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Bushfire Assessment

Proposed Seniors Living

14 Hamilton Road,
Albion Park

14 Hamilton Road Pty Ltd

22 October 2020

(Ref: 20101)

report by
david peterson

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FPA AUSTRALIA (NO.BPAD18882)
BPAD LEVEL 3 ACCREDITED PRACTITIONER
ABN 28 607 444 833

Contents

1 Introduction

Street or property name:	14 Hamilton Road		
Suburb, town or locality:	Albion Park	**Postcode:**	2527
Lot/DP no:	Lot 1 DP 1069961		
Local Government Area:	Shellharbour City Council		
Type of development:	Seniors living (SFPP development)		

1.1 Background

The landowner commissioned Peterson Bushfire to prepare a Bushfire Assessment Report for a proposed seniors living development on land identified as 'bushfire prone' located at the above address. This report presents the assessment and recommendations to ensure compliance with the relevant bushfire protection legislation and policy.

This bushfire assessment has been prepared by a consultant accredited by the Fire Protection Association of Australia's BPAD scheme (Accreditation No. BPD-L3-18882).

1.2 Location and description of the proposal

At almost 2 hectares in size, the subject land is a single lot located adjacent the southern side of the Macquarie Rivulet north of the Albion Park shopping district as shown on Figure 1. The lot is cleared and supports a single dwelling and outbuildings. The adjacent lands are managed with exception of the Macquarie Rivulet which forms the northern boundary.

The proposal consists of 39 independent living units and access roads as shown on the development layout plan included as Figure 2. Also proposed is an Asset Protection Zone (APZ) and perimeter trail along the northern side of the development and riparian zone revegetation along the banks of the Macquarie Rivulet.

1.3 Assessment requirements

The subject land is identified as bushfire prone land by Shellharbour City Council as shown by the bushfire prone land mapping on Figure 3. In addition, the proposal is defined as 'Special Fire Protection Purpose' (SFPP) development. Section 4.47 of the *Environmental Planning and Assessment Act 1979* requires a bushfire assessment of SFPP development on bushfire prone land following the process and methodology set out within s100B *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2013* and the NSW Rural Fire Service (RFS) document *Planning for Bush Fire Protection 2019* (referred to as 'PBP' throughout this report).

Legend

Watercourse

Subject Land

N

DKGIS

Date: 22/10/2020

0 250 500 1,000

Metres

Figure 1: The Location of the Subject Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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Legend

- Watercourse
- Building
- Lot
- Fire Trail
- Top of Bank (Ecoplanning 2020)
- Top of Bank 40m Offset(Ecoplanning 2020)
- Subject Land
- Cadastre

N

DKGIS

Date: 22/10/2020

0 12.5 25 50

Metres

Figure 2: The Proposal

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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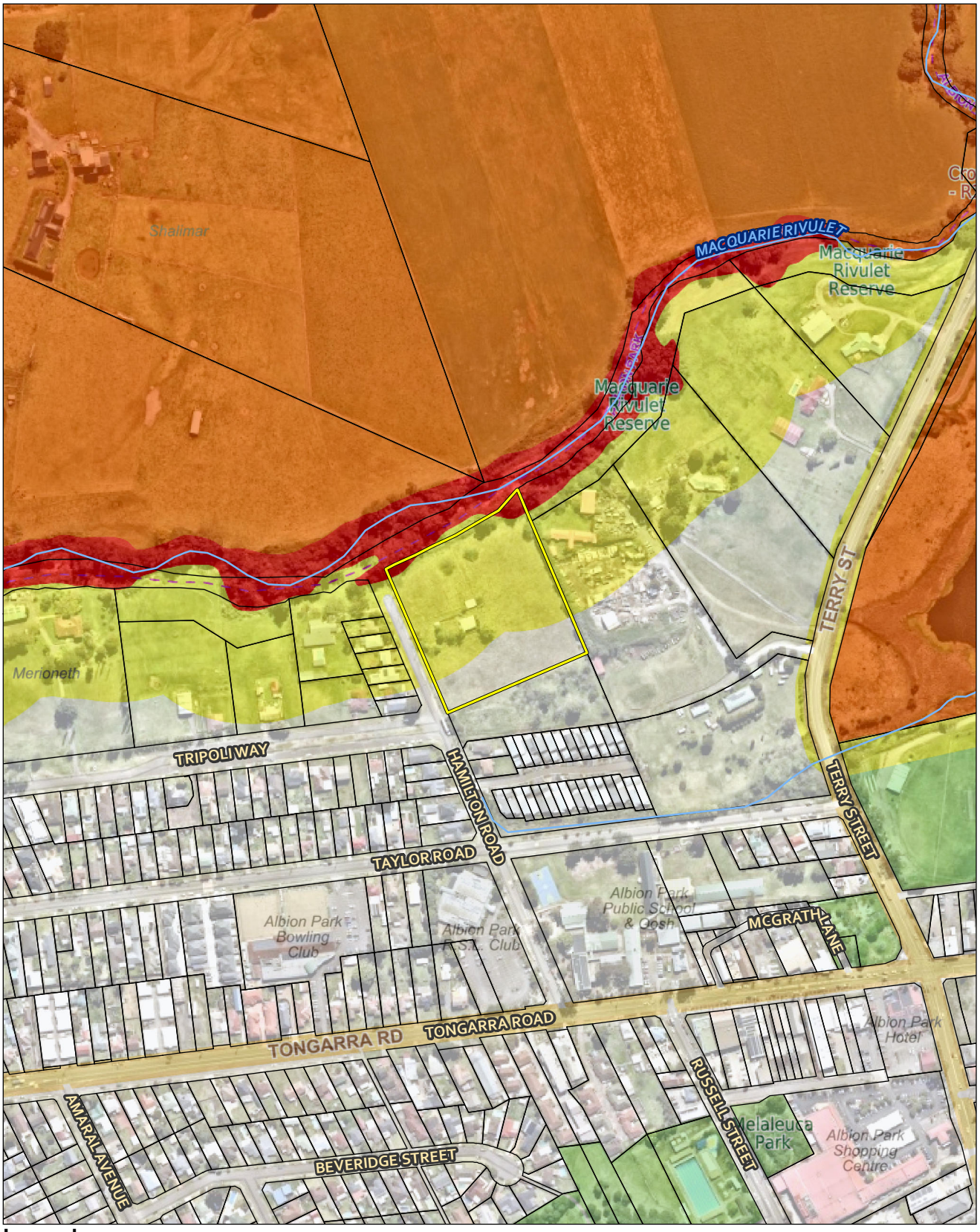

Legend

Watercourse
Subject Land
Cadastre

Bushfire Prone Land

Vegetation Buffer
Vegetation Category 1
Vegetation Category 2
Vegetation Category 3

N

DKGIS

Date: 22/10/2020

0 50 100 200

Metres

Figure 3: Bushfire Prone Land

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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2 Bushfire hazard

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as Asset Protection Zone location and dimension. This section provides a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour.

An inspection of the subject land and potential bushfire hazards occurred on 21st July 2020. Photographs are available in Appendix A.

3.1 Bushfire prone land

The purpose of bushfire prone land mapping is to identify lands that may be subject to bushfire risk based simply of the presence of vegetation within proximity (i.e. typically 100 m). The maps are a planning tool used to trigger further detailed assessment. They do not present a scalable measure of hazard, threat or risk. These parameters are to be determined under further assessment in accordance with PBP (i.e. this Bushfire Assessment Report).

The Shellharbour Bushfire Prone Land Map presented in Figure 3 identifies the majority of the subject land as bushfire prone. This is due to the remnant vegetation within the adjacent riparian corridor of the Macquarie Rivulet. Any development proposal within a lot containing mapped bushfire prone land (i.e. bushfire prone property) is to comply with the requirements of PBP.

The maps are produced at a broad scale by desk-top Geographic Information Systems (GIS) covering an entire Local Government Area (LGA). They are often conservative and are designed to identify any potential bushfire threat of all levels. The identification of hazards is discussed below.

Most importantly, the identification of bushfire prone land does not preclude development. The maps are not prescriptive and simply trigger further detailed assessment.

3.2 Predominant vegetation

The ‘predominant vegetation’ influencing fire behaviour approaching the subject land has been assessed in accordance with the methodology specified by PBP. The vegetation within 140 m of the subject land consists of the remnant riparian vegetation along the Macquarie Rivulet, which will be complemented by regeneration under guidance of the proposed Vegetation Management Plan (VMP) by Ecoplanning (2020). Currently the vegetation consists of scattered stands of remnant, canopy She Oaks with an understorey almost entirely of weeds (predominantly groundcovers, climbers and patches of Lantana).

Regeneration of the corridor will occur from the proposed APZ limit to the northern boundary of the subject land as mapped on Figure 4. The hazard will continue upstream and downstream through the remnant riparian corridor including Macquarie Rivulet Reserve to the north-east.

Although the She Oaks are the only evidence remaining of the original vegetation community, the vegetation classification used to determine APZs and BALs is Eastern Riverine Forest

(Forested Wetland) and is the climax community that will be the objective of the VMP by Ecoplanning (2020).

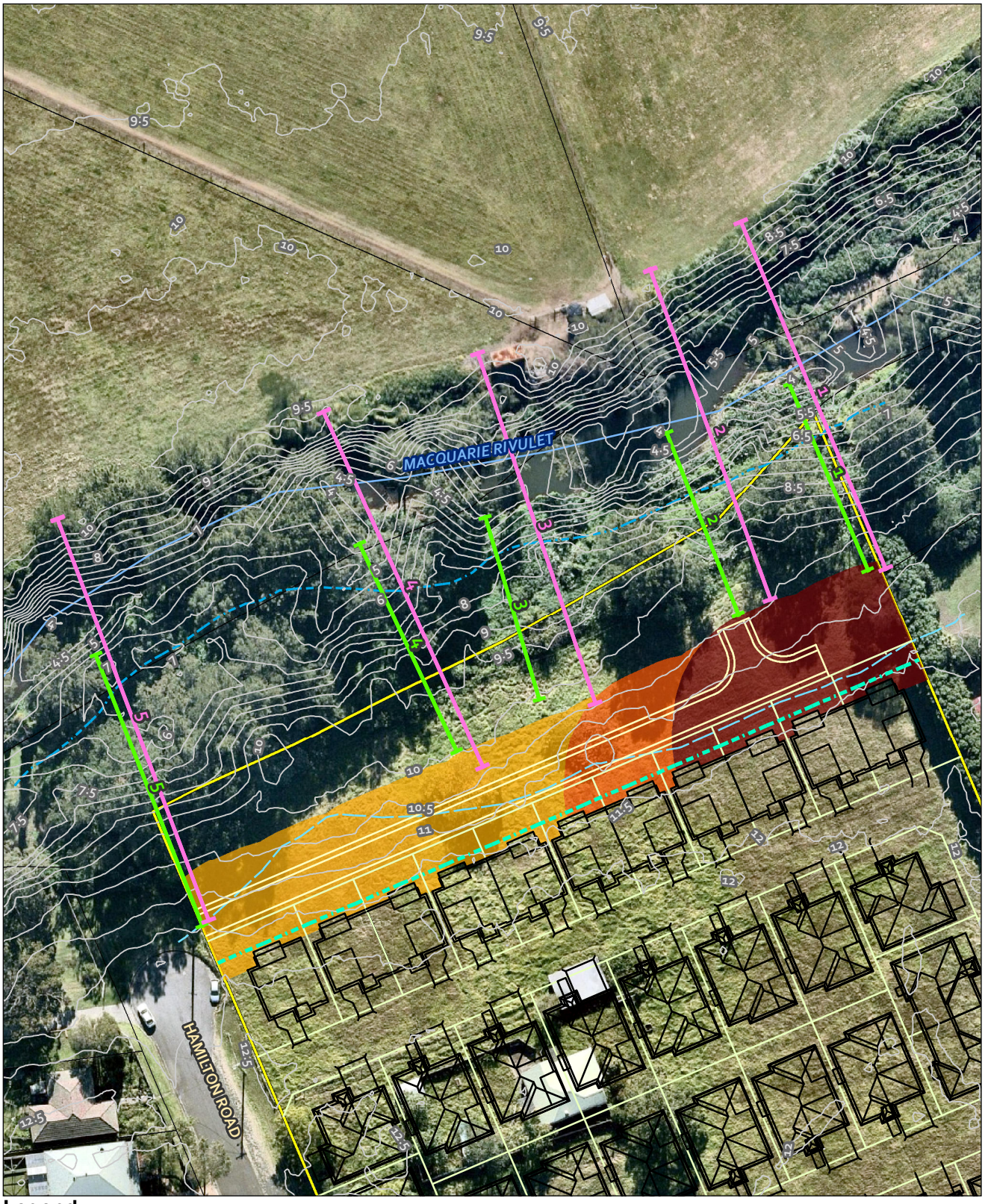
The riparian corridor acts as a low bushfire hazard and poses a low risk to the proposal. The assessment of low risk is attributable to the following risk parameters:

- Separation from other bushfire hazards for kilometres upstream and downstream. A fire would not spread from an off-site bushland area into the corridor to impact the proposal. Ignition would have to occur within the corridor from a point source (e.g. lighting, arson etc). Fire development and spread from point source ignition within such a narrow corridor would be limited by the available short fire run.
- The small size and narrow width of the corridor restricts the length of fire run and fire development period directly towards the proposal.
- Lower fuel levels in the Forested Wetland community resulting in a low intensity fire, most likely confined to the ground within narrow corridors (i.e. canopy fire is unlikely with a restricted fire run).
- Early detection of ignition and fire activity, effective response and suppression by fire agencies, and safe evacuation, if required.

3.3 Effective slope

The ‘effective slope’ influencing fire behaviour has been assessed in accordance with the methodology specified by PBP. This is conducted by measuring the slope that would most significantly influence fire behaviour where the vegetation occurs over a 100 metre transect measured outwards from the proposed units.

The effective slope consists of the embankment of the Rivulet leading down to the channel. The slope ranges from 7 degrees at the upstream end in the west to 13 degrees at the downstream end in the east. Slope transects are shown on Figure 4.



Legend

- Transect - Effective Slope
- Transect - Short Fire Run
- Radiant Heat Sheild
- Watercourse
- Building
- Lot
- Fire Trail
- Top of Bank (Ecoplanning 2020)
- Top of Bank 40m Offset(Ecoplanning 2020)
- Subject Land
- Asset Protection Zone - 18m
- Asset Protection Zone - 19m
- Asset Protection Zone - 21m

N

DKGIS

Date: 22/10/2020

0 12.5 25 50

Metres

Figure 4: Bushfire Hazard Analysis and Asset Protection Zone

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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3 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total provide an adequate level of protection for development. The measures required to be assessed are listed in Table 1 below and are discussed in detail in the remainder of this section.

Table 1: PBP bushfire protection measures

Bushfire protection measures	Considerations
Asset Protection Zones (APZ)	Location and dimension of APZ building setbacks from identified hazards including prescriptions of vegetation management within the APZ.
Building construction standards (BALs)	Mapping and application of BALs across the site to highlight affected buildings.
Access	Assessment to include access to proposed lots, perimeter access, and design standards for roads.
Water supply and other utilities	List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire-fighting.

4.1 Asset Protection Zones (APZ)

APZ dimensions for SFPP development are determined in accordance with the Acceptable Solutions listed in Table A1.12.1 of PBP, or otherwise an alternate solution that satisfies the Performance Criteria that *"radiant heat levels of greater than 10 kW/m^2 will not be experienced on any part of the building."*

An alternate solution has been developed for the proposal to determine the minimum APZ required to satisfy the performance requirement for the threat posed by the riparian corridor.

The alternate solution is the Short Fire Run (SFR) model which has been operated in accordance with the RFS document '*Short Fire Run - Methodology for assessing bushfire risk for low risk vegetation*' (RFS 2019). The NBC Bushfire Attack Assessor was used to calculate the APZ in accordance with the RFS document. Model reports are included at Appendix 1.

An alternate solution has been used rather than the Acceptable Solution dimension as the length of fire run and available fire development period that would be possible within the riparian corridor would be far less than that assumed by the models underpinning the APZ dimensions specified by PBP. As described in Section 3, the width, shape and limited connectivity to other bushland areas allows the use of the Short Fire Run (SFR) model to determine APZ dimension. In this case, the SFR model provides a more accurate representation of expected radiant heat flux when a fire reaches the outer edge of the vegetated zone. The model assumes the worst-case scenario of a fire igniting at the northern edge of the corridor and travelling in a southerly direction across the full width of the corridor towards the proposal. The radiant heat flux is determined from the resulting width of the head fire (which is less than the 100 m assumed by

the acceptable solution APZ) and reduced flame height (assuming that a canopy fire won't develop in such a short run). The applicability of the SFR model to the riparian corridor was discussed with the RFS in August 2020. Approval in principle was provided verbally.

The modelling includes an additional radiant heat protection factor, being a 1.8 m high radiant heat shield in the form of a solid, non-combustible fence to be erected along the northern boundary of the units as indicated on Figure 4.

Five SFR transects have been assessed through the riparian corridor as shown on Figure 4. Table 3 below lists the model inputs and outputs for each transect. Table 3 shows that the minimum APZ to achieve a radiant heat flux no more than 10 kW/m^2 at the building interface ranges from 21 m to 18 m. The APZ mapping on Figure 4 shows the resulting APZ along the northern side of the proposed units.

Table 3: SFR model calculation summary

Input	Transect 1	Transect 2	Transect 3	Transect 4	Transect 5
FDI *(Determined by PBP)*	100				
Effective slope *(Measured underneath hazard perpendicular to contours using 0.5 m intervals)*	13°	10º	9°	8°	7º
Site slope *(Measured between hazard and proposed lot boundary perpendicular to contours with 0.5 m intervals)*	3°	3º	3°	4°	4º
Vegetation formation *(Determined by VMP)*	Eastern Riverine Forest				
Overall fuel load *(Allocated to vegetation formation as per SFR methodology)*	15.1 t/ha				
Surface fuel load *(Allocated to vegetation formation as per SFR methodology)*	8.2 t/ha				
Elevated fuel height *(Allocated to vegetation formation as per SFR methodology)*	0.9 m				

Flame temperature (Determined by PBP for SFPP development)	1200 K				
Elevation of receiver (Determined by SFR model)	2.4 m eave height				
Length of fire run (Width of vegetated corridor)	65 m	65 m	65 m	70 m	75 m
Heat shield height (Height of non-combustible fence)	1.8 m				
Output	**Transect 1**	**Transect 2**	**Transect 3**	**Transect 4**	**Transect 5**
Radiant heat flux (Determined by SFR model)	9.68 kW/m^2	9.55 kW/m^2	9.88 kW/m^2	9.68 kW/m^2	9.48 kW/m^2
APZ (Determined by SFR model)	21 m	19 m	18 m	18 m	18 m

4.2 APZ management and landscaping

Vegetation management within the APZ and across the development is to achieve the following APZ specifications formulated to comply with the following RFS documents which guide APZ establishment and maintenance:

- *Planning for Bush Fire Protection 2019* Appendix 4; and
- *Standards for Asset Protection Zones*.

The APZ and development is to be managed in the following way:

- Canopy: Trees are to have a sparse canopy by achieving gaps between crowns of 2 to 5 m and ensuring a direct path from the vegetated area to the buildings is not created.
- Understorey: Shrubs and landscaping to only be within defined and well-managed garden beds separated from the buildings.
- Groundcover treatment: Groundcovers such as grasses are to be maintained to a short height (i.e. 100 mm).

4.3 Bushfire Attack Level (BAL)

The BAL has been determined in accordance with Table A1.12.5 of PBP. The BAL relates to a set of construction specifications listed within Australian Standard *AS 3959-2018 Constructions of buildings in bushfire-prone areas* (AS 3959).

As shown on Figure 5, the BAL ratings for the proposed units range from BAL-12.5 to BAL-LOW. All units, with the exception of Lots 1-10 along the southern boundary, are required to be designed and constructed to comply with BAL-12.5. The NSW variation to AS 3959 is to be applied in addition to the above BAL specifications. The variation is listed within Section 7.5.2 of PBP.

Figure 5: Bushfire Attack Level

Coordinate System: GDA 1994 MGA Zone 56

Imagery: © Nearmap

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4.4 Access

4.4.1 Alternate access and egress

PBP requires an access design that enables safe evacuation whilst facilitating adequate emergency response. All bushfire prone areas should have an alternate access option depending on the bushfire risk and the chances of the road being cut by fire for a prolonged period.

The proposal will have dual access onto Hamilton Road which provides a single access route in the south direction to the surrounding streets of Albion Park. Although technically a single access road, it leads away from the bushfire threat and is the logical direction for access in regard to evacuation and operational response. A secondary access point is not required for the proposal.

The road layout satisfies PBP access objectives in relation to alternate access and egress.

4.4.2 Perimeter access

The evacuation and operational response strategy for the hazard interface (perimeter) is to allow residents to evacuate using the internal loop road and provide emergency authorities such as fire-fighters a dedicated fire access road along the northern perimeter within the APZ as shown on Figures 2 and 4.

The road will extend from the Hamilton Road cul-de-sac for just over 100 m before culminating in a Type C turning head (as per Section A3.3 of PBP) at the eastern boundary. The road will be 4 m wide within a 6 m wide easement.

The interface between the subject land and the riparian corridor does not require a specific public perimeter access road due to the low risk nature of the hazard and short distance from the adjoining public road network (i.e. Hamilton Road).

The proposed road layout satisfies PBP access objectives in relation to perimeter access.

4.4.3 Design and construction standards

The internal access road is to be designed in accordance with the PBP Acceptable Solutions for the design and construction of roads in SFPP facilities as required by PBP Table 6.8b. The requirements are listed below.

<u>PBP Acceptable Solution design standards for internal roads servicing SFPP developments:</u>

- *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 service vehicles.*

- *Access roads must provide suitable turning areas in accordance with Appendix 3 of PBP.*
- *One way only public access roads are no less than 3.5 m wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.*
- *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.*
- *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.*
- *There is suitable access for a Category 1 fire appliance to within 4 m of the static water supply where no reticulated supply is available.*
- *Perimeter roads are:*
    - *there are two-way sealed roads;*
    - *minimum 8 m carriageway width kerb to kerb;*
    - *parking is provided outside of the carriageway width;*
    - *hydrants are to be located clear or parking areas;*
    - *there are through roads, and these are linked to the internal road system at an internal of no greater than 500 m;*
    - *curves of roads have a minimum inner radius of 6 m;*
    - *the maximum road grade is 15º and average grade of not more than 10º;*
    - *the road crossfall does not exceed 3º;*
    - *a minimum vertical clearance of 4 m to any overhanging obstruction, including tree branches, is provided.*
- *Non-perimeter roads are:*
    - *Minimum 5.5 m carriageway width kerb to kerb;*
    - *parking is provided outside of the carriageway width;*
    - *hydrants are located clear or parking areas;*
    - *there are through roads, and these are linked to the internal road system at an internal of no greater than 500 m;*

- *curves of roads have a minimum inner radius of 6 m;*
- *the maximum road grade is 15º and average grade of not more than 10º;*
- *the road crossfall does not exceed 3º;*
- *a minimum vertical clearance of 4 m to any overhanging obstruction, including tree branches, is provided.*

4.5 Water supply and utilities

4.5.1 Water supply

Fire hydrants are to be installed along the perimeter road and internal road to ensure compliance with PBP and *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419).

4.5.2 Electrical supply

Electrical supply will be provided underground and therefore complies with PBP.

4.5.3 Gas supply

Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2014 The storage and handling of LP gas*.

4 Conclusion and recommendations

5.1 Summary

The proposal consists of a seniors living development adjacent a low risk riparian corridor that has been identified as bushfire prone vegetation. The corridor acts as the bushfire hazard and the portion that falls within the subject land will be regenerated under the guidance of an approved VMP.

The assessment demonstrates that the proposed seniors independent living units can be developed providing the recommended bushfire protection measures (see recommendations below) are integrated into the design. The identified hazard does not present a risk to the site that cannot be overcome by the standard suite of bushfire protection measures.

An alternate solution has been relied upon to determine the APZ dimension. The Short Fire Run (SFR) model with combination of radiant heat shielding has been used as a method to calculate the radiant heat flux and required APZ. The width, shape and limited connectivity of the riparian corridor to other bushland areas allows the use of the SFR model to determine APZ dimension in this case.

5.2 Conclusion

The assessment demonstrates that the proposal, together with the recommendations (see below), complies with s100B *Rural Fires Act 1997*, Clause 44 of the *Rural Fires Regulation 2013* and *Planning for Bush Fire Protection 2019* (refer to Section 4 – Bushfire Protection Measures).

5.3 Recommendations

The recommendations made within this assessment are repeated below:

1. An APZ of minimum dimension ranging from 18 m to 21 m as mapped on Figure 4 is to be maintained within the subject land north of the northern row of units.

2. A solid, non-combustible fence of minimum 1.8 m height is to be erected along the northern boundary of the units.

3. The APZ and development site is to be managed in accordance with the vegetation management specifications listed at Section 4.2.

4. All units, with the exception of Lots 1-10 along the southern boundary, are required to be designed and constructed to comply with BAL-12.5 of Australian Standard *AS 3959-2018 Constructions of buildings in bushfire-prone areas* (AS 3959). The NSW variation to AS 3959 is to be applied in addition to the above BAL specifications. The variation is listed within Section 7.5.2 of PBP.

5. A perimeter road is to be constructed from the cul-de-sac of Hamilton Road along the northern interface within the APZ between the units and the vegetated riparian zone. The road is to have a 4 m wide carriageway within a 6 m wide easement to achieve a

cleared area of 1 m either side of the road. The road is to culminate in a Type C turning head (refer to Section A3.3 of PBP) proximate to the eastern boundary.

6. The internal access road is to be designed in accordance with the PBP Acceptable Solutions for the design and construction of roads in SFPP facilities as required by PBP Table 6.8b. The requirements are listed in Section 4.4.3.

7. Fire hydrants are to be installed along the perimeter road and internal road to ensure compliance with PBP and *AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (AS 2419).

8. Any gas services are to be installed and maintained in accordance with *AS/NZS 1596-2014 The storage and handling of LP gas*.

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BPAD Bushfire Planning & Design Accredited Practitioner Level 3

References

NSW Rural Fire Service (RFS). 2019. *Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities and Developers*. State of New South Wales through the NSW Rural Fire Service.

NSW Rural Fire Service (RFS). Short Fire Run: Methodology for assessing bushfire risk for low risk vegetation. Accessed 21 October 2020, https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0005/58424/Short-Fire-Run.pdf.

Standards Australia 2005. *Fire hydrant installations - System design, installation and commissioning,* AS2419.1, Fourth edition 2005, Standards Australia International Ltd, Sydney.

Standards Australia 2014. *The storage and handling of LP Gas*, AS/NZS 1596-2014, Standards Australia International Ltd, Sydney.

Standards Australia 2018. *Construction of buildings in bushfire-prone areas*, AS 3959, Standards Australia International Ltd, Sydney.

Appendix A – Photographs

Photograph 1: Edge of riparian vegetation along northern edge of subject land

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Photograph 2: Typical view across the corridor from the middle of the northern boundary

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Photograph 3: Typical view along the channel

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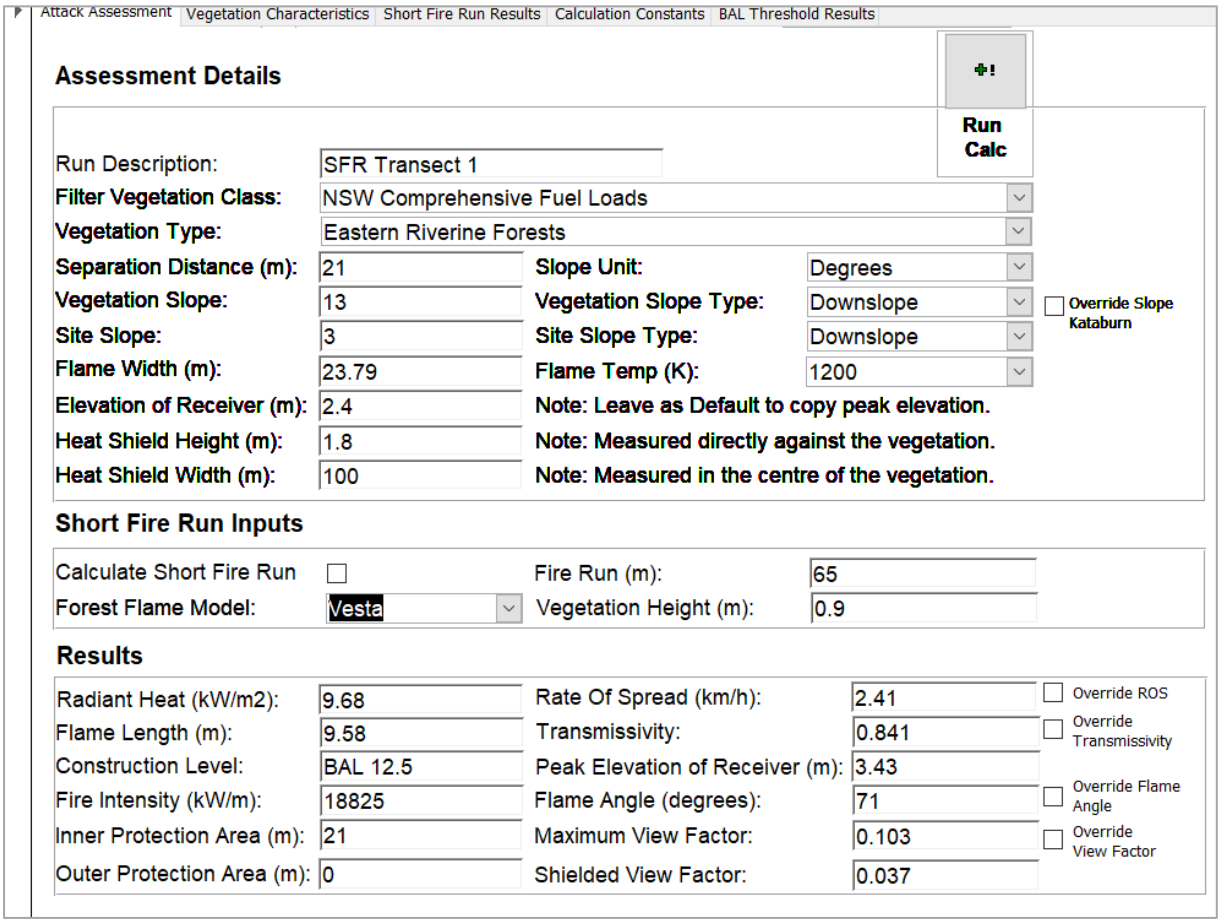
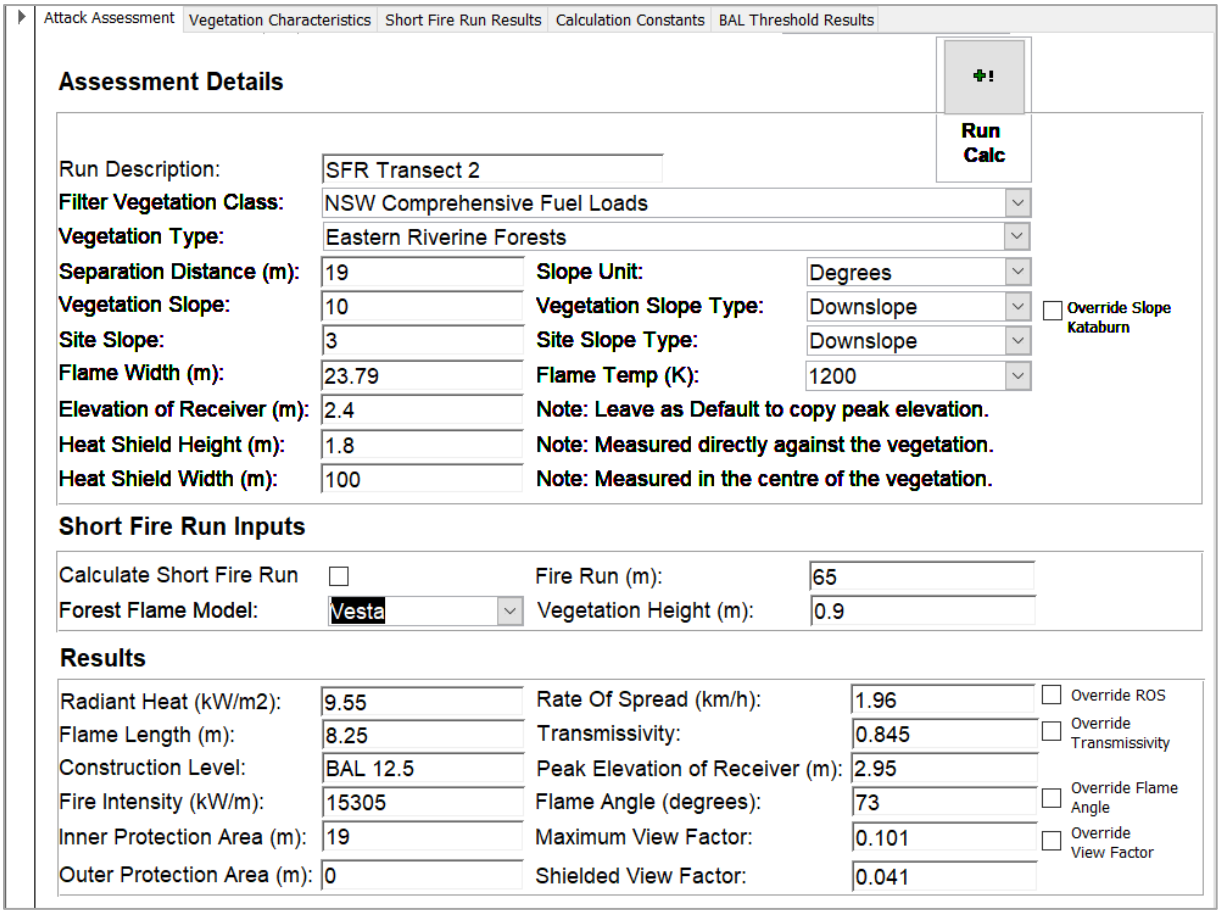
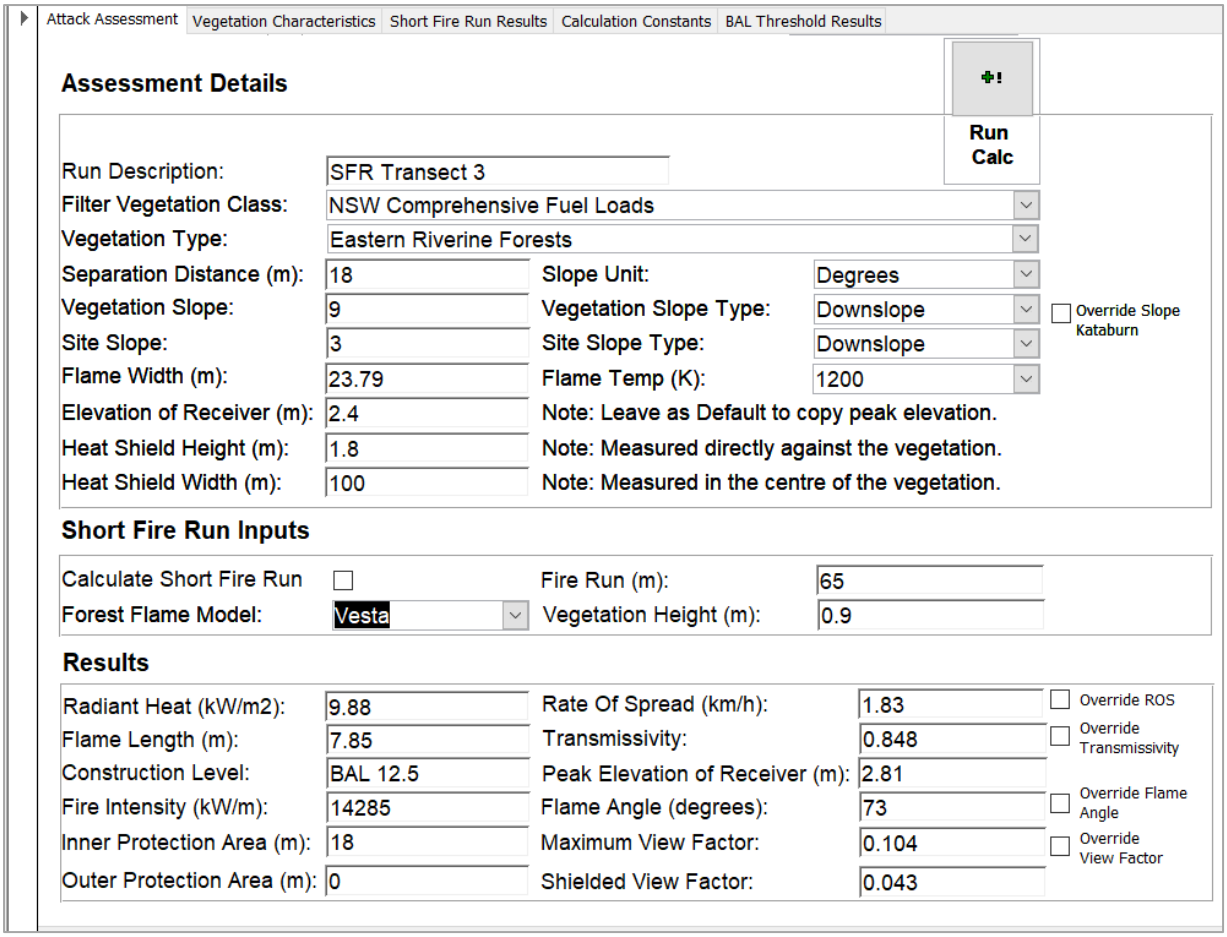
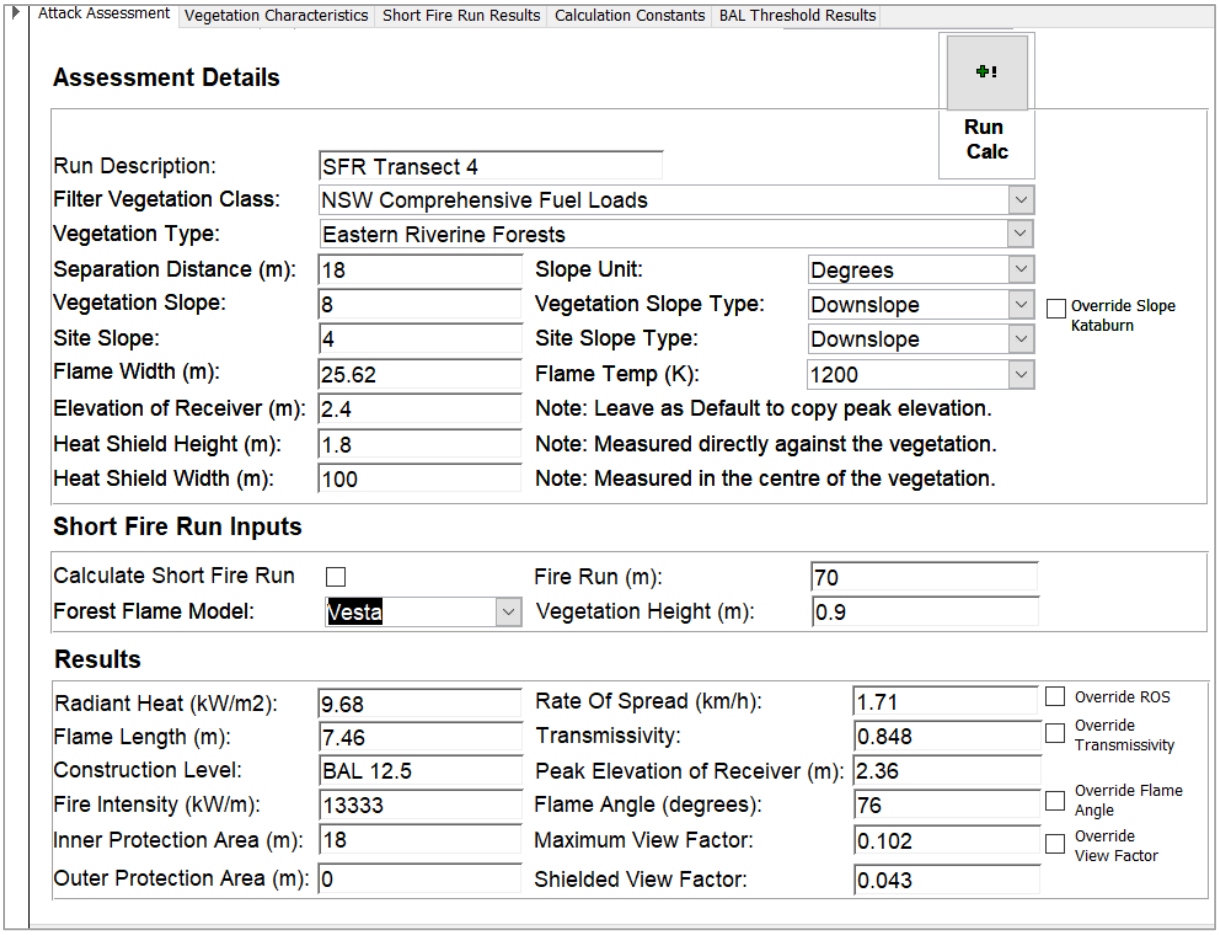
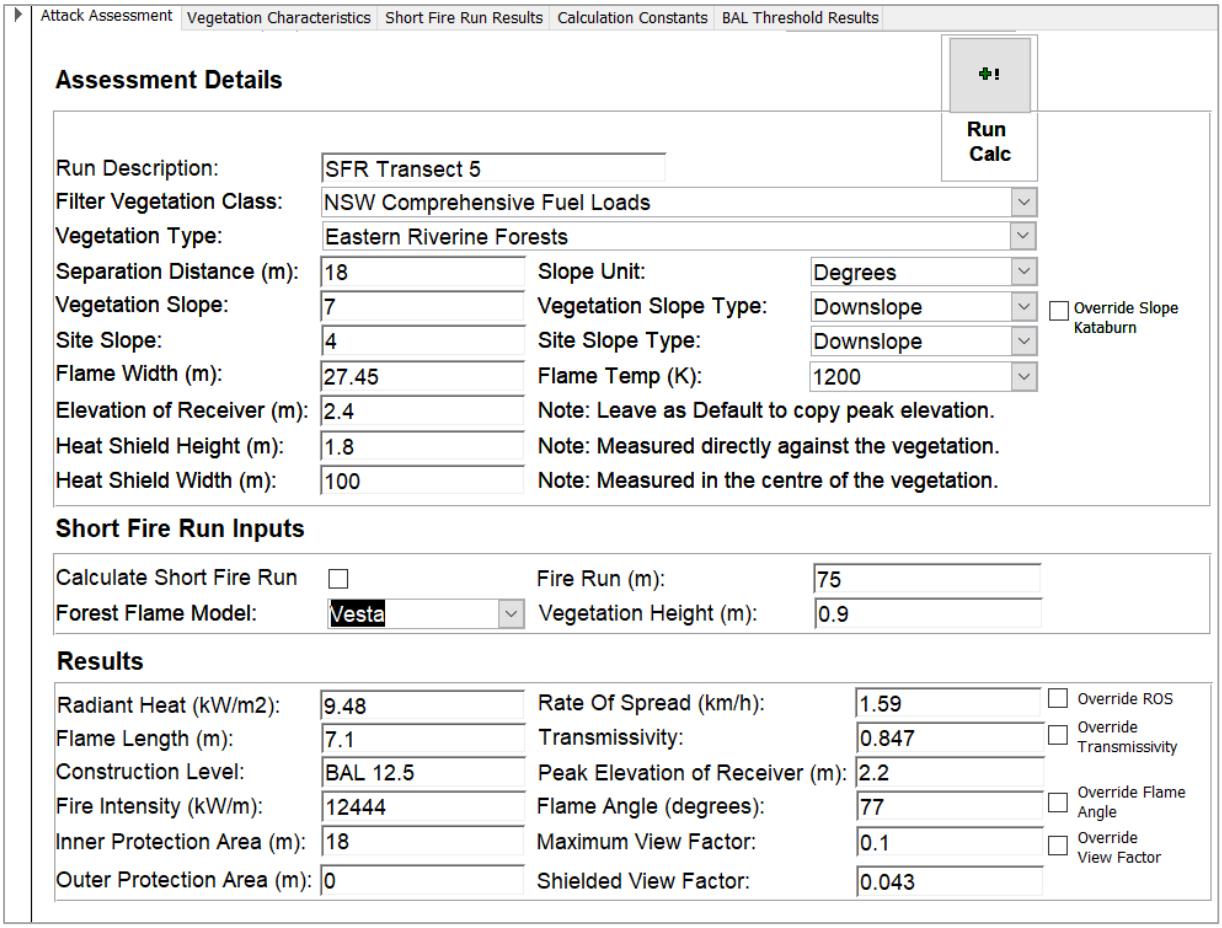
Appendix B – SFR model reports




Attack Assessment
Vegetation Characteristics
Short Fire Run Results
Calculation Constants
BAL Threshold Results
Assessment Details
Run Calc
Run Description: SFR Transect 2
Filter Vegetation Class: NSW Comprehensive Fuel Loads
Vegetation Type: Eastern Riverine Forests
Separation Distance (m): 19
Slope Unit: Degrees
Vegetation Slope: 10
Vegetation Slope Type: Downslope
Override Slope Kataburn
Site Slope: 3
Site Slope Type: Downslope
Flame Width (m): 23.79
Flame Temp (K): 1200
Elevation of Receiver (m): 2.4
Note: Leave as Default to copy peak elevation.
Heat Shield Height (m): 1.8
Note: Measured directly against the vegetation.
Heat Shield Width (m): 100
Note: Measured in the centre of the vegetation.
Short Fire Run Inputs
Calculate Short Fire Run
Fire Run (m): 65
Forest Flame Model: Vesta
Vegetation Height (m): 0.9
Results
Radiant Heat (kW/m2): 9.55
Rate Of Spread (km/h): 1.96
Override ROS
Flame Length (m): 8.25
Transmissivity: 0.845
Override Transmissivity
Construction Level: BAL 12.5
Peak Elevation of Receiver (m): 2.95
Fire Intensity (kW/m): 15305
Flame Angle (degrees): 73
Override Flame Angle
Inner Protection Area (m): 19
Maximum View Factor: 0.101
Override View Factor
Outer Protection Area (m): 0
Shielded View Factor: 0.041


Attack Assessment
Vegetation Characteristics
Short Fire Run Results
Calculation Constants
BAL Threshold Results
Assessment Details
Run Calc
Run Description: SFR Transect 3
Filter Vegetation Class: NSW Comprehensive Fuel Loads
Vegetation Type: Eastern Riverine Forests
Separation Distance (m): 18
Slope Unit: Degrees
Vegetation Slope: 9
Vegetation Slope Type: Downslope
Override Slope Kataburn
Site Slope: 3
Site Slope Type: Downslope
Flame Width (m): 23.79
Flame Temp (K): 1200
Elevation of Receiver (m): 2.4
Note: Leave as Default to copy peak elevation.
Heat Shield Height (m): 1.8
Note: Measured directly against the vegetation.
Heat Shield Width (m): 100
Note: Measured in the centre of the vegetation.
Short Fire Run Inputs
Calculate Short Fire Run
Fire Run (m): 65
Forest Flame Model: Vesta
Vegetation Height (m): 0.9
Results
Radiant Heat (kW/m2): 9.88
Rate Of Spread (km/h): 1.83
Override ROS
Flame Length (m): 7.85
Transmissivity: 0.848
Override Transmissivity
Construction Level: BAL 12.5
Peak Elevation of Receiver (m): 2.81
Fire Intensity (kW/m): 14285
Flame Angle (degrees): 73
Override Flame Angle
Inner Protection Area (m): 18
Maximum View Factor: 0.104
Override View Factor
Outer Protection Area (m): 0
Shielded View Factor: 0.043


Attack Assessment
Vegetation Characteristics
Short Fire Run Results
Calculation Constants
BAL Threshold Results
Assessment Details
Run Calc
Run Description: SFR Transect 4
Filter Vegetation Class: NSW Comprehensive Fuel Loads
Vegetation Type: Eastern Riverine Forests
Separation Distance (m): 18
Slope Unit: Degrees
Vegetation Slope: 8
Vegetation Slope Type: Downslope
Override Slope Kataburn
Site Slope: 4
Site Slope Type: Downslope
Flame Width (m): 25.62
Flame Temp (K): 1200
Elevation of Receiver (m): 2.4
Note: Leave as Default to copy peak elevation.
Heat Shield Height (m): 1.8
Note: Measured directly against the vegetation.
Heat Shield Width (m): 100
Note: Measured in the centre of the vegetation.
Short Fire Run Inputs
Calculate Short Fire Run
Fire Run (m): 70
Forest Flame Model: Vesta
Vegetation Height (m): 0.9
Results
Radiant Heat (kW/m2): 9.68
Rate Of Spread (km/h): 1.71
Override ROS
Flame Length (m): 7.46
Transmissivity: 0.848
Override Transmissivity
Construction Level: BAL 12.5
Peak Elevation of Receiver (m): 2.36
Fire Intensity (kW/m): 13333
Flame Angle (degrees): 76
Override Flame Angle
Inner Protection Area (m): 18
Maximum View Factor: 0.102
Override View Factor
Outer Protection Area (m): 0
Shielded View Factor: 0.043


Attack Assessment
Vegetation Characteristics
Short Fire Run Results
Calculation Constants
BAL Threshold Results
Assessment Details
Run Calc
Run Description: SFR Transect 5
Filter Vegetation Class: NSW Comprehensive Fuel Loads
Vegetation Type: Eastern Riverine Forests
Separation Distance (m): 18
Slope Unit: Degrees
Vegetation Slope: 7
Vegetation Slope Type: Downslope
Override Slope Kataburn
Site Slope: 4
Site Slope Type: Downslope
Flame Width (m): 27.45
Flame Temp (K): 1200
Elevation of Receiver (m): 2.4
Note: Leave as Default to copy peak elevation.
Heat Shield Height (m): 1.8
Note: Measured directly against the vegetation.
Heat Shield Width (m): 100
Note: Measured in the centre of the vegetation.
Short Fire Run Inputs
Calculate Short Fire Run
Fire Run (m): 75
Forest Flame Model: Vesta
Vegetation Height (m): 0.9
Results
Radiant Heat (kW/m2): 9.48
Rate Of Spread (km/h): 1.59
Override ROS
Flame Length (m): 7.1
Transmissivity: 0.847
Override Transmissivity
Construction Level: BAL 12.5
Peak Elevation of Receiver (m): 2.2
Fire Intensity (kW/m): 12444
Flame Angle (degrees): 77
Override Flame Angle
Inner Protection Area (m): 18
Maximum View Factor: 0.1
Override View Factor
Outer Protection Area (m): 0
Shielded View Factor: 0.043

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