of Buildings Map for Proposed Development		
Direction	**Vegetation Type[1]**	**Slope**
North	Remnant Vegetation	Upslope
East	Remnant Vegetation	Upslope
South	Managed Land[2]	N/A
West	Managed Land	N/A

Vegetation mapping provided by SEED Portal is provided as Figure 2-2 below

[1] Vegetation to the North and East is regarded as remnant vegetation as it has width <50m as per A1.11.1 of PBP 2019.
[2] Vegetation to the South is managed land, and as such does not require the removal of any native vegetation for Asset Protection Zones in the proposal. Refer to Appendix C for site photos.

A - NEW RESIDENTIAL
B - NEW TAVERN & FUNCTION CENTRE
C - NEW HOTEL
D - NEW RESIDENTIAL
E - NEW RESIDENTIAL
F - CAR PARKING
G - TEMPORARY MARQUEE LOCATION
H - MARINA (FUTURE POTENTIAL)

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 2-1: VEGETATION MAP

CLIENT Client
SITE DETAILS Cams Wharf
DATE 4 March 2022

Legend
- Subject Site
- Remnant Vegetation
- Managed Vegetation

NORTH
0 25 50 100
SCALE 2000 @ A3

PIXELDRAFTING

Ref No 2883 C

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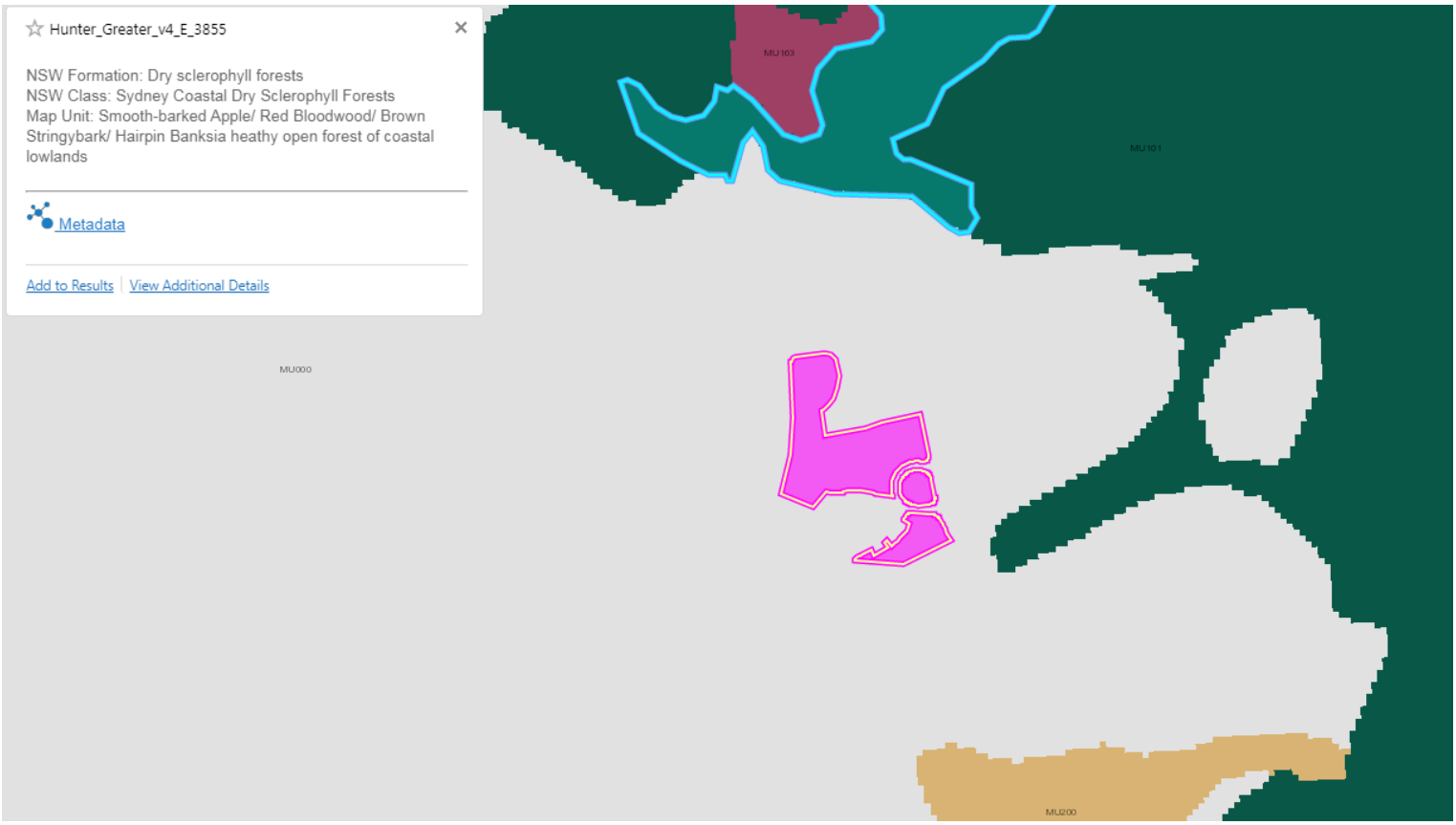
P O Box 354 Newcastle NSW 2300

firebird

Figure 2-2 Vegetation Map from SEED Portal



2.2 Determination of Fire Danger Index (FDI)

The FFDI was determined by referring to the RFS. The NSW Local Government Areas (LGA) Fire Danger Index (FDI) is repeated below for quick reference.

The LGA is Lake Macquarie in accordance with the NSW Planning Portal, and therefore the FDI is Greater Hunter (100)

3 BUSHFIRE PROTECTION ASSESSMENT

3.1 Asset Protection Zones (APZ)

The PBP (RFS, 2019) guidelines has been used to determine the widths of the APZs required for habitable buildings within the site using the vegetation and slope data identified in Section 2-1 of this report.

The site lies within Lake Macquarie Local Government Area and therefore is assessed under a FDI rating of 100. Using the results from the Site Assessment (section 2-1 of this report) the deemed to satisfy APZ requirements for the proposed buildings within the site was determined using AS3959 (2018). Refer to Table 3-1 and Figure 3-1 for required APZs for future habitable buildings.

Table 3-1: Recommended APZs for the Proposed SFPP Development

Direction from Building Envelope	Vegetation Classification within 140m	Effective Slope (within 100m)	APZ to be Provided[3]	Width of allowable OPA	Comment
North	Remnant Vegetation	Upslope	An APZ of 38m is to be provided and maintained.	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
East	Remnant Vegetation	Upslope	An APZ of 38m is to be provided and maintained.	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
South	Managed Land[4]	N/A	N/A	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
West	Managed Land	N/A	N/A	N/A	Acceptable solution in accordance with PBP (RFS, 2019)

[3] APZ distances are in accordance with Table A1.12.1 of PBP 2019. No native vegetation is required to be removed for the installation of the above-mentioned APZs.
[4] Vegetation to the South is managed land, and as such does not require the removal of any native vegetation for Asset Protection Zones in the proposal. Refer to Appendix C for site photos.

A - NEW RESIDENTIAL
B - NEW TAVERN & FUNCTION CENTRE
C - NEW HOTEL
D - NEW RESIDENTIAL
E - NEW RESIDENTIAL
F - CAR PARKING
G - TEMPORARY MARQUEE LOCATION
H - MARINA (FUTURE POTENTIAL)

Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 3-1: ASSET PROTECTION ZONES

CLIENT Client
SITE DETAILS Cams Wharf
DATE 4 March 2022

Legend
Subject Site
38m APZ

NORTH
0 25 50 75
SCALE 1500 @ A3

PIXELDRAFTING

Ref No 2883 C

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4 COMPLIANCE

The planning proposal is to support the development of a 8 storey hotel as well as residential flat buildings and is an SFPP development, and therefore development standards apply. Table 4-1 details the proposed compliance with Development Standards for SFPP Developments.

Table 4-1: Proposed Hotel and Residential Flat Buildings Compliance with Special Fire Protection Purpose Development Standards

Acceptable Solutions	Compliance with Acceptable Solutions	Performance Criteria	Compliance with Performance Criteria
ASSET PROTECTION ZONES			
〉 the building is provided with an APZ in accordance with PBP 2019 (Table A1.12.1 in Appendix 1).	**Complies –** The required APZs are established within the site.	〉 radiant heat levels of greater than 10kW/m² (calculated at 1200K) will not be experienced on any part of the building.	**N/A** – Complies with Acceptable Solution
〉 APZs are located on lands with a slope less than 18 degrees.	**Complies** – the APZ is located on land with a slope of <18 degrees	〉 APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	**N/A** – Complies with Acceptable Solution
〉 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; 〉 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** – the APZ is to be managed in perpetuity in accordance with PBP 2019. Refer to Appendix B of this document for a summary of APZ requirements.	〉 APZs are managed and maintained to prevent the spread of fire to the building. 〉 the APZ is provided in perpetuity	**N/A** – Complies with Acceptable Solution
LANDSCAPING			

〉 landscaping is in accordance with Appendix 4; and 〉 fencing is constructed in accordance with section 7.6.	**Complies –** landscaping is to occur on site in accordance with Appendix 4 of PBP 2019 (summarised in Appendix B of this report), and fencing is to be constructed in accordance with Section 7.6 of PBP 2019	〉 landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions	**N/A –** Complies with Acceptable Solution
CONSTRUCTION STANDARDS			
〉 a construction level of BAL-12.5 under AS 3959 or NASH Standard and Section 7.5 of PBP 2019 is applied	**Complies –** the entire site has been assessed as BAL-12.5 or less.	〉 the proposed building can withstand bush fire attack in the form of wind embers, radiant heat and flame contact.	**N/A –** Complies with Acceptable Solution
ACCESS			
〉 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 these areas to ensure accessibility to reticulated water for fire suppression	**Complies –** the access road is to meet the requirements of the acceptable solution	〉 firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	**N/A –** Complies with Acceptable Solution
〉 the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23	**Complies –** the access road is to meet the requirements of the acceptable solution	〉 the capacity of access roads is adequate for firefighting vehicles.	**N/A –** Complies with Acceptable Solution

tonnes); bridges and causeways are to clearly indicate load rating.			
〉 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; and 〉 there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.	**Complies** – fire hydrants are appropriately placed	〉 there is appropriate access to water supply.	**N/A** – Complies with Acceptable Solution
PERIMETER ROADS			
〉 there are two-way sealed roads; 〉 minimum 8m carriageway width kerb to kerb; 〉 parking is provided outside of the carriageway width; 〉 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 degrees and average grade of not more than 10 degrees; 〉 the road crossfall does not exceed 3 degrees; and	**Complies –** all roads are to meet the requirements of the acceptable solution.	〉 perimeter access roads are designed to allow safe access and egress for 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.	**N/A** – Complies with Acceptable Solution

〉 a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.			
NON-PERIMETER ROADS			
〉 minimum 5.5m carriageway width kerb to kerb; 〉 parking is provided outside of the carriageway width; 〉 hydrants are 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 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** – all roads are to meet the requirements of the acceptable solution.	〉 non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants are evacuating.	**N/A** – Complies with Acceptable Solution
WATER SUPPLY			
〉 reticulated water is to be provided to the development, where available; or 〉 a 10,000 litres minimum static water supply for firefighting purposes is	**Complies** – the site is connected to reticulated water	〉 an adequate water supply for firefighting purposes is installed and maintained.	**N/A** – Complies with Acceptable Solution

provided for each occupied building where no reticulated water is available.			
〉 fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005; 〉 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** – fire hydrants are appropriately placed	〉 water supplies are located at regular intervals. 〉 the water supply is accessible and reliable for firefighting operations.	**N/A** – Complies with Acceptable Solution
〉 fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	**Can comply** – flows and pressures assumed compliant	〉 flows and pressure are appropriate.	**N/A** – Complies with Acceptable Solution
〉 all above-ground water service pipes external to the building are metal, including and up to any taps.	**Can comply** – above-ground pipes assumed compliant	〉 the integrity of the water supply is maintained.	**N/A** – Complies with Acceptable Solution
〉 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;	**Complies** – the site is connected to reticulated water	〉 water supplies are adequate in areas where reticulated water is not available	**N/A** – Complies with Acceptable Solution

〉 a hardened ground surface for truck access is supplied within 4m of the access hole; 〉 above-ground tanks are manufactured from concrete or metal; 〉 raised tanks have their stands constructed from non-combustible material or bush fire-resisting timber (see Appendix F AS 3959); 〉 unobstructed access is provided at all times; 〉 tanks on the hazard side of a building are provided with adequate shielding for the protection of firefighters; 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; and 〉 fire hose reels are constructed in accordance with AS/NZS 1221:1997 Fire hose reels, and installed in accordance with the relevant clauses of AS 2441:2005 *Installation of fire hose reels.*			
ELECTRICITY SERVICES			
〉 where practicable, electrical transmission lines are underground;	**Can comply** – electricity services to the site will meet	〉 location of electricity services limits the possibility of	**N/A** – Complies with Acceptable Solution

〉 where overhead, electrical transmission lines are proposed as follow: ○ lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and ○ no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.	the requirements of the acceptable solution	ignition of surrounding bush land or the fabric of buildings.	
GAS SERVICES			
〉 reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; 〉 all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side; 〉 connections to and from gas cylinders are metal; 〉 if gas cylinders need to be kept close to the building, safety valves are directed away from the building and at least 2m away from any combustible material, so they do not act as a catalyst to combustion; 〉 polymer-sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used; and	**Can comply** - gas services to the site will meet the requirements of the acceptable solution	〉 location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	**N/A** – Complies with Acceptable Solution

〉 above-ground gas service pipes external to the building are metal, including and up to any outlets.			
EMERGENCY MANAGEMENT			
〉 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.	**Can comply** – An emergency management plan will be prepared for the proposed development at the Development Application stage which will further address emergency evacuation access and procedures subject to the amendment to height of buildings map in Lake Macquarie Local Environmental Plan 2014 being approved.	〉 a Bush Fire Emergency Management and Evacuation Plan is prepared.	**N/A** – Complies with Acceptable Solution

〉 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.	**N/A -** the proposal is not a child care or age care development	〉 appropriate and adequate management arrangements are established for consultation and implementation of the Bush Fire Emergency Management and Evacuation Plan.	**N/A -** the proposal is not a child care or age care development

5 STRATEGIC MATTERS

The following table lists the matters to be addressed by a Bush Fire Strategic Study under the NSW RFS, 2019, 'Planning for Bushfire Protection' (p.35) in order to demonstrate that strategic consideration has been provided to the site from a bushfire perspective. Table 10 – Compliance with PBP for Strategic Matters.

Table 5-1: Bushfire Strategic Study

Issue	Detail	Assessment Considerations	Assessment
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	The bush fire hazard in the surrounding area, including: ▪ Vegetation ▪ Topography ▪ Weather	The dot points below summarise the assessment of the bushfire hazard in the surrounding area; ▪ Vegetation: The site is not mapped as Bushfire Prone Land, however it is in close proximity to pockets of Category 2 vegetation and 30 metre buffers to the North and East of the site. This vegetation to the North and East of the site is classified as 'rainforest' in accordance with Keith 2004 vegetation classification framework as the vegetation provides a short fire run as it has width <50m as per A1.11.1 of PBP. Managed land occurs to the South and West of the site for a distance of >100m. Refer to Figure 4-1 and 4-2 of the SBFS for an aerial view of the vegetation within the site. ▪ Topography: Managed land occurs to the South and West for >100 metres from the site over downslope (0-5°). Remnant vegetation occurs to the North over cross slope, and to the East over upslope ground. ▪ Weather: The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds.

Issue	Detail	Assessment Considerations	Assessment
			▪ The typical / average climate in the Lower Hunter Bush Fire Management Committee (BFMC) area is warm subtropical with the higher altitude areas tending toward warm temperate. The fire season is declared annually by the RFS and for the Study Area is generally declared from October to March however, is varied in some years. Prevailing weather conditions associated with the bush fire season in the Lower Hunter BFMC area are north-westerly winds accompanied by high day-time temperatures and low relative humidity.
		The potential fire behaviour that might be generated based on the above.	Whilst each bushfire event is different, fire spreads by responding to changes in fuel, terrain, and weather conditions. Therefore, based on landscape conditions and fire history, potential fire behaviour can be determined. It is generally anticipated that a potential fire within the site and its surrounds, would spread more quickly and have the potential for higher intensities when: ▪ burning under the influence of north-westerly winds, particularly during warmer summer months; and If fires were to occur under a Fire Danger Rating (FDR) of Very High or above, within steeper forested areas, such fires may have the potential to spread quickly through vegetated land. However, if a fire was to approach the development land, it is likely to become slower moving and much less intense, due to the slope of the land where the hazard occurs being upslope.
		Any history of bush fire in the	The Lower Hunter BFMC area has on average 200

Issue	Detail	Assessment Considerations	Assessment
		area	bush fires per year, of which 3 on average can be considered to be major fires.
		Potential fire runs into the site and the intensity of such fire runs.	Fire runs into the site occur in an Easterly direction under the influence of Westerly winds. Southerly and/or Easterly weather changes also have the potential to intensify wildfire.
		The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	The landscape bushfire risk indicates the potential for bushfire attack of the site given the presence of Bush Fire Prone Vegetation (BFPV) on the adjoining areas. There are advantages to fire mitigation in the landscape that can be achieved by the provision of appropriate bushfire protection measures, such as APZs, perimeter roads, connected road network and cultural controlled burns within the retained vegetation (BFPV). These strategies have been factored into the proposed master plan.
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	The risk profile of different areas of the development layout based on the above landscape study.	The entire site consists of managed land. Remnant 'rainforest'vegetation occurs to the North and East of the site. The negative impact of a fire within the 5 year life of the BFRMP using fire history data, was determined as being low and may even be of benefit to the asset and surrounding habitat. The future development footprint has been located in the centre of the site which is considered to be the lowest risk profile.
		The proposed land use zones and permitted uses.	The entire site is zoned as SP3 - Tourist; and supports the end use by changing the height of buildings map from 8.5 metres to support the development of an 8 storey hotel.

Issue	Detail	Assessment Considerations	Assessment
		The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site).	The centre of the site has been chosen for the development footprint as it is considered the least constrained in terms of slope and vegetation. The site consists of managed land; and remnant vegetation occurs to the north and east of the site.
		The impact of the siting of these uses on APZ provision.	The entire site is to be managed as an APZ. No native vegetation is to be removed for the installation of this APZ. The APZ widths are proposed to comply with PBP (RFS, 2019), which limits SFPP buildings to a maximum heat exposure of no more than 10 kW/m^2. The development is proposed to achieve best practice by meeting this standard through the proposed application of future development control plan clauses. Vegetation that is introduced through landscaping or restoration can avoid the need for further APZs if: ▪ individual patches of vegetation within 100m of properties are <0.25 ha per patch; ▪ the perpendicular width of linear strips of vegetation is <20m when measured perpendicular to structures; ▪ any vegetation within 100m of properties meets the definition of managed vegetation under PBP (RFS, 2019). Figures 3-1 and 4-1 of the SBFS illustrate the proposed distribution of APZs Bushfire Attack Level (BAL) ratings throughout the site, consistent with PBP (RFS, 2019).

Issue	Detail	Assessment Considerations	Assessment
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile,	Seca Solution has undertaken traffic modelling surveys for existing traffic conditions at Flowers Drive, Pacific Highway and Cams Wharf Road , which are State owned roads. It is understood that the proposed development will have minor impact on traffic delays and is therefore satisfactory, not requiring any road upgrades.
		The location of key access routes and direction of travel.	The proposed master plan provides entry / egress points to the site via Lorikeet Loop and Wild Duck Drive, as well as recent road connection to Murrays Beach, allowing site egress via Lake Forest Drive and Jetty Point Drive. The master plan has been designed around access to Raffertys Resort via Raffertys Road, and subsequent access via minor road sections being Lorikeet Loop and Wild Duck Drive that would facilitate the movement of traffic throughout the site. The road design of the proposed master plan meets the acceptable solutions for residential subdivisions outlined in PBP (RFS, 2019). Refer to Appendix A for the master plan.
		The potential for development to be isolated in the event of a bush fire.	The development is located adjacent to the existing Lorikeet Loop and through to Wild Duck Drive, both which provide immediate access / egress for the site in an emergency bushfire event. Emergency access / egress is provided via Raffertys Road and Cams Wharf Road, as well as through Murrays Beach via Lake Forest Road and Jetty Point Drive to the Pacific Highway. The proposed master plan road layout and hierarchy have been designed to comply with PBP (RFS, 2019), thereby ensuring that no area of the site would be isolated in the event of a bushfire.

Issue	Detail	Assessment Considerations	Assessment
Emergency services	An assessment of the future impact of new development on emergency services.	Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades.	In order to achieve the strategic land use planning objectives and strategic planning principles of PBP (RFS, 2019) relating to emergency management, strategic emergency management planning is recommended. It should be undertaken in collaboration with emergency service organisations within the strategic land use planning process to establish preferred future outcomes (i.e. emergency evacuation) that have implications for land use planning, including: ▪ emergency evacuation planning; and ▪ evacuation adequacy assessment.
		Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	The master plan proposes no new entry / egress points into the site, with access via Lorikeet Loop and Wild Duck Drive being adequate. The master plan has been designed around access to Raffertys Resort via Raffertys Road, and subsequent access via minor road sections being Lorikeet Loop and Wild Duck Drive that would facilitate the movement of traffic throughout the site. In the event of a bushfire emergency, access/egress is provided for firefighting vehicles via Cams Wharf Road and Raffertys Road, as well as through Murrays Beach via Lake Forest Drive and Jetty Point Drive. Perimeter roads in compliance with the provisions of PBP (RFS, 2019) have been incorporated into the master plan and will be located between all future dwellings and retained vegetation. The ability of emergency services to carry out fire suppression in a bush fire emergency would not be hindered by the proposed master plan. Several local fire stations exist within the vicinity of the site, the closest being Swansea Fire Station, located at 10 Lake Road, Swansea; approximately 7.3km away by road.

Issue	Detail	Assessment Considerations	Assessment
			Other fire stations located in proximity to the site are Belmont Fire Station and Doyalson Fire Station. These Fire services are adequate in responding to any incidents which may arise in association with the proposed development.
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants.	The site will be connected to reticulated water and will have adequate water pressure, flow and fire hydrant spacing to deal with a major bushfire event, therefore complying with PBP (RFS, 2019). Future development will need to demonstrate that fire hydrant spacing, sizing and pressures complies with AS 2419.1 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. Fire hydrants should not be located within any road carriageway. All above ground water and gas service pipes external to the building are to be metal, including and up to any taps.
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.	Electricity and Gas – Underground electricity supply to the site is compliant with PBP (RFS, 2019) requirements. If electrical transmission lines to the site are above ground, no part of a tree is to be closer than 0.5 m to the powerline conductors. Reticulated or bottled gas to future residential lots (if proposed) would be required to be installed and maintained in accordance with Australian Standards

Issue	Detail	Assessment Considerations	Assessment
			Australia 2014) and the requirements of relevant authorities (for example, metal piping must be used). All high voltage power lines and natural gas lines would be located underground.
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	Given the adherence to PBP (RFS, 2019) and other land use planning requirements, the proposed land uses should not increase bushfire management needs for retained and/or adjoining bushfire prone vegetation.

5.1 Ministerial Direction (4.4 – Planning For Bushfire)

The Environmental Planning and Assessment Act 1979 (Section 9.1, Ministerial Direction, 4.4 – Planning for Bush Fire Protection) identifies that a planning proposal must, where development is proposed, comply with the appropriate provisions. These provisions and an appropriate response are provided in the following table.

Table 5-2: Ministerial Direction (4.4 – Planning for Bushfire)

No	• Assessment Considerations	Complies	Assessment
1	Provide an APZ incorporating: • An Inner Protection Area (IPA) bounded by a perimeter road or reserve, which circumstances the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property. • An Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road.	Yes	Please refer to 3.1 – Assessment.
2	For infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with.	Yes	The proposal is for infill development, and an appropriate APZ can be achieved.
3	Contain provisions for adequate water supply for firefighting purposes,	Yes	Please refer to 4-1 – Bushfire Protection Measures.
4	Minimise the perimeter of the area of land interfacing the hazard, which may be developed, and	Yes	Please refer to 4-1 – Bushfire Protection Measures.

5	Introduce controls on the placement of combustible materials in the IPA.	Yes	Please refer to 4-1 – Bushfire Protection Measures.

6 CONCLUSION & RECOMMENDATIONS

In summary, a Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of Iris Capital for a proposed amendment to the Lake Macquarie Local Environmental Plan (LMLEP) Height of Buildings Map to allow for the development of an 8 storey hotel at Lot 31, DP 270043 and 4 storey residential flat buildings at Lot 30, DP 270043 Cams Wharf, NSW 2281. The report forms part of the supporting documentation for a Planning Proposal to be submitted to Lake Macquarie City Council (LMC).

This SBFS is suitable for submission with a Planning Proposal and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2019), AS3959-2018 Construction of Buildings in Bush Fire Prone Areas, the development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal.

This report aims to consider and assess the amendment of Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014) to enable the development of an 8 storey hotel and two 4-storey residential flat buildings, both of which exceed the current 8.5 metre Maximum Height of Buildings; and identify the bushfire hazard and associated potential threats relevant to such a proposal and to outline the minimum mitigative measures which would be required in accordance with the abovementioned provisions of legislation.

Council and the NSW RFS must be satisfied that the development conforms to the Bushfire Protection Measures (BPM)s listed within PBP under the EP&A ACT 1979 (s4.14 – Consultation and development consent – certain bush fire prone land). The BPMs identified for the development are:

1. **Asset Protection Zone (APZ)** – The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.

The APZ is the distance from the external wall of the habitable building or building envelope to the unmanaged vegetation line to the North. The shortest distance from the building envelope to the unmanaged vegetation line has been identified to be 38m from the Northern vegetation.

In order to achieve a Bushfire Attack Level (BAL) of BAL-12.5 or less for future Buildings. An APZ is to be managed in accordance with 'Planning for Bushfire Protection (Appendix 4 – Asset Protect Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'. The APZ is entirely within the boundaries of the site. No native vegetation is required to be cleared for the implementation of this APZ.

2. **Property Access Roads** – Access standards provide for emergency evacuation and firefighting operations.
All property access roads are to be consistent with the following requirements:

a. SFPP access roads are two-wheel drive, all-weather roads;
b. Access is provided to all structures
c. Traffic management devices are constructed to not prohibit access by emergency service vehicles;
d. Access roads must provide suitable turning areas in accordance with Appendix 3; and
e. One way only public access roads are no less than 3.5m wifde and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.
f. 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.
g. hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;
h. hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and
i. there is suitable access for a Category 1 fire appliances to within 4m of the static water supply where no reticulated supply is available.

3. Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

All perimeter roads on the site are existing and they comply with the following:

a. there are two-way sealed roads;
b. minimum 8m carriageway width kerb to kerb;
c. parking is provided outside of the carriageway width;
d. hydrants are to be located clear of parking areas;
e. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
f. curves of roads have a minimum inner radius of 6m;
g. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
h. the road crossfall does not exceed 3 degrees; and
i. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

j. minimum 5.5m carriageway width kerb to kerb;
k. parking is provided outside of the carriageway width;
l. hydrants are located clear of parking areas;
m. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
n. curves of roads have a minimum inner radius of 6m;
o. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
p. the road crossfall does not exceed 3 degrees; and
q. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

4. Non-Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

The non-perimeter roads are existing and they comply with the following:

a. minimum 5.5m carriageway width kerb to kerb;
b. parking is provided outside of the carriageway width;
c. hydrants are located clear of parking areas;
d. there are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
e. curves of roads have a minimum inner radius of 6m;
f. the maximum grade road is 15 degrees and average grade of not more than 10 degrees;
g. the road crossfall does not exceed 3 degrees; and
h. a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

5. Water Supplies – A water supply is required for firefighting operations. An assessment of the Master Plan (Apppendix A) has identified reticulated water and an associated water hydrant will be provided within 70m of future buildings because of the construction of local roads. This reticulated water supply is to be designed and constructed in accordance with the following requirements:

a. reticulated water is to be provided to the development, where available; or
b. a 10,000 litre minimum static water supply for firefighting purposes is provided for each occupied building where no reticulated water is available
c. fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2005;
d. hydrants are not located within any road carriageway; and
e. reticulated water supply to SFPPs uses a ring main system for areas with perimeter roads.
f. fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
g. all above-ground water service pipes external to the building are metal, including and up to any taps.

6. Electricity Services – The installation of new electricity seeks to limit the possibility of igniting the surrounding bushland. Transmission lines are to be placed underground. If placing them underground is not practical, then overhead transmission lines are to:

a. Be installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas, and
b. No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 – Guideline for Managing Vegetation Near Power Lines.

7. Gas Services – The location and design of gas services will not lead to the ignition of surrounding buildings or the fabric of buildings. The provision of gas requires that:

a. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities,
b. Metal piping is used,
c. All fixed gas cylinders are kept clear of all flammable materials to 10m and shielded on the hazard side,
d. Connections to and from gas cylinders are metal,

e. Polymer-sheathed flexible gas supply lines are not used, and
f. Above-gas service pipes are metal including and up to any outlets.

8. Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire. The shorter the APZ (distance between the external wall of the habitable building and the unmanaged vegetation), then the higher the construction standard, which is referred to as the BAL.

Based on the APZ provided above, we understand that future development may be sited to achieve <10kW/m^2, which would result in BAL-12.5. However, all future buildings situated in Bushfire Prone Land will be subject to a separate Bushfire Assessment Report (BAR) at a future point in time.

9. Landscaping – The type, location and ongoing maintenance of landscaping is considered a necessary BPM.

a. The identified APZ is to be managed in accordance with PBP (Appendix 4);
b. A clear area of low-cut lawn or pavement is maintained adjacent to the development;
c. Fencing details in accordance with PBP (7.6 – Fences and gates);
d. The branches will not overhang the roof;
e. The tree canopy is not continuous; and
f. Any proposed windbreak is located on the elevation from which fires are likely to approach.

10. Emergency Evacuation – An emergency management plan will be prepared for the proposed development at the Development Application stage which will further address emergency evacuation access and procedures subject to the amendment to height of buildings map in Lake Macquarie Local Environmental Plan 2014 being approved.

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APPENDIX A PROPOSED SITE PLANS

Legend

SITE A - NEW RESIDENTIAL
25 Apartments
15 - 3 Bed & 10 - 2 Bed
47 Car Spaces
(40 residential owners + 7 visitor spaces)

SITE B - NEW TAVERN & FUNCTION CENTRE
Ground Floor Tavern
Level 1 Function Centre
Terraced outdoor areas
Community pools & facilities
39 Car Spaces (existing)

SITE C - NEW HOTEL
141 Rooms Over 8 Levels
Basement Car Parking (2 Levels) - 118 Spaces
Hotel Pool & Landscaped Areas
118 Car Spaces

SITE D - NEW RESIDENTIAL
21 Apartments
6 - 3 Bed, 14 - 2 Bed & 1 - 1 Bed
36 Car Spaces
(27 residential owners + 6 visitor spaces + 3 hotel staff parking)

SITE E - NEW RESIDENTIAL (Currently Conference & Café)
8 - 3 Bed Attached Dwellings
8 Garages
8 Visitor (6 in driveways of Villa Lots,
2 spaces opposite the Villa's along Lorikeet Loop)
25 Public Accessible Spaces

SITE F - CAR PARKING
39 Public Accessible Car Spaces

SITE G - TEMPORARY MARQUEE LOCATION
USED DURING CONSTRUCTION OF
NEW FUNCTION CENTRE

SITE H - MARINA (FUTURE POTENTIAL)
14 permanent berths
14 visitor berths

RAFFERTYS RESORT

A05 MASTERPLAN

SCALE 1:1000@A3

0 10mm 50mm 100mm ON ORIGINAL A3

REV	DATE	COMMENTS	DRN	CHKD	VRFD
A	10/02/2022	PRELIMINARY CONSULTANT ISSUE	FV	MR	
B	28/02/2022	CONSULTANT RE-ISSUE	FV	MR	

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APPENDIX B ASSET PROTECTION ZONES

APPENDIX 4

ASSET PROTECTION ZONE REQUIREMENTS

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

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

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

A4.1 Asset Protection Zones

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

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

An APZ provides:

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

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

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

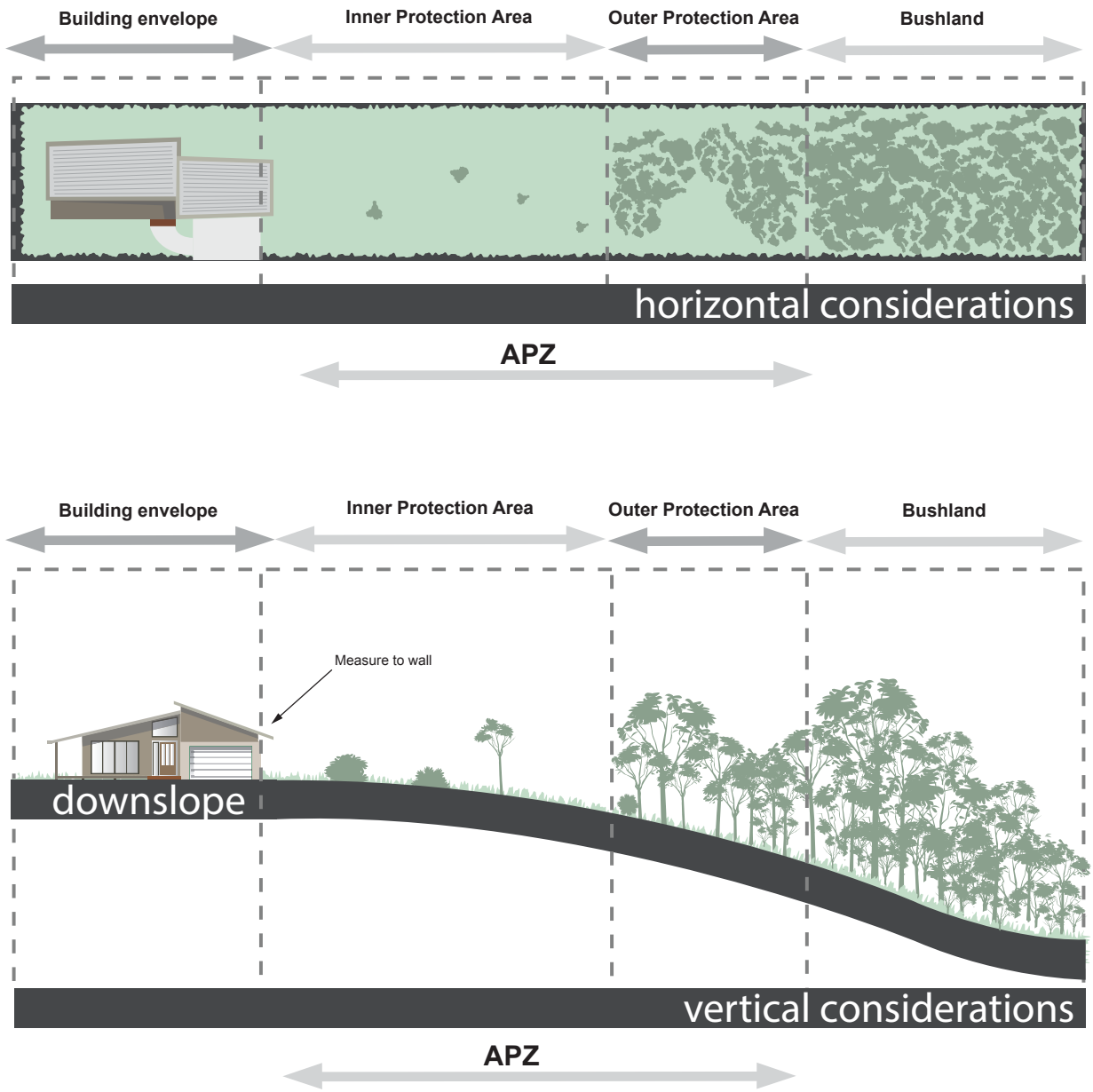
- direct flame contact on the building;
- damage to the building asset from intense radiant heat; and
- ember attack.

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

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

Figure A4.1

Typical Inner and Outer Protection Areas.



A4.1.1 Inner Protection Areas (IPAs)

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

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

When establishing and maintaining an IPA the following requirements apply:

Trees

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

Shrubs

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

Grass

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

A4.1.2 Outer Protection Areas (OPAs)

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

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

When establishing and maintaining an OPA the following requirements apply:

Trees

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

Shrubs

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

Grass

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

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

APPENDIX C SITE PHOTOS