IN THE LAND & ENVIRONMENT COURT OF NEW SOUTH WALES

Proceedings 2022/279591

Class 1 Appeal

GOLDCORAL PTY LIMITED
Applicant

V

RICHMOND VALLEY COUNCIL

Respondent

Joint Bushfire Expert Report

Lew Short (for the Respondent)
Stuart McMonnies (for the Applicant)

11 April 2024
Version 1.0

1. Uniform Civil Procedure Rules and the Expert Witness Code of Conduct

The Joint Expert Report has been prepared in accordance with Division 2 of Pt 31 of the Uniform Civil Procedure Rules (UCPR) and the Expert Witness Code of Conduct in Schedule 7 of the UCPR. We have read the Expert Witness Code of Conduct and agree to be bound by it. We confirm that the Joint Expert Report has been carried out in accordance with the Code of Conduct and the requirements of Division 2 of Part 31 of the UCPR.

2. Qualifications

Lew Short is the Respondents bushfire expert and has qualifications as set out in Annexure 1. Lew Short is recognised by the Fire Protection Association of Australia (FPAA) as a 'Bushfire Planning & Design' (BPAD) Level 3 Certified Practitioner (No. BPD-PA 16373). A site inspection for the proceedings was completed on 6 March 2023.

Stuart McMonnies is the Applicants bushfire expert and has qualifications as set out in Annexure 2. Stuart McMonnies is recognised by the FPAA as a 'Bushfire Planning & Design' (BPAD) Level 3 Accredited Practitioner (No. BPAD9400). I have inspected the site on 12 January 2024.

3. Background

The application is at 240 Iron Gates Road, Evans Head (the site) which is legally known as Lot 163 in DP 831052, Lots 276 and 277 in DP 755624, Crown Reserve between Lots 163 in DP 831052 and Lot 276 in DP 75524.

Access to the Site is via an existing public road, Iron Gates Drive, which is a two way bitumen carriageway but there is no kerb or gutter or line markings. The Site contains a single dwelling but is otherwise generally vacant. The site is designated as Bushfire Prone Land and is Integrated development in accordance with Section 4.46 of the Environmental Planning and Assessment Act, 1979 (EPA Act) and Section 100B of the Rural Fires Act, 1997 (RF Act).

The concept development application (DA No. 2015/96) (concept application) as determined by the Northern Regional Planning Panel sought approval for a for subdivision, clearing earthworks, roadworks, drainage, upgrading of Iron Gates Drive, infrastructure and embellishment of proposed public reserves. In detail the concept application is integrated development comprised 184 residential lots (including super lots being 3 residue lots) to be undertaken in two stages of development. The application included public open space (4 lots), infrastructure lots (being one drainage reserve and 1 sewer pump station lot) and detailed works for the first stage of the proposed subdivision comprising 147 lots, primarily in the north-eastern portion of the site, and upgrading of Iron Gates Drive; and Subdivision works including road works, drainage, water supply, sewerage, landscaping and embellishment work.

The Amended Application seeks approval for both a Concept Proposal and Detailed Proposal including subdivision works for Stage 1 and Stage 2 areas. The Concept Proposal identifies two stages of development with the Stage 2 area identified as being subject to further study.

The Concept Proposal seek approval for subdivision to create a total of 147 allotments comprised of the following:

(a) 121 residential lots (Lots 1-107 and 109--122) in Stage 1 and a further 17 residential allotments in Stage 2 (Lots 123-139). Stage 1 residential lots ranging in area from 601sqm to 780sqm with the majority of lots with an areas of less than 650sqm. The Stage 2 residential lots range in area between 610sqm and 1300sqm with five of the lots having areas greater than 700sqm.;
(b) One Community Refuge lot (Lot 108) with an area of 2,462sqm for community use during bushfire and flooding events;
(c) Two rainforest lots (Lots 140 and 141 measuring 57,187sqm and 23,199sqm respectively) part of which is identified in the proof of concept as being delivered as a local park;
(d) One residue lot (Lot 142) comprising 47.45 ha (with a dwelling entitlement);
(e) Four residual lots being Lots 143, 144, 145 and 146. The purpose and ownership of the lots is unclear on the submitted material;
(f) One residual lot, Lot 147 which is proposed to be dedicated as local open space with an area of 4,982sqm;
(g) Six infrastructure lots being Lot 901 for designated pump station and Lots 1001, 1002, 1003, 1004 and 1005 as bio retention areas.

The Amended Application is seeking approval for:

(a) Residential occupation of the proposed residential allotments;
(b) The use of Lot 108 as a Community Refuge;
(c) Use of Lots 140 and 141 for environmental conservation purposes;
(d) Indicative dwelling typologies;
(e) The development footprint for the Stage 1 and Stage 2 subdivision development area; and
(f) A network of internal roads in the Stage 1 and Stage 2 development areas.

The experts have considered the request for further and better particulars from Corrs lawyers dated 18 March 2024 and Mr Short has provided further clarity on the particulars within that document. This response was considered by both experts in the preparation of this Joint Report.

4. Contentions

The contentions are addressed:

Bushfire Hazard

13 *The proposed development is considered unacceptable pursuant to the provisions of s4.15(1)(b) of the EP&A Act as the site is isolated development and the likely impacts of the development from the bushfire hazard on the site have not been adequately mitigated.*

Particulars

(a) The proposed development is Integrated development in accordance with Section 4.46 of the EPA Act and Section 100B of the Rural Fires Act, 1997. A Bushfire Safety Authority has not been provided for the amended application by the NSW Rural Fire Service (RFS).

A Bush Fire Safety Authority (BFSA) authorises development to the extent that it complies with PBP including standards regarding setbacks, provision of water supply and other measures in combination considered by the Commissioner of the NSW Rural Fire Service (RFS) necessary to protect persons, property or the environment from danger that may arise from a bushfire.

It is agreed that RFS document Planning for Bush Fire Protection 2019 (PBP) provides the current bushfire development standards for new subdivisions in Bushfire Prone Areas and is appropriate for use in this matter rather than the 2006 version referenced in the BFSA.

It is agreed by the experts that the development is Integrated development in accordance with Section 4.46 of the EPA Act. It is also agreed that a current BFSA in accordance with Section 100B of the RF Act has not been provided by the NSW RFS.

The NSW RFS did issue a Bush Fire Safety Authority (ref DA-2014-03456-CL55-3) for the subject Development Application, but to a superseded version of the proposal. This approval can be found at Annexure 03 and includes five (5) conditions of consent.

To assist the following modifications have occurred to the application assessed and approved by the NSW RFS:

a. reduction in residential allotments from 175 to 138;
b. addition of community refuge;
c. reduction in the residential subdivision area by approximately 2.1ha, for a loss of approximately 37 residential lots;
d. removal of a fire trail from the eastern perimeter of the development, which has been replaced by a bioretention basin and perimeter road;
e. reconfiguration of road layout throughout the development to ensure that all vegetation is separated from residential lots by a road; and
f. clear designation of public open space and a commitment that vegetation in these areas would be managed as low vegetation areas; and
g. creation of an incorporated association which will own, and have responsibility for management of, the community refuge, littoral rainforest and public open space areas.

The experts agree that the current proposal is better from a bushfire safety perspective, in particular the reduction in residential allotments, provision of perimeter roads (northeast and east) and introduction of a purpose built refuge building.

The experts acknowledge that the Court can exercise Clause 39(6)(a) of the *Land and Environment Court Act* 1979 in the absence of a Bush Fire Safety Authority.

(b) The proposal does not provide a perimeter road along the north-eastern and eastern boundaries of the site which is inconsistent with Section 4.1.3[1] of Planning for Bushfire Protection 2006 (PfBP), increases the bushfire hazard to the site and is contrary to the objectives for subdivision of PfBP.

The experts agree the that current proposal includes Perimeter Roads along the north-eastern and eastern boundaries of the development site.

While the experts acknowledged that the physical Stage 2 road works do not form part of this application, and are the subject of a future application, they agree that the one-way section of Road 9 in front of Lots 123-128 should be increased to a two-way Perimeter Road. This is to include a minimum 8 metre carriageway, with all parking outside.

In addition, suitable turning for a Category 1 fire appliance as described in Figure A3.3 of PfPB shall be provided at the locations nominated in Figure 01 below until such time the continuation of the road network in Stage 2 is completed. These turning locations are to have a hydrant point located within 20 metres.

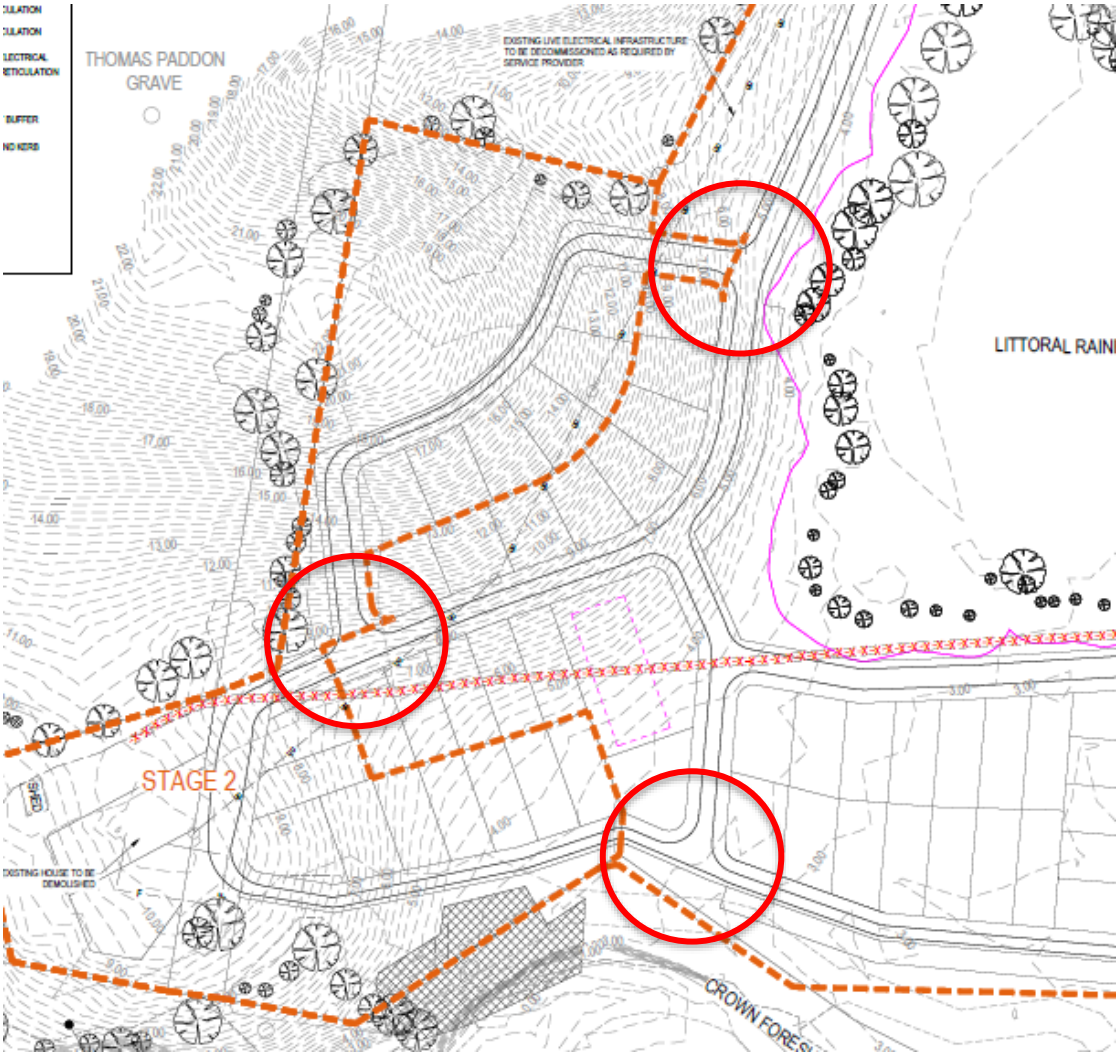


Figure 01: Mark-up showing required turning areas

Alternatively, temporary linking trails, generally consistent with the road alignment shown for Stage 2, can be provided for attending fire services. These trails are to have an all-weather surface capable of accommodating a fully loaded fire fighting appliance and a minimum 4 metre carriageway.

(c) *Proposed Road 5, which separates the two rainforest lots (proposed Lots 140 & 141), is only seven (7) metres wide and surrounded by vegetation, which does not satisfy the requirement of PfBP for all public roads to have a minimum carriageway width of 8 metres.*

The experts agree the that current proposal has increased the carriageway of the road (Road 1 – formally Road 5) which separates the two rainforest lots to 8 metres.

In relation to Road 1 the Engineering Services Report prepared by Arcadis states:

> *……..The adopted cross section shown on the engineering drawings in Appendix A, shows an 8.0m wide pavement carriageway with no allowance for on-street parking. Safety barriers (guard rails) have been adopted on both sides of the road to help in minimizing the total width.*

No verge is proposed on the northern edge of the road. Along the southern edge an expected 2.0m wide elevated platform clear of obstructions will be provided as a pedestrian boardwalk connection between the wider sections of the road. The proposed services required to run along this road shall be provided beneath the pedestrian boardwalk, with the relevant services attached to the structure or otherwise buried beneath the boardwalk in a standard trenching arrangement.

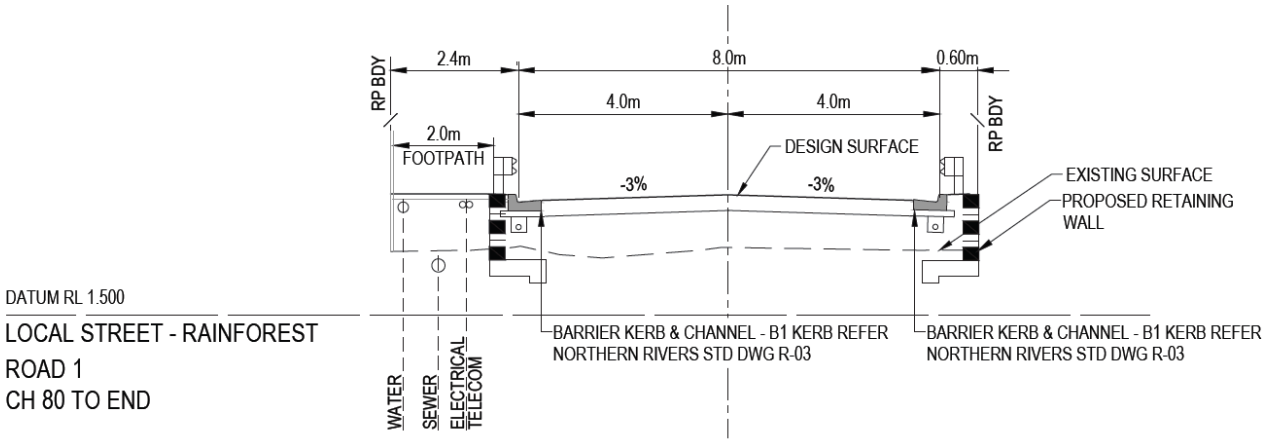


Figure 02: Extract from Typical Road Sections prepared by Arcadis (dwg no IRG-AAP-DA-00-DRG-CV-0241, issue02)

(d) The proposed internal road system relies on a prohibition of on-street car parking to satisfy PfBP. Such a prohibition is difficult to enforce and is not supported.

The experts agree that the acceptable solution within PfBP for the minimum carriageway cannot include parking. Pursuant to section 5.3.2 of PBP the following are the minimum carriageway applicable to road type:

Perimeter Roads:	minimum 8 metre carriageway
Non-Perimeter Roads:	minimum 5.5 metre carriageway
One-Way Roads:	minimum 3.5 metre carriageway

The amended application achieves the minimum carriageway for Perimeter Roads and exceeds the carriageway for Non-Perimeter Roads (6m) and One-way roads (4m). The experts agree the exceedance to the Non-Perimeter Roads and One-way road is appropriate and must also not be comprised by parking.

In acknowledging the low-risk nature of the foreshore vegetation and prohibition to undertake hazard reductions under the *Bush Fire Environmental Assessment Code* 2021 the provision of the Perimeter Road requirements for the section of Road 2 fronting proposed Lots 93-94, 97-98, 101-101 and 105-106 (one-way road) is not considered necessary.

It was however agreed that a strategic fire fighting platform be provided to facilitate fire suppression activities in the unlikely event this vegetation is the subject of an unplanned fire. The strategic fire fighting platform is to comprise of an additional 2 metre width (totalling 6m) for a 20 metre length, and a hydrant point and located at a point along this road.

Figure 03: Street and Block Layout prepared by Dickson Rothschild and modified by the experts to nominate relevant classification of roads under PfBP

(e) *The proposal has not satisfactorily demonstrated the safe operational access via Iron Gates Drive to structures within the site for emergency services, while residents are seeking to evacuate from an area. This lack of clarity over Iron Gates Drive is exacerbated by the site's relatively isolated location within the Evans Head locality and the lack of a secondary access or egress point to the site.*

The proposal includes an upgrade of the existing Iron Gates Drive (outside the mapped coastal wetlands), which currently includes a 6.5m-7.3m sealed carriageway and minimum 1m shoulders, to provide an 8m full width carriageway seal and 0.5m of shoulders. This results in a 9m wide proposed formation width.

In addition, the proposal includes vegetation trimming and removal along Iron Gates Drive (outside the mapped coastal wetlands).

The experts agree that the site's relatively isolated location within the Evans Head locality and single available access / egress point warrants additional considerations as set out in section 5.1.1 'Isolated Subdivision' of PfPB. This section of PfBP identifies that in circumstances where occupants may need to travel large distances through bush fire prone vegetation, and fire service may be hindered, there are additional measures to reflect the need for occupants to be more self-sufficient.

In addition to the clustering of dwellings, which is achieved in the proposed design, the additional measures set out in PfBP for Isolated Subdivisions are:

1. *access and egress within the developable land and along the adjoining public road system shall include safety provisions for attending emergency service vehicles and evacuating residents, including road widths and management of vegetation along road verges. Clearing or modifying vegetation in roadside verges of existing road reserves may not be permitted;*

2. *subdivision design shall include perimeter roads separating developable lots from hazardous bushland areas. The objective of perimeter roads is to not only provide a fuel free area adjacent to the hazard but to also ensure suitable unrestricted access for firefighting and fire management purposes. Maintenance of perimeter roads shall be the responsibility of the cluster community;*

3. *access for maintenance of APZ and other fuel management activities;*

4. *larger APZs outside of the range prescribed in PBP and increased Bush Fire Attack Level (BAL) to proposed buildings to create a safer area for occupants and firefighters remaining on site; and*

5. *firefighting water supply and associated firefighting equipment (i.e. pump and hose) for each dwelling in addition to any reticulated water supplies.*

As outlined above the proposal includes an upgrade of the existing Iron Gates Drive, which is considered reasonable by the experts and responds to item 1. In the event of a bushfire impacting or being likely to impact Iron Gates Drive, the experts agree that it is unsafe for residents or emergency services to be exposed to uncontrolled fire along the road. It is possible that vehicles could be overrun by fire if Iron Gates Drive is used during the impact and passage of a fire.

As a redundancy, the proposal includes a purpose-built onsite refuge building and all residents will be bound by an incorporated association. The incorporated association provides advantages when compared to a typical Torrens Title subdivision, as it allows for a considered and coordinated emergency management system. The proposed refuge building also provides local Shelter-in-Place option, noting the closest registered Neighbourhood Safer Place is Evans Head Sporting Ground, being an open-air refuge point.

The experts acknowledge the emergency management framework set out in the Flood Emergency Response Plan (FERP) prepared by Martens (ref P2209002JR02V03, dated November 2023), including the establishment of an association committee and appointment of a Chief Flood Warden, Deputy Chief Flood Warden and Flood Wardens.

This framework is known to the experts, however its application is a residential setting comprising of detached housing is considered unique in their experiences, with this framework more commonly applied to Commercial and Residential Apartment Buildings developments.

This framework, where effectively implemented, offers a superior and more coordinated and robust emergency management system, when compared to the individual Bush Fire Survival Plans typically applied to detached housing developments.

The experts agree that not utilising this framework when it is being established for another emergency event (flooding) would be illogical. It is however agreed that as a redundancy in the bushfire emergency management response system independent Bush Fire Survival Plans are also to be conditioned.

Mr McMonnies has completed bushfire design modelling at Annexure 06. The experts agree that the refuge building is located in a footprint that achieves compliance with the NSW Rural Fire Service publication '*Neighbourhood Safer Places – Guidelines for the Identification and Inspection of Neighbourhood Safer Places in NSW*'. The experts agree that the modelling utilises the same inputs as the RFS (in the determination of NSP) to determine the acceptable radiant heat level and bushfire attack level at the proposed refuge building. The modelling outputs (at Appendix 6) provide for radiant heat at the proposed refuge of less than 10kWm^2 which is in keeping with RFS NSP tolerable limits.

Mr Short comments that PfBP (p. 77) provides the following in relation to Community Bushfire Refuges:

> ***8.3.4 Community bush fire refuges***
>
> *Community bush fire refuges need to comply with the design and Construction of Community Bush Fire Refuges Handbook published by the ABCB.*
>
> *In NSW, any proposal to construct a community bush fire refuge should be referred to the NSW RFS*

Further, Section 47 of the *Rural Fires Regulation 2022* recognises a community bushfire refuge as being considered a Special Fire Protection Purpose (SFPP) development in accordance with Section 100B of the *Rural Fires Act*, 1997 (RF Act).

The enabling environment for a Community Fire Refuge is provided by the EPA Act, RF Regulation and PfBP,

Mr Short notes that following the *2009 Victorian Bushfires Royal Commission*, a number of actions were completed to provide redundancy and harm minimisation options to provide for the life safety of people in isolated areas. This included community bushfire refuges and private bushfire shelters. These include:

Australian Building Codes Board (2014) *Design and Construction of Community Bushfire Refuges*

https://www.abcb.gov.au/sites/default/files/resources/2022/Handbook-community-bushfire-refuges-2014.pdf

Emergency Management Victoria (2015) *Community Fire Refuges*

https://files.emv.vic.gov.au/2021-07/Community-Fire-Refuges-Policy-2015.pdf

The experts agree that a refuge is documented within NSW and they are provided for nationally in the Australian Building Codes Board (ABCB) *Design and Construction of Community Bushfire Refuges* guidelines and within the 5 operational community Fire Refuges in Victoria. However, the experts are not aware of a new residential subdivision being approved with a refuge as a core component (albeit a redundancy option) of the Bushfire Protection Measures.

The experts agree that while the refuge building does not form part of the core bushfire protection measures, there is merit in the provision of a refuge as a redundancy option to provide a failsafe option.

More recently, the ABCB within the National Construction Code (NCC) of Australia 2022 Volume One - Building Code of Australia Class 2 to 9 buildings provides a new acceptable solution called *Specification 43 Bushfire protection for certain Class 9 buildings*[1] that provides refuge and life safety for highly vulnerable[2] members of the community being

A Class 9a health-care building.

A Class 9b—early childhood centre; or primary or secondary school.

A Class 9c residential care building.

Specification 43 represents current best practice to provide acceptable solutions for vulnerable members of the community who must seek refuge within a designated building. To assist the Court, the experts agree the proposed refuge building could provide a suitable Shelter-in-Place option in the event of a bushfire emergency, contingent on the following measures as derived from Specification 43 'Bushfire protection for certain Class 9 buildings' of *National Construction Code* 2022 and additional measures considered necessary:

1. The building shall comply with sections 3 and 8 (BAL 40) of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2018;
2. A non-combustible pathway directly adjacent to the building and not less than 1.5 m wide must be provided around the perimeter of the building.
3. To maintain internal tenability throughout the duration of occupancy during a bushfire event, the building must comply with the following:

   (a) An air handling system must be provided that is capable of—
   - (i) being adjusted for full recycling of internal air for a period of not less than 4 hours to avoid the introduction of smoke into the building; and
   - (ii) maintaining an internal air temperature of not more than 25°C.

[1] https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/g-ancillary-provisions/43-bushfire-protection-certain-class-9-buildings

[2] https://ncc.abcb.gov.au/editions/ncc-2022/adopted/volume-one/g-ancillary-provisions/part-g5-construction-bushfire-prone-areas#_f2c9b166-24f2-4118-b1a4-eee8c34e593c

(b) The building envelope must be designed such that if an air handling system required by (a) fails, then—

(i) internal air temperatures can be maintained below 39°C; and

(ii) internal surface temperatures can be maintained below 60°C.

(c) If the building is divided into separate compartments then, for the purposes of (a), each compartment must have a separate air handling system.

(d) Each air handling system required by (a) must be designed to account for the activation of smoke detectors from low concentrations of smoke from external sources, so as to ensure that air-conditioning and other essential systems remain operational.

4. Emergency power must be provided to support, for not less than 4 hours before and 2 hours after the passing of the fire front during a bushfire event, the ongoing operation of—

   (a) air handling systems to maintain internal tenability; and
   (b) any pumps for fire-fighting; and
   (c) any emergency lighting and exit signs; and
   (d) any other emergency equipment listed in C3D14(6) and required to be provided.

   Manual control for emergency back-up power supply must be provided to facilitate manual intervention where the power supply fails or runs out.
5. Signage must be provided to warn building occupants against storing combustible materials under or adjacent to the building.
6. That the 150kL water supply tank nominated in the Flood Emergency Response Plan is to be accessible to fire services by either being fitted with a 65mm storz valve or if underground have an access hole of 200mm.
7. At least two (2) fire hose reels are to be installed on the building and provide complete overlap when deployed.
8. That the building has a minimum Floor Area, which is able to be used by residents in the event of a bushfire emergency, of 500m^2.
9. That the building is constructed prior to the issue of any Occupation Certificate for a future dwelling within the residential lots.

The experts agree that the nationally agreed position of bushfire combat agencies in relation to the optimum action of the public to mitigate threat to life from a bushfire emergency is:

> *The safest option is to avoid bush fire risk areas on elevated fire danger days or when bushfires are occurring within a locality.*

This risk management and harm minimisation approach relies on a range of strategies from fire agencies being implemented by private citizens, including Bushfire Survival Plans. The experts agree that an overall framework can be provided, however, each household will determine their risk tolerance level that could be in conflict with site wide arrangements.

The experts have not experienced an incorporated association arrangement that would compel a private citizen to be bound to an emergency management procedure or actions in a torrens title residential subdivision and housing arrangement. The experts flag any legal structure issues for consideration by the lawyers as to compliance with bylaws and rules etc. The experts acknowledge that there is a high degree of personal accountability and reasonableness in people within any future development (if the application were approved) making informed decisions and acting on them to appropriately respond to a bushfire emergency (i.e. relocate early or Shelter in Place (respective dwelling or refuge building)).

In consideration of item 2 above the experts agree that the proposal includes Perimeter Roads to all identified bushfire hazards, noting the section of Road 2 fronting proposed Lots 93-94, 97-98, 101-101 and 105-106 (one-way road) will have a designated fire fighting platform.

These roads will provide access for maintenance of APZ and other fuel management activities.

As shown at Annexure 04 the minimum required Asset Protection Zones for Residential Development as determined from Table A1.12.3 of PfPB are exceeded to the proposed residential allotments and nominated building envelopes.

The Bushfire Attack Levels were determined from Table A1.12.6 of PfBP and found that twenty-five (25) lots are BAL 29, twenty-five (25) lots are BAL 19, sixty-five (65) lots are BAL 12.5 and six (6) lots are in BAL Low. Consistent with item 4, section 5.1.1 of PfBP the agreed conditions include a requirement that each future dwelling be constructed one level higher than that determined from Table A1.12.6 and as shown in Annexure 04. This measure provides additional confidence that the dwellings will provide a reasonable Shelter in Place option.

The subject development will be serviced by hydrants which is to comply with the sizing, spacing and pressures outlined in AS2419.1 2021. In addition the refuge building will have a 150kL water supply tank (accessible to fire services) and at least two (2) fire hose reels. The experts agree that this water supply is adequate for the replenishment of attending fire services.

(f) *A number of "pinch points" are within and external to the site. A "pinch point" in the context of bushfires refers to a location where vegetation affecting a road can potentially hinder or restrict movement during a fire emergency. They are likely to be cut by fire rendering them unsafe. These pinch points can significantly impact firefighting efforts and evacuation procedures.*

The experts agree there are "pinch points" and that they have the potential to hinder or restrict movement at the time of bushfire impact and after the passage of a fire.

The experts agree that a bushfire pinch point for access refers to a narrow or restricted area within a bushfire prone landscape that presents significant challenges for firefighters or residents to access or escape during a bushfire event. These pinch points could include narrow roads, bridges, or pathways with adjoining vegetation that limit the movement of emergency vehicles or evacuating individuals. In such scenarios, the bottleneck effect can hinder rapid response efforts and increase the risk of trapping people within the fire's path.

As outlined in the response to contention (e) additional measures have been included to reflect the need for occupants to be more self-sufficient and provide increased confidence that the residents are afforded protection from a bushfire.

(g) *The Plan of Subdivision prepared by LandPartners (9 November 2023) and the Supplementary Bushfire Report by Bushfire Risk Consultants (dated 16 November 2023) does not include the proposed subdivision design and the provision of the required asset protection zone (APZ) within the site. The compliance of the proposed Lots with APZs that provide for a house footprint cannot be verified. The APZ plan in the Bushfire Report is inconsistent with that in the Rothschild Proof of Concept Plan (20 November 2023).*

The experts have relied upon the extent of APZs shown at Annexure 04.

The experts agree that the entire extent of the APZs (excluding the bio swale) and 'proposed managed open space land', inclusive of those shown in Stage 2, are to be managed in accordance with an APZ and created prior to the registration of the Stage 1 Subdivision Certificate. These APZs and 'proposed managed open space land' are to be managed in perpetuity by either the owner of the respective residential lot or incorporated association for all other land.

(h) *The retained forest and rainforest vegetation between the northern and southern precincts provides a pathway for bushfire to penetrate a larger number of houses, which can also cut off access to and from the site (creating a pinch point) contrary to the Specific Objective at Section 5.2 of PBP-2019 which requires as follows: "minimise vegetated corridors that permit the passage of bush fire towards buildings".*

The experts acknowledge that regardless of the design, the retained vegetation within the Rainforest vegetation and the vegetation adjacent to Iron Gates Drive present pinch points.

Proposed Lot 140 comprises of Littoral Rainforest and Coastal Vine Thickets of Eastern Australia under the *Environmental Protection and Biodiversity Conservation Act* 1999 (Critically Endangered) and Littoral Rainforest under the *Biodiversity Conservation Act* 2016 (Endangered), as well as revegetation areas which rationalise the management interface and 'proposed managed open space land' which is to be managed in accordance with an APZ.

The proposal includes 'proposed managed open space land' on both sides of Road 02, which separates the retained Forest and Rainforest. This managed buffer in conjunction with the formation of Road 2 provides at its closest point a 30 metre separation, with the bulk of the managed buffer located on the western (Forest) side. This separation provides a clear break in in the retained Forest and Rainforest vegetation and subsequent bushfire path.

The experts agree that the design has minimised vegetated corridors that permit the passage of bush fire towards buildings.

(i) *The Proof of Concept Plan prepared by Rothschild (20 November 2023) has different APZ extents than from the Bushfire Report. The Rothschild Proof of Concept Plan show extensive areas of managed land. The Supplementary Bushfire Report states that "All open space land would be dedicated to council to be maintained in perpetuity." Council does not accept this ongoing management responsibility for APZs throughout the site.*

Mr McMonnies comments that the proposed 'incorporated association' has been proposed as an alternative to a community scheme for the development. As such, it is understood to be designed to function as close as possible to a community association in a community scheme, or an owners corporation for a strata scheme. Specifically, each incoming purchaser of a lot within the proposed development is understood to be required, by the terms of their Contract for Sale with the developer, to become a member of the association. The constitution for the incorporated association would require each member to contribute funds to the association that would be spent on matters that are designated in the constitution of the association to be the collective responsibility of the association members.

Further, Mr McMonnies is instructed that the association would also own and be responsible for the maintenance of the littoral rainforest land (Lots 140 and 141) and would also retain the public open space areas. As such, the association will be required to maintain those spaces in accordance with any necessary plans of management and positive covenants that are required to be prepared/registered by conditions of consent, including those requiring the preservation of APZs on public land.

The experts agree that the entire extent of the APZs (excluding the bio swale) and 'proposed managed open space land', inclusive of those shown in Stage 2, are to be managed in accordance with an APZ and created prior to the registration of the Stage 1 Subdivision Certificate. These APZs and 'proposed managed open space land' are to be managed in perpetuity by either the owner of the respective residential lot or incorporated association for all other land. This burdens the incorporated association with ongoing management of the APZ areas and obligations and commitments within the Vegetation Management Plan.

(j) The Community Bushfire Refuge Building provides for only 50% of potential occupants on site. As a redundancy, the refuge building should provide for all community members and provide provision for emergency services that may be isolated in the event of a fire closing access within the site or along Iron Gates Drive.

The experts agree that the development proposal seeks consent for the creation of one hundred and twenty-one (121) residential lots in Stage 1. In addition, the indicative layout for Stage 2 indicates a further seventeen (17) residential allotments, totalling 138 residential lots.

The average dwelling occupancy for the Richmond Valley LGA as per the Australian Bureau of Statistic's 2021 Census of Population and Housing is 2.45 person per dwelling[6].

[6] https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA16610

As a margin of safety and consistent with the calculations outlined in the Flood Assessment and Flood Emergency Response Plan prepared by Martens (2023) an allowance of 3 persons per lot has been adopted.

The resultant total number of occupants is 414 (being 138 x 3).

As set out in the Australian Building Codes Board publication 'Design and Construction of Community Bushfire Refuges' 2014 the minimum Acceptance Criteria for the Floor Area is 0.75m^2 per person and Volume is 1.2m^3 per person.

The minimum Floor Area to cater for the total occupants for a bushfire emergency was determined to be 311m^2.

The minimum Volume to cater for the total occupants for a bushfire emergency was determined to be 497m^3.

The concept design for the Community Centre (Refuge Building) prepared by Dickson Rothschild (project no 22-070, dwg no DA-0-206, rev C, dated 17/11/2023) indicates an available Ground Floor area, comprising of the Hall and Kiosk areas only, of 600m^2.

The experts agree that the Community Centre (Refuge Building) should have a minimum Floor Area, which can be used by residents and others at the time of a bushfire emergency, of **500m^2**.

(k) The proposal is inconsistent with the specific objectives for subdivision pursuant to Section 4.1.2 of PfBP as the proposal:

(i) Does not minimise perimeters of the subdivision exposed to the bush fire hazard as a result of the lack of a perimeter road along the norther-eastern and eastern boundaries of the site (adjoining Lots 1 to 20 and 60).

The experts agree the that current proposal includes Perimeter Roads along the north-eastern and eastern boundaries of the development site.

(ii) Does not minimise bushland corridors that permit the passage of bush fire arising from the retention of the two areas of Littoral Rainforest (Lot 140 and Lot 141) in the centre of the subdivision. The vegetation within Lot 140 is contiguous with the vegetation to the east of the site.

The experts agree with that with the inclusion of the agreed conditions set out in Annexure 07 that the proposed design has suitably mitigated the bushfire threat and provides a superior bushfire safety outcome compared to that previously approved by the NSW RFS.

(iii) Does not provide open space and public recreation areas as accessible public refuge areas or buffers.

The proposal includes a purpose-built refuge building. Refer to response to contention (e).

(iv) Cannot ensure the ongoing maintenance of asset protection zones as there will be multiple landowners who properties are in the asset protection zones.

The experts agree that the entire extent of the APZs (excluding the bio swale) and ‘proposed managed open space land’, inclusive of those shown in Stage 2, are to be managed in accordance with an APZ and created prior to the registration of the Stage 1 Subdivision Certificate. These APZs and ‘proposed managed open space land’ are to be managed in perpetuity by either the owner of the respective residential lot or incorporated association for all other land.

(l) *The fire trail on the eastern side of the proposed subdivision is inadequate because of restricted space for vehicle movements, including turning, and level variations between the proposed fire trail, adjacent allotments and land to the north.*

The experts agree this particular is no longer relevant to the current proposal.

(m) *The bushfire information has been provided in Supplementary reports. The original Bushfire Report (2019) is outdated and should be revised to reflect the amended application. The Bushfire Supplementary report does not follow the required format within Clause 45 of the Rural Fires Regulations 2022 or Planning for Bushfire Protection 2019 for documentation supporting an application.*

The experts agree with that with the inclusion of the agreed conditions set out in Annexure 07 that the proposal will provide a superior bushfire safety outcome compared to that previously approved by the NSW RFS and will satisfy the relevant specification and requirements of PfBP.

(n) *Inadequate information has been provided in relation to biodiversity impacts of the proposed APZ and road construction to relevant standards through the east-west road through the site and the mangrove vegetation communities within Iron Gates Drive.*

The experts have relied upon the extent of APZs shown at Annexure 04.

The experts agree that the entire extent of the APZs and 'proposed managed open space land', inclusive of those shown in Stage 2, are to be managed in accordance with an APZ and created prior to the registration of the Stage 1 Subdivision Certificate. These APZs and 'proposed managed open space land' are to be managed in perpetuity by either the owner of the respective residential lot or incorporated association for all other land.

The suitability of the biodiversity impact is for others.

	
Lew Short B.A., Grad. Dip. (Design for Bushfires), Grad. Cert. of Management (Macq), Grad. Cert. (Applied Management) BPAD Level 3 - BPAD16373	Stuart McMonnies G. D. Design in Bushfire Prone Areas. Certificate IV Fire Technology Fire Protection Association of Australia BPAD – L3 Accredited Practitioner Certification number – BPAD 9400
BPAD Bushfire Planning & Design Accredited Practitioner Level 3	BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Annexure 1 - Lew Short Curriculum Vitae

Qualifications

- BPAD Level 3 Accredited Practitioner Fire Protection Association of Australia
- Graduate Diploma of Bush Fire Design University of Western Sydney, 2006
- Graduate Certificate of Applied Management Australian Institute of Police Management, 2005
- Graduate Certificate of Management Macquarie Graduate School of Management
- Macquarie University, 2001
- Bachelor of Arts, Resource and Environmental Management Macquarie University, 1994
- Member Ku-ring-gai Bushfire Brigade (Basic Fire Fighter, Advanced Fire Fighter, Village Fire Fighter, Crew Leader).

Career Summary

Organisation: **Blackash Bushfire Consulting**
Position: Principal
August 2014 - Present

Organisation: **Emergency Management Victoria**
Position: General Manager Risk, Consequence & Resilience
November 2014 – December 2016
State Consequence Manager
January 2015 – December 2016

Organisation: **Eco Logical Australia**
Position: Principal, Emergency Management & Resilience
January 2013 - Present

Organisation: **NSW Rural Fire Service**
Position: Group Manager Community Resilience
July 2008 – December 2012

Organisation: **NSW Rural Fire Service**
Position: Manager Development Control
May 2003 – July 2008

Organisation: **Ku-ring-gai Council**
Position: Manager Natural Environment and Bushland
April 2001 – May 2003

Organisation: **Ku-ring-gai Council**
Position: Bushland Group Co-ordinator
November 1998 – April 2001

Organisation: **Ku-ring-gai Council**
Position: Bush Fire Management Program Coordinator
November 1995 - November 1998

Organisation: **Ku-ring-gai Municipal Council**
Position: Fire and Natural Resource Officer, 1994 - 1995

Project Experience

- Program Director for AFAC on the Nationally significant review of the Fire Danger Ratings System and National Board Member.
- Developed Community Resilience Framework for Emergency Management in Victoria
- State Consequence Manager for various all hazards state level incidents in Victoria including bushfire.
- NSW RFS Planning for Bush Fire Protection 2006 and associated policy, guidelines and manager of business practice.
- Responsible for over 80,000 bushfire protection assessment at NSW Rural Fire Service
- Bushfire expert in Land and Environment Court cases
- Project manager various bushfire technical reports
- State level manager for NSW Rural Fire Service
- Member of the NSW Building Regulation Advisory Committee, which formulates state-wide policy and input into the Building Code of Australia.
- Represented AFAC on Australian Standards committees (FP20 for AS3959) and the National Building Codes Committee, which determines changes to the Building Code of Australia for bushfire.
- Chair AFAC Bushfire Reference Group and member AFAC Community Safety and Built Environment Group.
- Pioneered various bushfire alert and communication systems.

Annexure 2 – Stuart Gordon McMonnies Curriculum Vitae

ADDRESS: 19 Alan Road, Berowra Heights

DATE OF BIRTH: 20th September 1985

Present Position:

Director / Manager Bushfire Section, Building Code & Bushfire Hazard Solutions P/L.

I have in excess of 20 years experience in both practical and theoretical terms within the sphere of bushfire hazard assessment, application of bushfire mitigation measures and bushfire fighting serving as a Crew Leader in the NSW Rural Fire Service.

Accreditation:

Fire Protection Association of Australia

Bushfire Planning and Design, Level 3 - Bushfire Planning Practitioner (Performance)

Recognises practitioners who develop planning and building applications by developing alternative design solutions (excluding construction provisions) in accordance with local regulatory requirements in addition to the activities described for a Level 1 and Level 2 Practitioner.

Tertiary Education:

University of Western Sydney
Graduate Diploma for Design in Bushfire Prone Areas, 2007

Petersham T.A.F.E
Certificate IV – Fire Technology, 2004-2005

Hornsby T.A.F.E.
Certificate IV - Business Management – Small Business, 2007 – 2008

NSW Rural Fire Service Qualifications:

Certificate of Proficiency – Prescribed Burn Supervisor
Certificate of Proficiency – Rural Fire Service Instructor
Certificate of Proficiency – Crew Leader
Certificate of Proficiency – Advanced Firefighter
Certificate of Proficiency – Village Firefighter
Certificate of Proficiency – Basic Bush Firefighter
Certificate of Proficiency – Rural Fire Driver
Certificate of Proficiency – Fire Boat Skipper
Certificate of Proficiency – Fire Boat Crew
Certificate of Proficiency – Chainsaw Operator (Cross Cut)
Certificate of Proficiency – Senior First Aid
Certificate of Proficiency – Urban Search & Rescue

Affiliations:

NSW Rural Fire Service

I am an active member of the Rural Fire Service (over 20 years) successfully completing Basic, Village, Advanced Fire Fighter and Crew Leader courses. I have been involved in wildfires, hazard reduction burns, and preparing mapping data for proposed hazard reductions at a local Brigade level.

I have been Incident Controller, a Sector Leader and Field Operations Assistant, being responsible for multiple crews of many brigades. I currently hold the position of Deputy Captain in the Berowra Waters Brigade.

NSW Rural Fire Service
Berowra Waters Rural Fire Brigade, 2003-present

Positions held:
Senior Deputy Captain
Deputy Captain
Hazard Reduction Officer
First Aid Officer
Vice President

NSW Rural Fire Service
Berowra Fire Tower, 2001-2003

Fire Protection Association of Australia

Chairman of the joint Bushfire Planning and Design and NSW Rural Fire Service Working Group, 2017 – 2020

Member of the joint Bushfire Planning and Design and NSW Rural Fire Service Working Group, 2017 - present

Member of the Planning for Bush Fire Protection Implementation Group, 2018 - 2019

Member of the Technical Advisory Committee TAC/20 Bushfire Safety, 2011 - present

Awards:

National Medal

NSW Rural Fire Service, Long Service Medal (20yr)

Premiers Bushfire Emergency Citation

National Emergency Medal (2019-20 Bushfires)

Life Member (Berowra Waters RFB)

Employment History:

Building Code & Bushfire Hazard Solutions P/L December 2003 - present

Director / *Manager Bushfire Section* 2022 – present

Responsible for quality control of documentation. I also monitor and mentor the staff under my direct control.

Bushfire Hazard Analysis and reports for developers, Local Governments other Government Departments, including multi unit apartment constructions, townhouse development, subdivisions and redevelopment of residential dwellings. Expert witness at Land and Environment Court.

Manager Bushfire Section – 2017 – 2022

Responsible for quality control of documentation. I also monitor and mentor the staff under my direct control.

Bushfire Hazard Analysis and reports for developers, Local Governments other Government Departments, including multi unit apartment constructions, townhouse development, subdivisions and redevelopment of residential dwellings. Expert witness at Land and Environment Court.

Senior Bushfire Consultant - December 2003 - 2017

Bushfire Hazard Analysis and reports for developers, Local Governments other Government Departments, including multi unit apartment constructions, townhouse development, subdivisions and redevelopment of residential dwellings. Expert witness at Land and Environment Court.

Annexure 03: Bush Fire Safety Authority

NSW GOVERNMENT

NSW RURAL FIRE SERVICE

Richmond Valley Council
Locked Bag 10
CASINO NSW 2470

Your reference: (CNR-35578) DA2015/0096
Our reference: DA-2014-03456-CL55-3

ATTENTION: Tony McAteer

Date: Thursday 16 June 2022

Dear Sir/Madam,

Integrated Development Application
s100B – Subdivision – Torrens Title Subdivision
240 IRON GATES DRIVE EVANS HEAD NSW 2473, 163//DP831052, 276//DP755624, 277//DP755624

I refer to your correspondence dated 17/02/2022 seeking general terms of approval for the above Integrated Development Application.

The New South Wales Rural Fire Service (NSW RFS) has reviewed the submitted amended information. General Terms of Approval are now re-issued, under Division 4.8 of the *Environmental Planning and Assessment Act 1979*, and a Bush Fire Safety Authority, under section 100B of the *Rural Fires Act 1997*, are now issued subject to the following conditions.

Asset Protection Zones
The intent of measures is to provide sufficient space and maintain reduced fuel loads so as to ensure radiant heat levels of buildings are below critical limits and to prevent direct flame contact with a building. To achieve this, the following conditions shall apply:

1. At the issue of a subdivision certificate, all proposed road reserves, Iron Gates Drive road reserve (with the exception of SEPP17 wetland mapped areas), all Lots excluding 136, 137, 138, 141, 142 and 143 must be managed as an inner protection area (IPA). The IPA must comprise:
   - Minimal fine fuel at ground level;
   - Grass mowed or grazed;
   - Trees and shrubs retained as clumps or islands and do not take up more than 20% of the area;
   - Trees and shrubs located far enough from buildings so that they will not ignite the building;
   - Garden beds with flammable shrubs not located under trees or within 10 metres of any windows or doors;
   - Minimal plant species that keep dead material or drop large quantities of ground fuel;
   - Tree canopy cover not more than 15%;
   - Tree canopies not located within 2 metres of the building;
   - Trees separated by 2-5 metres and do not provide a continuous canopy from the hazard to the building; and,

Postal address
NSW Rural Fire Service
Locked Bag 17
GRANVILLE NSW 2142

Street address
NSW Rural Fire Service
4 Murray Rose Ave
SYDNEY OLYMPIC PARK NSW 2127

T (02) 8741 5555
F (02) 8741 5550
www.rfs.nsw.gov.au

- Lower limbs of trees removed up to a height of 2 metres above the ground.

2. At the issue of subdivision certificate, section 88B easements under the 'Conveyancing Act 1919' is to be created. The easements are to burden Lots within the 15, 21, 25 and 27 metre markings identified on the plan titled 'Bushfire Setback Plan Over Proposed Subdivision of Lots 276 & 277 on DP755627, Lot 163 on DP831052, Crown Public Road Reserve (Between Lot 163 DP831052 and Lot 276 on DP755624) and Crown Foreshore Reserve (Adjacent to Evans River)', drawing number BRJD6396-100-45-2, dated 23 March 2020. The easement is to restrict the user from the construction of any habitable building within these areas. The easement is to ensure the lot accommodates the required asset protection zones (APZs) required for the future dwelling located on the lot.

Access – Public Roads

The intent of measures is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area. To achieve this, the following conditions shall apply:

3. Public road access shall comply with the following requirements of section 4.1.3 (1) of 'Planning for Bush Fire Protection 2006':

- Iron Gates Drive (and proposed road 5) from the intersection of Cherry Street to the intersection of Road 1 is to provide appropriate fog line-markings, guideposts and centreline cats-eyes to council requirements.
- Road(s) shall be two wheel drive, all weather roads.
- Urban perimeter roads are two way, with a carriageway 8 metres minimum kerb to kerb.
- The perimeter road is linked to the internal road system at an interval of no greater than 500 metres.
- Traffic management devices are constructed to facilitate unobstructed access by emergency services vehicles.
- Public roads have a cross fall not exceeding 3 degrees.
- All roads should be through roads. Dead end roads are not recommended, but if unavoidable, dead end roads are not more than 200 metres in length, incorporate a 12 metre outer radius turning circle, are clearly signposted as dead end and direct traffic away from the hazard.
- Non-perimeter road widths comply with Table 4.1 in 'Planning for Bush Fire Protection 2006'.
- Curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres.
- The minimum distance between inner and outer curves is 6 metres.
- Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.
- There is a minimum vertical clearance to a height of 4 metres above the road at all times.
- The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.
- Public roads greater than 6.5 metres wide locate hydrants outside of parking reserves to ensure accessibility to reticulated water supply for fire suppression.
- Public roads between 6.5 metres and 8 metres wide are 'No Parking' on one side with services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.
- Public roads directly interfacing the bush fire hazard provide roll top kerbing to the hazard side of the road.

Access – Fire Trails

The intent of measures is to provide suitable access for fire management purposes and maintenance of APZs. To achieve this, the following conditions shall apply:

4. Fire trails shall comply with the following requirements of section 4.1.3 (3) of 'Planning for Bush Fire Protection 2006':

- A minimum carriageway width of 4 metres is provided with an additional 1 metre wide strip on each side of the trail (clear of bushes and long grass).

- The trail has a maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed.
- A minimum vertical clearance of 4 metres is provided to any overhanging obstructions, including tree branches.
- The crossfall of the trail is not more than 10 degrees.
- The trail has the capacity for passing by
  - reversing bays using the access to properties to reverse fire tankers, which are 6 metres wide and 8 metres deep to any gates, with an inner minimum turning radius of 6 metres and outer minimum radius of 12 metres; and/or
  - a passing bay every 200 metres, 20 metres long by 3 metres wide, making a minimum trafficable width of 7 metres at the passing bay.
- The fire trail is accessible to fire fighters and maintained in a serviceable condition by the owner of the land.
- Appropriate drainage and erosion controls are provided.
- The fire trail system is connected to the property access road and/or to the through road system at frequent intervals of 200 metres or less.
- Fire trails do not traverse a wetlands or other land potentially subject to periodic inundation (other than a flood or storm surge).
- Gates for fire trails are provided and locked with a key/lock system authorised by the local RFS.
- Fire trail design does not adversely impact on natural hydrological flows.
- Fire trail design acts as an effective barrier to the spread of weeds and nutrients.
- Fire trail construction does not expose acid-sulphate soils.

Water and Utility Services

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building. To achieve this, the following conditions shall apply:

5. Water, electricity and gas must comply with the following:
   - Fire hydrant design, spacing, sizing and pressures must comply with AS2419.1. Fire hydrants must not be located within any road carriageway.
   - Ring main systems must be used for urban subdivisions with perimeter roads.
   - All aboveground water pipes external to the building must be metal including and up to any taps/outlets/fittings.
   - Electrical transmission lines should be located underground where possible.
   - Overhead electricity lines must have short pole spacing (i.e. 30 metres) except where crossing gullies, gorges or riparian areas. No tree may be closer to an electricity line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.
   - Gas must be installed and maintained as set out in the relevant standard and all pipes external to the building must be metal including and up to any taps/outlets/fittings. Polymer-sheathed flexible gas supply lines must not be used.

General Advice – Consent Authority to Note

The recommendations are based on the documents/plans supplied via Councils referral to the NSW RFS.

- The plan titled 'Bushfire Setback Plan Over Proposed Subdivision of Lots 276 & 277 on DP755627, Lot 163 on DP831052, Crown Public Road Reserve (Between Lot 163 DP831052 and Lot 276 on DP755624) and Crown Foreshore Reserve (Adjacent to Evans River)', drawing number BRJD6396-100-45-2, dated 23 March 2020.
- The plan titled 'Plan of Proposed Subdivision - DA 2015/0096 - Stage 1 Iron Gates - Evans Head', drawing number BRJD6396.100-015, revision Q, dated 19 July 2021.
- The plan titled 'Concept Proposals for Subdivision, Clearing, Earthworks, Roadworks, Drainage, Upgrading of Iron Gates Drive, Infrastructure and Embellishment of Proposed Public Reserves - DA 2015/0096 - Stage 1 & 2 Iron Gates - Evans Head', drawing number BRJD6396.100-55, revision 1 dated 19 July 2021.
- The plan titled 'Access Road Signage & Linemarking Layout Plan sheet 1 of 2 prepared by Arcadis Australia Pacific, reference K218-AA007094-02.

- The plan titled 'Access Road Signage & Linemarking Layout Plan sheet 2 of 2 prepared by Arcadis Australia Pacific, reference K219-AA007094-02.
- The revised consolidated bush fire assessment prepared by Bushfire Risk, ref 1810DAC-b, version 3 dated 12 July 2019.
- Bush fire assessment – Additional Information Response Re: Iron Gates Drive, Evans Head NSW prepared by Melanie Jackson of Bushfire Risk Pty Ltd, version 1 dated 8 March 2017.

This letter is in response to an assessment of the application based on the submitted further information and supersedes our previous general terms of approval dated 09/11/2021.

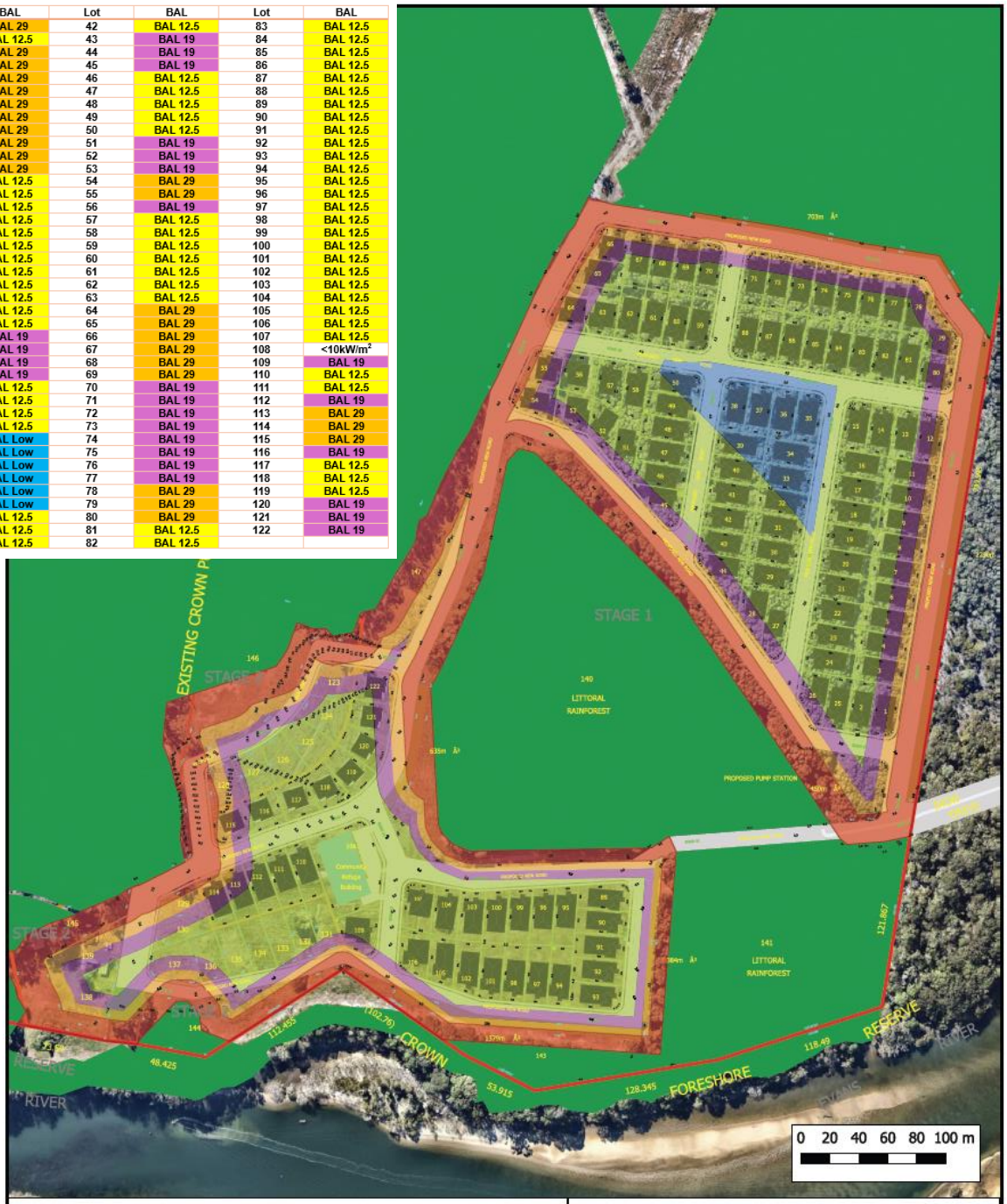
For any queries regarding this correspondence, please contact Wayne Sketchley on 1300 NSW RFS.

Yours sincerely,

Alan Bawden
Supervisor Development Assessment & Plan
Built & Natural Environment

Annexure 04: Extent of APZs and Bushfire Attack Level Overlay

Lot	BAL	Lot	BAL	Lot	BAL
1	BAL 29	42	BAL 12.5	83	BAL 12.5
2	BAL 12.5	43	BAL 19	84	BAL 12.5
3	BAL 29	44	BAL 19	85	BAL 12.5
4	BAL 29	45	BAL 19	86	BAL 12.5
5	BAL 29	46	BAL 12.5	87	BAL 12.5
6	BAL 29	47	BAL 12.5	88	BAL 12.5
7	BAL 29	48	BAL 12.5	89	BAL 12.5
8	BAL 29	49	BAL 12.5	90	BAL 12.5
9	BAL 29	50	BAL 12.5	91	BAL 12.5
10	BAL 29	51	BAL 19	92	BAL 12.5
11	BAL 29	52	BAL 19	93	BAL 12.5
12	BAL 29	53	BAL 19	94	BAL 12.5
13	BAL 12.5	54	BAL 29	95	BAL 12.5
14	BAL 12.5	55	BAL 29	96	BAL 12.5
15	BAL 12.5	56	BAL 19	97	BAL 12.5
16	BAL 12.5	57	BAL 12.5	98	BAL 12.5
17	BAL 12.5	58	BAL 12.5	99	BAL 12.5
18	BAL 12.5	59	BAL 12.5	100	BAL 12.5
19	BAL 12.5	60	BAL 12.5	101	BAL 12.5
20	BAL 12.5	61	BAL 12.5	102	BAL 12.5
21	BAL 12.5	62	BAL 12.5	103	BAL 12.5
22	BAL 12.5	63	BAL 12.5	104	BAL 12.5
23	BAL 12.5	64	BAL 29	105	BAL 12.5
24	BAL 12.5	65	BAL 29	106	BAL 12.5
25	BAL 19	66	BAL 29	107	BAL 12.5
26	BAL 19	67	BAL 29	108	<10kW/m^2
27	BAL 19	68	BAL 29	109	BAL 19
28	BAL 19	69	BAL 29	110	BAL 12.5
29	BAL 12.5	70	BAL 19	111	BAL 12.5
30	BAL 12.5	71	BAL 19	112	BAL 19
31	BAL 12.5	72	BAL 19	113	BAL 29
32	BAL 12.5	73	BAL 19	114	BAL 29
33	BAL Low	74	BAL 19	115	BAL 29
34	BAL Low	75	BAL 19	116	BAL 19
35	BAL Low	76	BAL 19	117	BAL 12.5
36	BAL Low	77	BAL 19	118	BAL 12.5
37	BAL Low	78	BAL 29	119	BAL 12.5
38	BAL Low	79	BAL 29	120	BAL 19
39	BAL 12.5	80	BAL 29	121	BAL 19
40	BAL 12.5	81	BAL 12.5	122	BAL 19
41	BAL 12.5	82	BAL 12.5		



Legend

Minimum APZ | BAL 19 | BAL Low | Subject Site

BAL 12-5 | BAL 29

BCBHS Ref: 231115
Drawn by: AM
Dated: 10/04/2024
Issue: 1
Address: Iron Gates Drive, Evans Head

Bushfire Hazard Solutions
(Pty. Limited) ABN 19 057 337 774
PO Box 124, Berowra NSW 2081
Telephone: (02) 9457 6530
www.bushfirehazardsolutions.com.au

SILVER MEMBER

Bushfire Attack Level Overlay

Annexure 05 Asset Protection Zone Requirements (source PBP p. 107)

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.

Annexure 06: Refuge Building Bushfire Design Modelling

NBC Bushfire Attack Assessment Report V4.1

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 10/04/2024 **Assessment Date:** 4/04/2024

Site Street Address:	Iron Gates Drive, Evans Head		
Assessor:	Stuart McMonnies; Bushfire Hazard Solutions		
Local Government Area:	Richmond Valley	**Alpine Area:**	No

Equations Used

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

Run Description: Refuge - East

Vegetation Information

Vegetation Type:	Rainforest		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	10	**Overall Fuel Load(t/ha):**	13.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope:	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	59

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K):**	1200

Calculation Parameters

Flame Emissivity:	100	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	120

Program Outputs

Level of Construction:	BAL 12.5	**Peak Elevation of Receiver(m):**	5.42
Radiant Heat(kW/m2):	8.34	**Flame Angle (degrees):**	82
Flame Length(m):	10.94	**Maximum View Factor:**	0.071
Rate Of Spread (km/h):	1.44	**Inner Protection Area(m):**	59
Transmissivity:	1	**Outer Protection Area(m):**	0
Fire Intensity(kW/m):	9821		

Run Description:	Refuge - South		
Vegetation Information			
Vegetation Type:	Rainforest		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	0 Degrees	Vegetation Slope Type:	Level
Surface Fuel Load(t/ha):	10	Overall Fuel Load(t/ha):	13.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	0 Degrees	Site Slope Type:	Level
Elevation of Receiver(m)	Default	APZ/Separation(m):	44
Fire Inputs			
Veg./Flame Width(m):	50	Flame Temp(K):	1200
Calculation Parameters			
Flame Emissivity:	100	Relative Humidity(%):	25
Heat of Combustion(kJ/kg	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	120
Program Outputs			
Level of Construction:	BAL 12.5	Peak Elevation of Receiver(m):	5.35
Radiant Heat(kW/m2):	8.92	Flame Angle (degrees):	78
Flame Length(m):	10.94	Maximum View Factor:	0.076
Rate Of Spread (km/h):	1.44	Inner Protection Area(m):	44
Transmissivity:	1	Outer Protection Area(m):	0
Fire Intensity(kW/m):	9821		

Run Description:	Refuge - West		
Vegetation Information			
Vegetation Type:	Rainforest		
Vegetation Group:	Forest and Woodland		
Vegetation Slope:	0 Degrees	Vegetation Slope Type:	Level
Surface Fuel Load(t/ha):	10	Overall Fuel Load(t/ha):	13.2
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	
Site Information			
Site Slope:	1 Degrees	Site Slope Type:	Downslope
Elevation of Receiver(m)	Default	APZ/Separation(m):	91
Fire Inputs			
Veg./Flame Width(m):	100	Flame Temp(K):	1200
Calculation Parameters			
Flame Emissivity:	100	Relative Humidity(%):	25
Heat of Combustion(kJ/kg	18600	Ambient Temp(K):	308
Moisture Factor:	5	FDI:	120
Program Outputs			
Level of Construction:	BAL 12.5	Peak Elevation of Receiver(m):	3.86
Radiant Heat(kW/m2):	4.17	Flame Angle (degrees):	85
Flame Length(m):	10.94	Maximum View Factor:	0.035
Rate Of Spread (km/h):	1.44	Inner Protection Area(m):	91
Transmissivity:	1	Outer Protection Area(m):	0
Fire Intensity(kW/m):	9821		

Annexure 07: Agreed Conditions

Asset Protection Zones

The intent of measure is to provide sufficient space and maintain reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and prevent direct flame contact.

1. At the commencement of building works or the issue of a subdivision certificate, whichever comes first, and in perpetuity all residential allotments and all land identified as 'Minimum APZ' or BAL 29-Low inclusive on the Bushfire Attack Level Overlay prepared by Bushfire Hazard Solutions dated 10.04.2024 (excluding the bio swales) must be maintained as an inner protection area in accordance with the requirements of Appendix 4 of *Planning for Bush Fire Protection 2019.*

   Management of the land is the responsibility of the owner of the respective residential lot or incorporated association for all other land.

When establishing and maintaining an inner protection area, the following requirements apply:

- 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 2 m above the ground;
- tree canopies should be separated by 2 to 5 m;
- preference should be given to smooth-barked and evergreen trees;
- large discontinuities or gaps in the shrubs layer should be provided to slow down or break the progress of fire towards buildings;
- shrubs should not be located under trees;
- shrubs should 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;
- 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 regularly.

2. At the issue of a subdivision certificate, suitable instruments shall be created pursuant to section 88B of the *Conveyancing Act* 1919 over Lots 54-55 and 115 which prohibit the construction of buildings other than class 10 structures within the asset protection zones (APZ) as identified on the Bushfire Attack Level Overlay prepared by Bushfire Hazard Solutions dated 10.04.2024. The name of the authority empowered to release, vary or modify the instruments shall be Richmond Valley Council.

Construction Standards

The intent of measure is to minimise the risk of bush fire attack and provide protection for emergency services personnel, residents and others assisting firefighting activities.

3. A restriction to the land use pursuant to section 88B of the *Conveyancing Act 1919* must be placed on the proposed residential allotments to ensure future development of habitable structures must be constructed one level higher than that shown on the Bushfire Attack Level Overlay prepared by Bushfire Hazard Solutions dated 10.04.2024.

Refuge Building:

The intent of measure is to minimise the risk of bush fire attack and provide an onsite Shelter in Place option.

4. The building shall comply with sections 3 and 8 (BAL 40) of Australian Standard 3959 'Construction of buildings in bushfire-prone areas' 2018;
5. A non-combustible pathway directly adjacent to the building and not less than 1.5 m wide must be provided around the perimeter of the building.
6. To maintain internal tenability throughout the duration of occupancy during a bushfire event, the building must comply with the following:

   (a) An air handling system must be provided that is capable of—
   - (iii) being adjusted for full recycling of internal air for a period of not less than 4 hours to avoid the introduction of smoke into the building; and
   - (iv) maintaining an internal air temperature of not more than 25°C.

   (b) The building envelope must be designed such that if an air handling system required by (a) fails, then—
   - (iii) internal air temperatures can be maintained below 39°C; and
   - (iv) internal surface temperatures can be maintained below 60°C.

   (c) If the building is divided into separate compartments then, for the purposes of (a), each compartment must have a separate air handling system.
   (d) Each air handling system required by (a) must be designed to account for the activation of smoke detectors from low concentrations of smoke from external sources, so as to ensure that air-conditioning and other essential systems remain operational.

7. Emergency power must be provided to support, for not less than 4 hours before and 2 hours after the passing of the fire front during a bushfire event, the ongoing operation of—

   (a) air handling systems to maintain internal tenability; and
   (b) any pumps for fire-fighting; and
   (c) any emergency lighting and exit signs; and
   (d) any other emergency equipment listed in C3D14(6) and required to be provided.

   Manual control for emergency back-up power supply must be provided to facilitate manual intervention where the power supply fails or runs out.
8. Signage must be provided to warn building occupants against storing combustible materials under or adjacent to the building.
9. That the 150kL water supply tank nominated in the Flood Emergency Response Plan is to be accessible to fire services by either being fitted with a 65mm storz valve or if underground have an access hole of 200mm.
10. At least two (2) fire hose reels are to be installed on the building and provide complete overlap when deployed.
11. That the building has a minimum Floor Area, which is able to be used by residents in the event of a bushfire emergency, of 500m^2.

12. That the building is constructed prior to the issue of any Occupation Certificate for a future dwelling within the residential lots.

Access – Public Roads

The intent of measure is to provide safe operational access to structures and water supply for emergency services, while residents are seeking to evacuate from an area.

13. Access roads must comply with the following general requirements of Table 5.3b of *Planning for Bush Fire Protection 2019* and the following:

    - traffic management devices are constructed to not prohibit access by emergency services vehicles;
    - maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10
    - degrees or other gradient specified by road design standards, whichever is the lesser gradient;
    - the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/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 2419.1:2021 - F*ire hydrant installations System design, installation and commissioning*; and

14. Perimeter roads as identified in Figure 03 of the Joint Bushfire Expert Report must comply with the general requirements of Table 5.3b of *Planning for Bush Fire Protection 2019* and the following:

    - 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;
    - 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.

15. Non-perimeter roads as identified in Figure 03 of the Joint Bushfire Expert Report must comply with the general requirements of Table 5.3b of *Planning for Bush Fire Protection 2019* and the following:

    - minimum 5.5m carriageway width kerb to kerb;
    - parking is provided outside of the carriageway width;
    - hydrants are located clear of parking areas;
    - curves of roads have a minimum inner radius of 6m;
    - the road crossfall does not exceed 3 degrees; and
    - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is
    - provided.

16. That suitable turning for a Category 1 fire appliance as described in Figure A3.3 of PfPB shall be provided at the locations nominated in Figure 01 of the Joint Bushfire Expert Report until such time the continuation of the road network in Stage 2 is completed. These turning locations are to have a hydrant point located within 20 metres.

17. That a strategic fire fighting platform be provided at a point along the section of Road 2 fronting proposed Lots 93-94, 97-98, 101-101 and 105-106 (one-way road). The strategic fire fighting platform is to comprise of an additional 2 metre width (totalling 6m) for a 20 metre length, and a hydrant point.

Water and Utility Services

The intent of measure is to provide adequate services of water for the protection of buildings during and after the passage of a bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building.

18. The provision of water, electricity and gas must comply with the following in accordance with Table 5.3c of *Planning for Bush Fire Protection 2019:*

    - reticulated water is to be provided to the development where available;
    - fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2021;
    - hydrants are not located within any road carriageway;
    - reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
    - fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2021;
    - all above-ground water service pipes are metal, including and up to any taps;
    - where practicable, electrical transmission lines are underground;
    - 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.
    - reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - The storage and handling of LP Gas, and the requirements of relevant authorities, and metal piping is used;
    - all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
    - connections to and from gas cylinders are metal; polymer - sheathed flexible gas supply lines are not used; and
    - above-ground gas service pipes are metal, including and up to any outlets.

Emergency and Evacuation Planning Assessment

Intent of measures: to provide suitable emergency and evacuation arrangements for occupants of SFPP developments.

19. That the occupants of all future dwellings complete a Bush Fire Survival Plan.

20. That a Bush Fire Emergency Management and Evacuation Plan is to be prepared in accordance with the NSW RFS document: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan. In addition:

    - The Bush Fire Emergency Management and Evacuation Plan should include planning for the early relocation of occupants;
    - 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.
    - An Emergency Planning Committee needs to be established to consult with residents in developing and implementing an Emergency Procedures Manual.