Travers

bushfire & ecology

bushfire protection assessment

addendum

Proposed Residential Aged Care Facility
Lot 3 DP 805710
181 Forest Way, Belrose

August 2018
(Ref: 18MORR02)

Bushfire Protection Assessment
(addendum)

Proposed Residential Aged Care Facility
Lot 3 DP 805710
181 Forest Way, Belrose

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EXECUTIVE SUMMARY

Travers bushfire & ecology (*TBE*) prepared a bushfire protection assessment for the proposed construction of a residential aged care facility at 181 Forest Way, Belrose in July 2017.

This revised bushfire assessment has been undertaken in support of a revised development application to take into account the amended site plan, the NSW Rural Fire Service (RFS) response (dated 29 August 2017) ref: D17/2523 and Northern Beaches Council letter (dated 28 September 2017) ref: DA2017/0697.

The NSW RFS has advised that they are not in a position to properly assess the application on the basis of the information provided. As a result *TBE* provide the following response to the matters raised;

> ***NSW RFS Response 1: Written confirmation from the adjoining land owner/s to the south of the subject site that they consent to the ongoing management of their property as an asset protection zone in perpetuity. In this regard an easement will be required over the adjoining property to ensure that the recently cleared vegetation is not re-established and threaten the aged care facility.***

TBE can confirm that the adjoining land owner will not agree to an easement on their land. Based on the RFS assumption that the vegetation to the south will be re-established, *TBE* has undertaken a further assessment to determine the bushfire risk posed. Assuming a worst case scenario, the area in question could re-establish to a 'tall heath formation'. As outlined in Section 3.2 of this report an adequate asset protection zone (APZ) setback within the property can be provided to reduce radiant heat to <10kW/m^2.

> ***NSW RFS Response 1: Details demonstrating that there is sufficient site access to the eastern elevation of the building to enable firefighting activities and property defence.***

As depicted within the amended site plan a four (4m) fire trail is proposed to extend from the internal entrance road along the southern and eastern facades of the building to enable firefighting activities and property defence. Discussions with Garth Bladwell (NSW RFS) occurred in October 2017 and again in August 2018, with Garth confirming acceptance of this approach.

> ***NSW RFS Response 1: Details demonstrating that the proposed access along the road reserve to the site entrance, meets the standard of a fire trail as per 'Planning for Bush Fire Protection 2006'.***

As depicted within the amended site plan firefighting access from the road reserve to the north will continue from the existing bitumen driveway with a turning area for fire fighting vehicles provided within the north-western corner of the site. The driveway on the existing road reserve has a clearway width of 4m wide and consists of a mixture of bitumen and gravel in compliance with the standards required for fire trails. Discussions with Garth Bladwell (NSW RFS) occurred in October 2017, with Garth confirming acceptance of this approach.

Northern Beaches Council have identified non-compliance / insufficient information issues associated with the DA. As a result *TBE* provide the following response to the bushfire matters raised;

> ***General Terms of Approval – NSW Rural Fire Service (RFS) - The issuing of a consent for the proposed development is dependent upon the granting 'General Terms of Approval' by the RFS in accordance with s91 of the Environmental Planning and Assessment Act 1979. The proposal has been reviewed by the RFS who refuse to grant approval to the proposed development in its current form. Attached to this correspondence are specific comments made by the RFS. This is a fundamental issue with the application and will not allow Council to recommend approval of the application nor will it allow the Sydney North Planning Panel, as the consent authority, to grant consent to the application.***

This issues raised by the NSW RFS have been addressed within this revised development application. It is expected that a bushfire safety authority will be granted for the application to allow approval by the Sydney North Planning Panel.

> ***The application is supported by a Bushfire Report (refer to 'Bushfire Protection Assessment' prepared by Travers Bushfire & Ecology dated July 2017). The report provides recommendations to ensure that the development is in accordance with, or greater than, the requirements of PBP. The following recommendations have been made where insufficient information has been provided to demonstrate the development is capable of achieving compliance or to undertake an assessment of the impact of such recommendations:***
>
> ***'Recommendation 3 – A 2.2 m high colourbond fence (radiant heat barrier) is to be constructed along a portion of the northern boundary as shown in Schedule 1 attached.'***
>
> ***No details of the fence have been provided on the architectural plans submitted with the applications. The fence must be included on these plans to enable a full and proper assessment of the proposal.***

The site plan has been updated to include the construction of a 2.2m high colourbond fence along the northern boundary of the site. A sliding gate will be incorporated into the fence to ensure access to the emergency turning area. This gate is to be installed with a lock which complies with the requirements of the NSW RFS.

> ***Recommendation 5 – Access, water, electricity and gas supply is to comply with Section 4.2.7 of PBP. A 4m wide fire trail is recommended extending from the entry driveway parallel to the southern boundary to the rear of the allotment. A second fire trail (4m wide) is also recommended extending from the existing easement in the north towards the north-eastern aspect of the building. A turning head for each fire trail is required to support a three point turn of a Category 1 tanker (7.8m long and 2.4m wide). A locked gate (compatible with RFS key) is to be provided to prevent public access to each of these fire trails. The Port Cochere is to have a minimum height of 4m.***

The Site Plan submitted with the application includes details of the proposed fire trails, however the recommended fire trail parallel to the southern boundary of the site does not extend to the rear of the site and conflicts with structures proposed along this elevation (outdoor seating, stair case, retaining walls etc.). Therefore insufficient information has been submitted with the application to demonstrate compliance with the recommendations of the Bushfire Protection Assessment.

The site plan has been updated as per the recommendations of the bushfire report to include a trafficable fire trail which extends along the southern and eastern elevation of the building.

The proposed development is categorised by the RFS as being a special fire protection purpose (SFPP) development. This classification requires the RFS to issue a bushfire safety authority (BSA) should the development accord with the provisions of *Planning for Bush Fire Protection 2006 (PBP).*

PBP dictates that the subsequent extent of bushfire attack that can potentially impact a SFPP building must not exceed a radiant heat flux of 10 kW/m^2. This rating assists in determining the size of the APZ to provide the necessary defendable space between hazardous vegetation and a building.

The assessment found that bushfire can potentially affect the proposed development from the remnant forest located to the north, forest to the east and tall heath to the south-east of the development resulting in possible ember attack, radiant heat and potentially flame attack. However, the bushfire risk posed to the development can be mitigated if appropriate bushfire protection measures are put in place and managed in perpetuity.

The assessment has concluded that the proposed development will provide compliance with the performance criteria as outlined within *PBP* and is subject to the following alternative solutions:

- Minimum APZs have been determined in accordance with Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas (2009).* This involves the construction of a 2.2m high *Colorbond* fence along the northern boundary of the site, adjacent to the remnant forest.
- Provision of a fire trail to provide access to the eastern and northern building elevation to enable firefighting activities and property defence. A swept path analysis has been undertaken to ensure Category 1 tankers are capable of manoeuvring / turning.

GLOSSARY OF TERMS

APZ	asset protection zone
AS1596	*Australian Standard – The storage and handling of LP Gas*
AS2419	*Australian Standard – Fire hydrant installations*
AS3745	*Australian Standard – Planning for emergencies in facilities*
AS3959	*Australian Standard – Construction of buildings in bushfire-prone areas 2009*
BAL	bushfire attack level
BCA	*Building Code of Australia*
BSA	bushfire safety authority
EEC	endangered ecological community
EP&A Act	*Environmental Planning & Assessment Act 1979*
FDI	fire danger index
ha	hectare
IPA	inner protection area
m	metres
OPA	outer protection area
PBP	*Planning for Bush Fire Protection 2006*
RF Act	*Rural Fires Act 1997*
RMS	Roads and Maritime Services
RFS	NSW Rural Fire Service
SFPP	special fire protection purpose
TSC Act	*Threatened Species Conservation Act 1995*

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Introduction 1

Travers bushfire & ecology has been requested to undertake a revised bushfire protection assessment for the proposed construction of a residential aged care facility at 181 Forest Way, Belrose.

The proposed development is located on land mapped by Northern Beaches Council as being bushfire prone.

The type of development triggers a formal assessment by Council in respect of the RFS policy entitled *Planning for Bush Fire Protection 2006 (PBP).*

1.1 Aims of the assessment

The aims of the bushfire protection assessment are to:

- review the bushfire threat to the landscape
- undertake a bushfire attack assessment in accordance with *PBP*
- provide advice on mitigation measures, including the provision of APZs) construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape

1.2 Project synopsis

The proposed development involves the construction of a residential aged care facility within the western portion of Lot 3 DP 805710. The eastern portion of the site will be managed as an APZ for a distance of 100m.

The facility will provide an overall one hundred and thirty eight (138) beds over four-storeys, landscaped courtyard, terrace and a parking / loading area with fifty (50) car parks, (20 visitors and 30 staff).

The proposal will be broken down into four (4) designated areas including; resident area, staff area, back of house area and wellbeing area and will be accessible from Forest Way in the west. Numerous site inspections were undertaken by both John Travers and Nicole van Dorst to identify a developable area ensuring a setback of 100m from the eastern boundary.

Figure 1.1 depicts the original proposal (DA lodged in 2017) with the revised proposal depicted in Figure 1.2. The main changes relate to the provision of a fire trail adjacent to the southern and eastern building façade and the revised location of the northern fire trail access to avoid impacting environmental constraints.

Schedule 1 shows the proposed development and bushfire protection measures, including APZs.

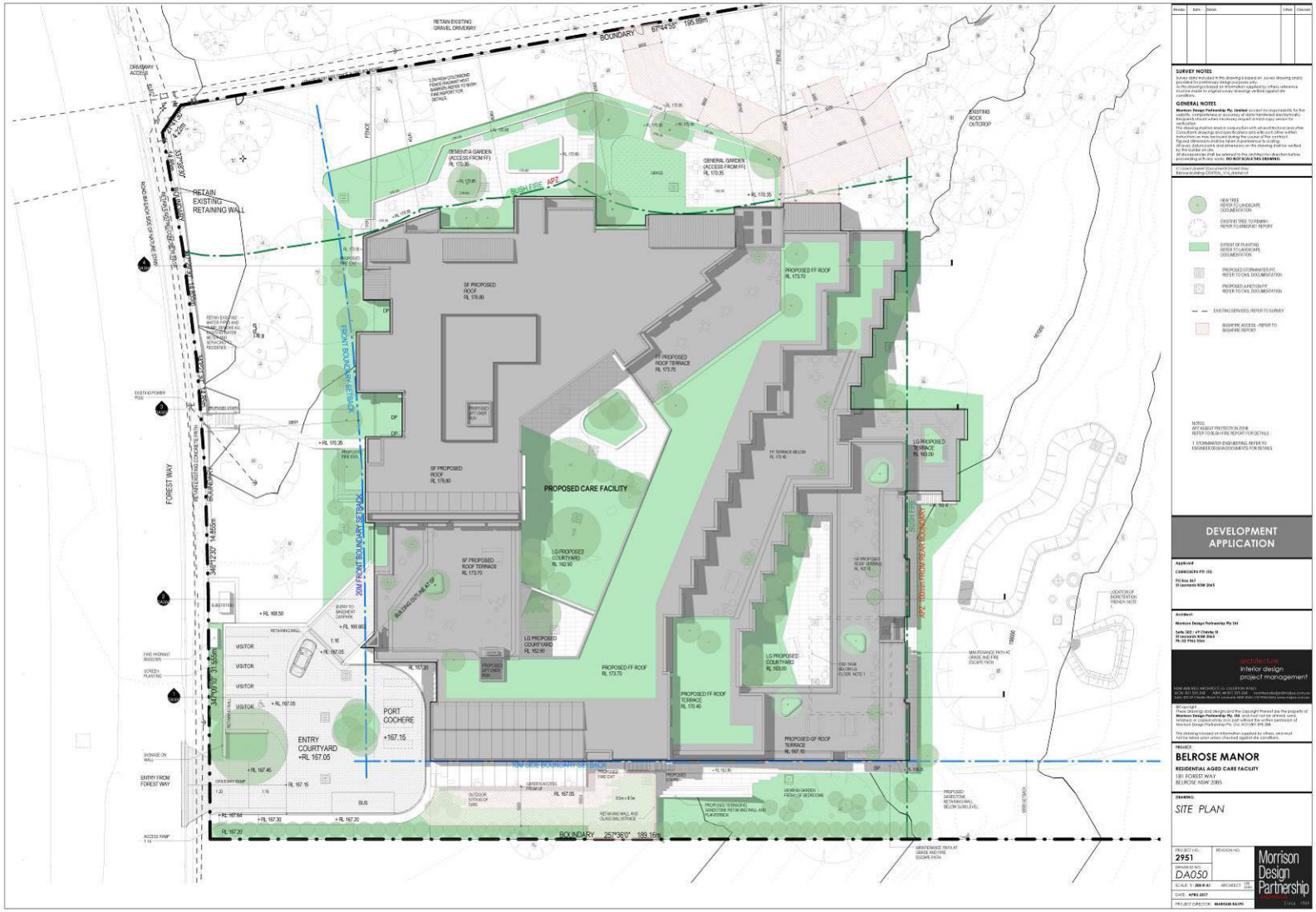


Figure 1.1 – Site Plan (original plan, dated April 2017)

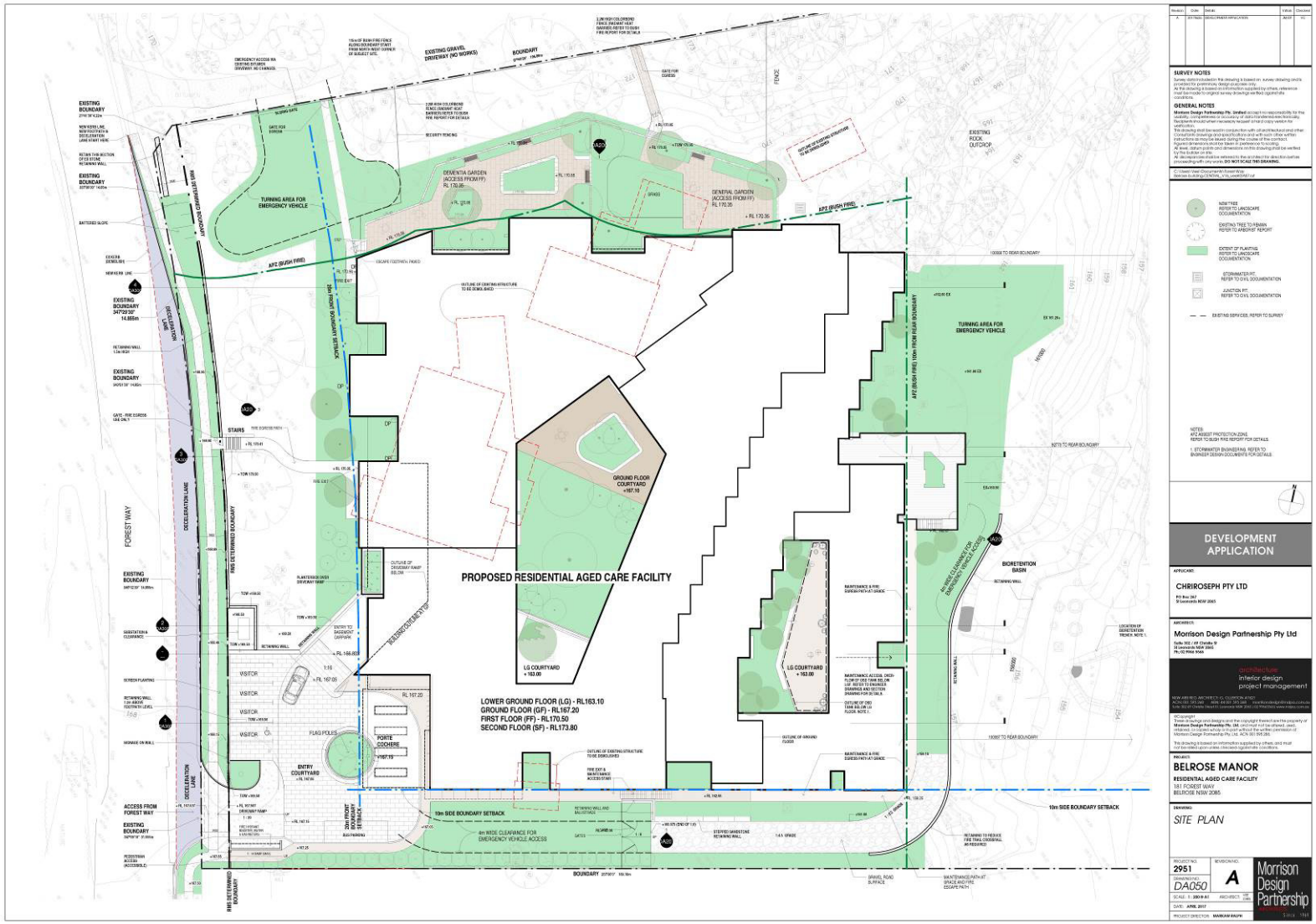


Figure 1.2 – Current site plan

1.3 Information collation

To achieve the aims of this report, a review of the information relevant to the property was undertaken prior to the initiation of field surveys. Information sources reviewed include the following:

- Site plans prepared by *Morrison Design Partnership* dated 26 April 2017
- Warringah Local Environmental Plan (2011)
- *Nearmap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- Australian Standard 3959 *Construction of buildings in bushfire-prone areas (AS3959)*
- *Planning for Bush Fire Protection 2006 (PBP) (RFS).*

An inspection of the proposed development site and surrounds was undertaken by Nicole van Dorst and John Travers on 22 November 2017 to assess the topography, slopes, aspect, drainage, vegetation and adjoining land use. The identification of existing bushfire measures and a visual appraisal of bushfire hazard and risk were also undertaken.

1.4 Site description

The property currently supports a residential dwelling, granny flat and outbuildings and is located to the east of Forest Way, Belrose within the local government area (LGA) of the Northern Beaches (refer Figure 1.3).

The site is moderately cleared with remnant canopy only. The vegetation beyond the site to the east and north-east supports forest vegetation associated with a bushland reserve.

Figure 1.3 – Aerial appraisal

1.5 Legislation and planning instruments

1.5.1 Environmental Planning and Assessment Act (EP&A Act)

The *EP&A Act* governs environmental and land use planning and assessment within New South Wales. It provides for the establishment of environmental planning instruments, development controls and the operation of construction controls through the *BCA*. The identification of bushfire prone land is required under Section 10.3 of the *Environmental Protection & Assessment Act 1979 (EP&A Act)*.

1.5.2 Bushfire prone land

Bushfire prone land maps provide a trigger for the development assessment provisions. The proposed development is located on land that is mapped by Northern Beaches Council as being bushfire prone (refer Figure 1.4).

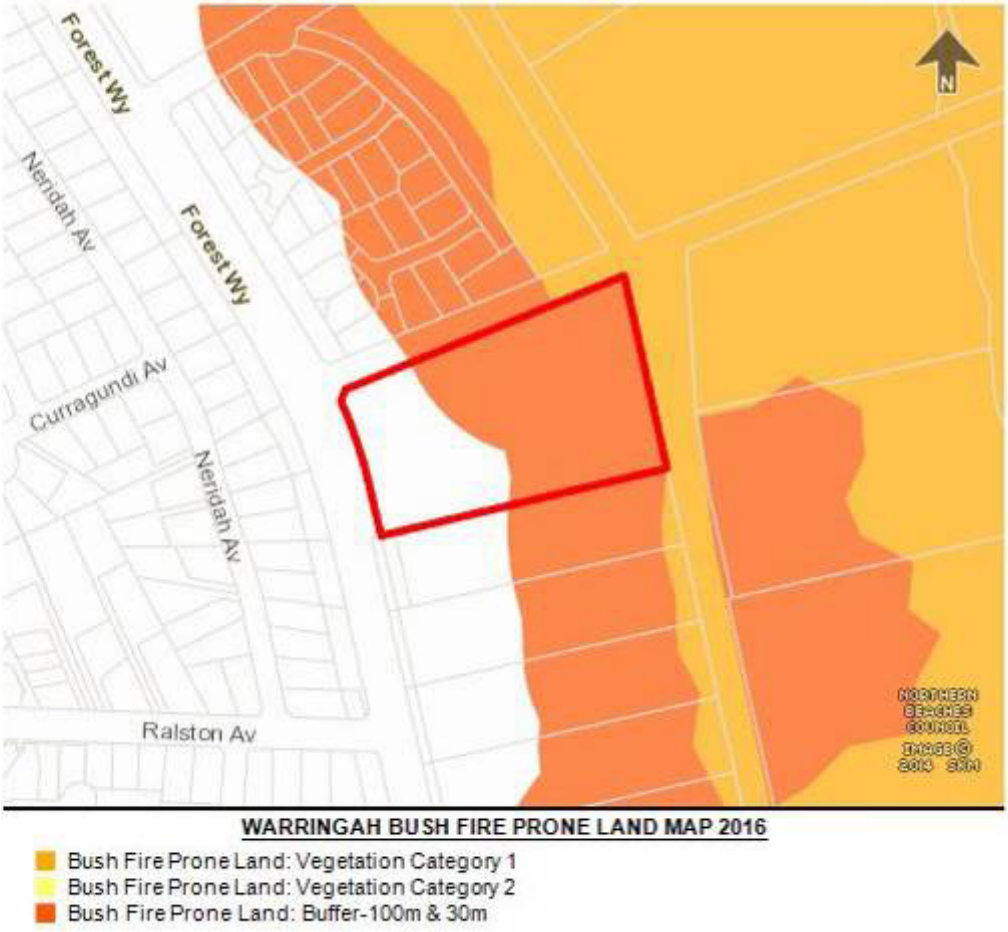


Figure 1.4 – Bushfire prone land map
(Source: Northern Beaches Bushfire Prone Land Map, 2011)

The proposed development is an integrated development under Section 4.46 of the *EP&A Act.*

Consequently, to proceed, the proposed development will require a bushfire safety authority (BSA) from the RFS. The Commissioner must be satisfied that the proposal complies with *PBP* before granting a BSA.

1.5.3 Rural Fires Act 1997 (RF Act)

This legislation is concerned with the prevention and control of bushfire, hazard reduction and administration.

Section 100B of the *Rural Fires Act 1007 (RF Act)* states that the Commissioner may issue a BSA for a special fire protection development (aged care) when it occurs on bushfire prone land.

1.5.4 Planning for Bush Fire Protection 2006 (PBP)

Bushfire protection planning requires the consideration of the RFS planning document entitled *PBP. PBP* provides planning controls for building in bushfire prone areas as well as guidance on effective bushfire protection measures.

The policy aims to provide for the protection of human life (including fire fighters) and to minimise impacts on property and the environment from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment. More specifically, the aims and objectives for all development located on bushfire prone land should:

1. Afford occupants of any building adequate protection from exposure to a bushfire.

2. Provide for a defendable space to be located around buildings.

3. Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition.

4. Ensure that safe operational access and egress for emergency service personnel and residents is available.

5. Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the APZ.

6. Ensure that utility services are adequate to meet the needs of fire fighters (and others who may assist in bushfire fighting).

As the aged care development is a type of development regarded by the RFS as a special fire protection purpose (SFPP) development, *PBP* requires additional objectives to be considered. These include the need to:

7. Provide for the special characteristics and needs of occupants. Unlike residential subdivisions, which can be built to a construction standard to withstand the fire event, enabling occupants and fire fighters to provide property protection after the passage of fire, occupants of SFPP developments may not be able to assist in property protection. They are more likely to be adversely affected by smoke or heat while being evacuated.

8. Provide for safe emergency evacuation procedures. SFPP developments are highly dependent on suitable emergency evacuation arrangements, which require greater separation from bushfire threats. During emergencies, the risk to fire fighters and other emergency services personnel can be high through prolonged exposure, where door to door warnings are being given and exposure to the bushfire is imminent.

The nature of SFPPs means that occupants may be more vulnerable to bushfire attack for because they may;

- be less educated in relation to bushfire impacts
- may have reduced capacity to evaluate risk and to respond adequately to the bushfire threat
- present organisational difficulties for evacuation and / or management
- be more vulnerable through stress, anxiety and smoke impacts arising from bushfire threat
- have significant communication barriers
- increased supervision may be required during a bushfire
- logistical arrangements for the numbers of residents may be complicated in terms of alternate accommodation, transport, healthcare and food supplies

In addition, *PBP* outlines the bushfire protection measures required to be assessed for new development in bushfire prone areas. The proposal has been assessed in compliance with the following measures:

- asset protection zones
- building construction and design
- access arrangements
- water supply and utilities
- landscaping, and
- emergency management arrangements.

1.5.5 Building Code of Australia (BCA) and the Australian Standard AS3959 Construction of buildings in bushfire-prone areas 2009 (AS3959)

The *BCA* is given effect through the *EP&A Act* and forms part of the regulatory environment of construction standards and building controls.

The *BCA* outlines objectives, functional statements, performance requirements and deemed to satisfy provisions.

In NSW, construction in bushfire prone areas applies to Classes 2, 3, 4 and 9b buildings or a Class 10a associated with Classes 2, 3, 4 and 9b buildings.

The construction manual for the deemed to satisfy requirements is the *AS3959*.

1.6 Environmental and cultural constraints

A flora and fauna assessment has been undertaken by *Cumberland Ecology*. The report has identified the presence of an endangered ecological community - Duffys Forest.

Mitigation measures recommended in the report include:

- vegetation protection;
- erosion, sedimentation and pollution control;
- pre-clearing and clearing surveys;
- weed control measures; and
- re-vegetation (considering bushfire APZs when planting shrubs or canopy)

Bushfire Threat Assessment 2

To assess the bushfire threat and to determine the required width of an APZ for a development, a review of the elements that comprise the overall threat needs to be completed.

PBP provides a methodology to determine the size of any APZ that may be required to offset possible bushfire attack. These elements include the potential hazardous landscape that may affect the site and the effective slope within that hazardous vegetation.

2.1 Hazardous fuels

PBP guidelines require the identification of the predominant vegetation formation in accordance with David Keith (2004) to determine APZ distances for SFPP developments. The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation within 140m of the development is detailed below:

- Remnant tall heath to the north of the site. The bushfire risk posed by this vegetation is minimal / negligible due to its narrow width and fire run potential (i.e. <10-20m road side vegetation). The bushfire risk is further reduced by the presence of an existing service road / electrical easement. The vegetation is dominated by tall heath which is managed / maintained in accordance with *TransGrid* guidelines (i.e. maintain a height less than 4m) and has a size of less than 1ha.

Photo 1 – Remnant tall heath vegetation to the north

Regardless of the factors outlined above the presence of this roadside vegetation does provide continuity with further bushland located to the north-east. There is potential for the vegetation to carry flame and produce radiant heat and therefore the risk cannot be disregarded.

As a result, *TBE* propose a 24m APZ (to include the adjoining service road where it meets the site boundary) along with the construction of a 2.2m high *Colorbond* fence will further reduce the radiant heat impact on the proposed development from the north.

Photo 2 – Remnant vegetation to the north of the site

- Forest vegetation east and north-east of the site (separation >100m)

Photo 3 – Forest vegetation to the east (with private access road)

Photo 4 – Forest vegetation to the east

- Tall heath vegetation to the south-east of the site.

As outlined in the NSW RFS response *'Written confirmation from the adjoining land owner/s to the south of the subject site that they consent to the ongoing management of their property as an asset protection zone in perpetuity. In this regard an easement will be required over the adjoining property to ensure that the recently cleared vegetation is not re-established and threaten the aged care facility'.*

The assessment undertaken in the original bushfire report was based on the land to the south being managed.

Photo 5 – Managed land

As outlined within *PBP* (page 52), reduced vegetation including maintained lawns and cultivated gardens are not considered a hazard or predominant vegetation class and can be included within an APZ.

Regardless of the current vegetation condition the NSW RFS has requested that an easement is granted by the adjoining landowner to ensure the vegetation is managed in perpetuity. *TBE* can confirm that our client has approached the owner of the adjoining land to the south and unfortunately an easement cannot be granted.

Based on the RFS assumption that the vegetation to the south will be re-established, *TBE* has undertaken a further assessment to determine the bushfire risk posed, assuming a worst case scenario, the area in question could re-establish to a 'tall heath formation'. As depicted in Figure 2.1 this vegetation community is supported by mapping prepared by Native Vegetation of Sydney Metropolitan Area (2016). The area consists of exposed rock with the potential for the re-establishment of Sydney Coastal Heath.

Figure 2.1 – Vegetation mapping

Table 2.1 provides a summary of the revised bushfire assessment for the south-eastern aspect of the site (identified in bold text). This assessment assumes re-establishment of tall heath to the east of the existing tennis court. The land between the tennis court and Forest Way consists of rocky landscaped gardens, a pool and manicured grassland surrounding the dwelling (refer Schedule 1 attached). Two design fires have been used, one based on a 10m flame width (based on the angle of impact and managed land provided by the tennis court) and a 100m flame width, as depicted within Schedule 1 attached.

2.2 Effective slope

The effective slope is assessed for a distance of up to 100m. Effective slope refers to that slope which provides the most effect upon likely fire behaviour. A mean average slope may not in all cases provide sufficient information such that an appropriate assessment can be determined.

The effective slope within the hazardous areas is described as follows:

- >15-18 degrees downslope within the forest vegetation to the east
- 10-15 degrees downslope within the forest vegetation to the north-east
- level to upslope within the remnant vegetation to the north

The effective slope within the "re-established" vegetation to the south-east is as follows:

- 13.5 degrees downslope within the tall heath

2.3 Bushfire attack assessment

A fire danger index (FDI) of 100 has been used to calculate bushfire behaviour on the site based on its location within the Greater Sydney region.

Table 2.1 provides a summary of the bushfire attack assessment, the minimum required APZs (i.e. to ensure radiant heat <10kWm^2) and the APZs provided in compliance with PBP.

Table 2.1 – Bushfire attack assessment

Aspect	Predominant vegetation within 140m of development	Effective slope of land	APZ required in accordance with Appendix 2 of PBP (metres)	APZ provided (metres)	
North	Remnant forest (refer Note 1)	Level	30	24 (see Note 2)	As per original assessment
North-east	Forest	10-15^{0D}	100	72 (see Note 3)	As per original assessment
East	Forest	>15-20^{0D}	100	100 (80m IPA & 20m OPA)	As per original assessment **(with inclusion of a 20m OPA)**
South-east	**Tall heath (10m flame width)**	**13.5 ° D**	**27m (refer Note 4)**	**8.17kW/m^2**	**Reassessment based on re-established vegetation**
	Tall heath (100m flame width)		**64m setback provided to 100m flame width**	**8.79kW/m^2**	

*Notes: * Slope is either 'U' meaning up slope or 'C' meaning cross slope or 'D' meaning down slope*

Note 1 – The vegetation to the north poses a reduced bushfire risk to the site due to its short and or narrow 'fire run' length (i.e. <50m) which in-turn reduces the opportunity to support a fully developed bushfire. *PBP* describes remnant vegetation as a parcel of vegetation with a size of less than 1ha or a

shape that provides a potential fire run directly towards a building not exceeding 50m. The vegetation to the north exhibits these qualities and therefore the threat posed is considered low and APZ setbacks for this aspect are the same as for the rainforest category outlined in *PBP*.

Note 2 – A performance based assessment using Appendix B of *AS3959* was undertaken to determine the required APZ (equivalent to radiant heat <10 *k/Wm²* for the SFPP building) based on remnant vegetation (fuel load 8/10) on a level slope.

The results indicate that based on this vegetation / slope and 24m APZ the SFPP building (as identified in Schedule 1) would be exposed to a radiant heat threshold of 13.22k/Wm² (i.e. refer A North Base Calculation in Appendix 2).

This impact is reduced further by with the construction of a 2.2m high *Colorbond* fence along the boundary of the site as detailed below.

Radiant heat shielding by 2.2m high radiant heat barrier

The following modelling has been undertaken using accepted methodology based on the view factor model. In this circumstance the construction of a 2.2m high *Colorbond* fence acts as a radiant heat shield to the affectation of the western vegetation.

The radiant heat barrier will be located adjacent to the bushland in this circumstance and therefore the methodology is straight forward.

The modelled results (refer Appendix 2) were prepared using the bushfire attack assessor (BFAA) developed by *Newcastle Bushfire Consulting*. The radiant heat calculations have been undertaken using the following three (3) steps;

1. Create a base model of the unshielded fire and record the view factor. This calculation is identified as:
    - 'Run Description: A North BASE. This has been undertaken based on a 24m APZ.

2. Create a shielded model of the fire with the vegetation fuel loadings reduced, decreasing the flame height to the same height of the proposed radiant heat shield i.e. 2.2m. The flame angle is then determined depending on the location of the radiant heat shield in relation to the building and the vegetation. As the radiant heat shield is directly against the vegetation it offers a 90 degree flame angle reduction. The view factor is then recorded. This calculation as;
    - 'Run Description: B North SHIELD

3. Finally, the view factor of the final radiant heat exposure to the building is measured as the 'View factor from Step 1 minus the view factor from Step 2".
   The measurement of a 2.2m radiant heat shield is shown in the following table. The results show that the aged care building will be exposed to radiant heat of 9.81 k/Wm².

Calculation	Radiant heat *k/Wm²*	View factor
Base calculation	13.87	0.15
2.2m pre - shield calculation	4.08	0.044
Final calculation	**9.81**	0.106

Note 3 – As outlined in the original bushfire report , a performance based assessment using Appendix B of *AS3959* was undertaken to determine the required APZ (equivalent to radiant heat <10 *k/Wm²* for the SFPP building) based on forest vegetation (fuel load 20/25) on a 10-15 degree slope and flame width potential of 24m. The results of this assessment is depicted in Schedule 1 attached with

modelled results using the bushfire attack assessor (BFAA) (developed by *Newcastle Bushfire Consulting)* provided in Appendix 2.

Note 4 – A performance based assessment using Appendix B of *AS3959* was undertaken to determine the radiant heat exposure based on "re-established" tall heath vegetation (reduced flame width of 10m and 100m) on a downslope of upslope of 13.5^0. The results of the assessment, provided below, were prepared using the bushfire attack assessor (BFAA) developed by *Newcastle Bushfire Consulting.*

NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Printed: 15/08/2018 **Assessment Date:** 15/08/2018

Site Street Address:	181 Forest Way, Belrose		
Assessor:	Mr Admin; admin		
Local Government Area:	Warringah	**Alpine Area:**	No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
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:	A South-east		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	13.5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	27
Fire Inputs			
Veg./Flame Width(m):	10	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	7.31
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	136602
Radiant Heat(kW/m2):	8.17	**Flame Angle (degrees):**	55
Flame Length(m):	17.85	**Maximum View Factor:**	0.088
Rate Of Spread (km/h):	10.58	**Inner Protection Area(m):**	27
Transmissivity:	0.834	**Outer Protection Area(m):**	0

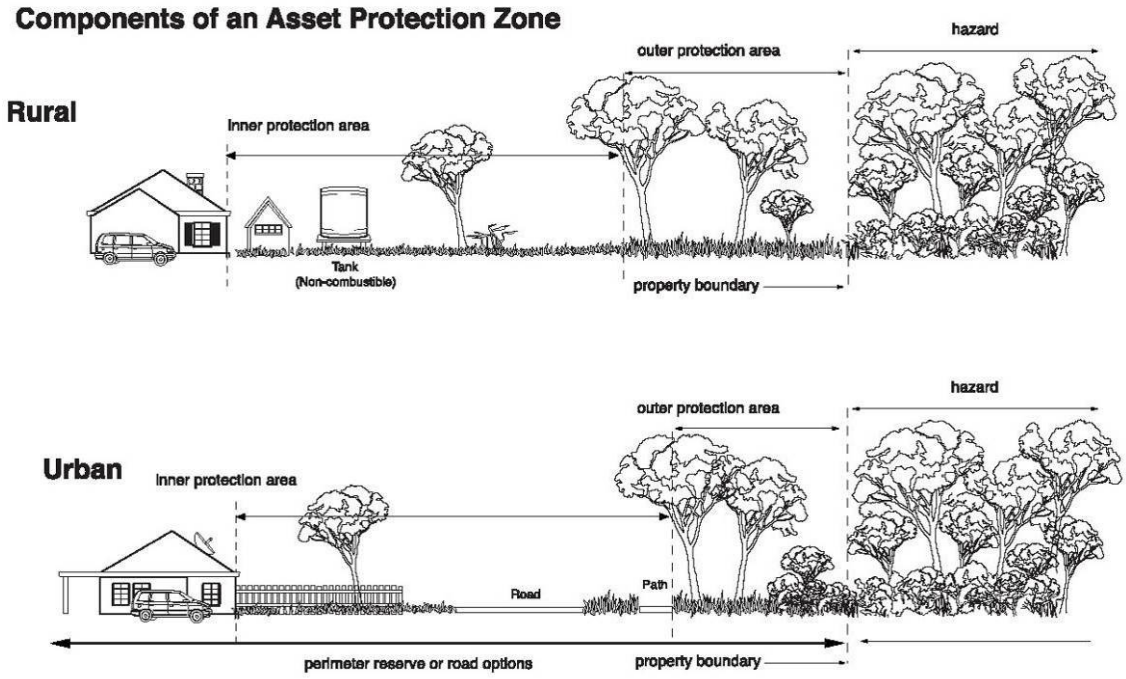
Run Description:	A South-east (100m flame width)		
Vegetation Information			
Vegetation Type:	Scrub/Tall Heath	**Vegetation Group:**	Shrub & Heath
Vegetation Slope:	13.5 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	64
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	8.73
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	136602
Radiant Heat(kW/m2):	8.79	**Flame Angle (degrees):**	78
Flame Length(m):	17.85	**Maximum View Factor:**	0.103
Rate Of Spread (km/h):	10.58	**Inner Protection Area(m):**	64
Transmissivity:	0.763	**Outer Protection Area(m):**	0

Specific Protection Issues

3

3.1 Asset protection zones

APZs are areas of defendable space separating hazardous vegetation from buildings. The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The IPA cannot be used for habitable dwellings but can be used for all external non-habitable structures such as pools, sheds, non-attached garages, cabanas, etc. A typical APZ, and therefore defendable space, is graphically represented below:



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

PBP dictates that the subsequent extent of bushfire attack that can potentially emanate from a bushfire must not exceed a radiant heat flux of 10*kW/m*^{2} for SFPP developments.

This rating assists in determining the size of the APZ in compliance with Appendix 2 of *PBP* to provide the necessary defendable space between hazardous vegetation and a building. Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3.1 – Performance criteria for asset protection zones (*PBP* guidelines pg. 19)

Performance criteria	Acceptable solutions	Complies
Radiant heat levels of greater than 10kW/m^2 will not be experience by occupants or emergency services workers entering or exiting a building.	An APZ is provided in accordance with the relevant tables and figures in Appendix 2 of *PBP.* Exits are located away from the hazard side of the building. The APZ is wholly within the boundaries of the development.	Complies with the performance criteria. As outlined in Section 2.3 a performance based assessment has been undertaken to ensure all aspects of the building are not exposed to radiant heat >10kW/m^2. .
Applicant demonstrates that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fire is negated.	Mechanisms are in place to provide for the maintenance of the APZ over the life of the development. The APZ is not located on land with a slope exceeding 18^o.	Complies – The APZ will consist of landscaped areas, roads and turf areas which require minimal maintenance.
APZs are managed and maintained to prevent the spread of a fire towards the building.	In accordance with the requirements of *Standards for Asset Protection Zones* (*RFS* 2005).	Complies - to be made a condition of consent.

Development allowable within the APZ includes sheds, outbuildings, access roads and car parking facilities, as well as back of house uses which do not permit use by aged care residents (i.e. staff office etc.)

Please note that any building within 10m of the aged care building will require compliance with *AS3959* (BAL levels) if located within 10m of the aged care building.

3.2 Building protection

The construction of buildings in bushfire prone areas is subject to stringent rules pertinent to the building envelope being located on the non-hazardous side of the APZ. The role of the APZ is to provide a safe space to separate the hazard from the building.

The construction classification system is based on five (5) bushfire attack levels (BALs). These are BAL – Flame Zone (FZ), BAL 40, BAL 29, BAL 19 and BAL 12.5 *AS3959*. The lowest level, BAL 12.5, has the longest APZ distance while BAL – FZ has the shortest APZ distance. These allow for varying levels of building design and use of appropriate materials.

The proposed aged care building should be protected to BAL 12.5 rating.

Note: There is no BAL 10 in *AS3959* so BAL 12.5 must be used.

3.3 Hazard management

Future development is to ensure that the APZ is (as depicted within Schedule 1):

- Managed in accordance with RFS document *Standards for Asset Protection Zones* available from www.rfs.nsw.gov.au by following the link 'Publications' and 'Hazard Reduction' and that:

- Landscape design within the property is to be undertaken in accordance with Appendix 5 of *PBP* also available from www.rfs.nsw.gov.au by following the link 'Publications' and *Building in a Bush Fire Prone Area*.

3.4 Access for fire fighting operations

The primary access to the development will be via from Forest Way in the west. An existing service road / electrical easement is also located adjacent to the northern boundary of the site as well as a private access road extending from Morgan Road in the north which runs parallel to the eastern boundary of the site (refer Figure 3.1).

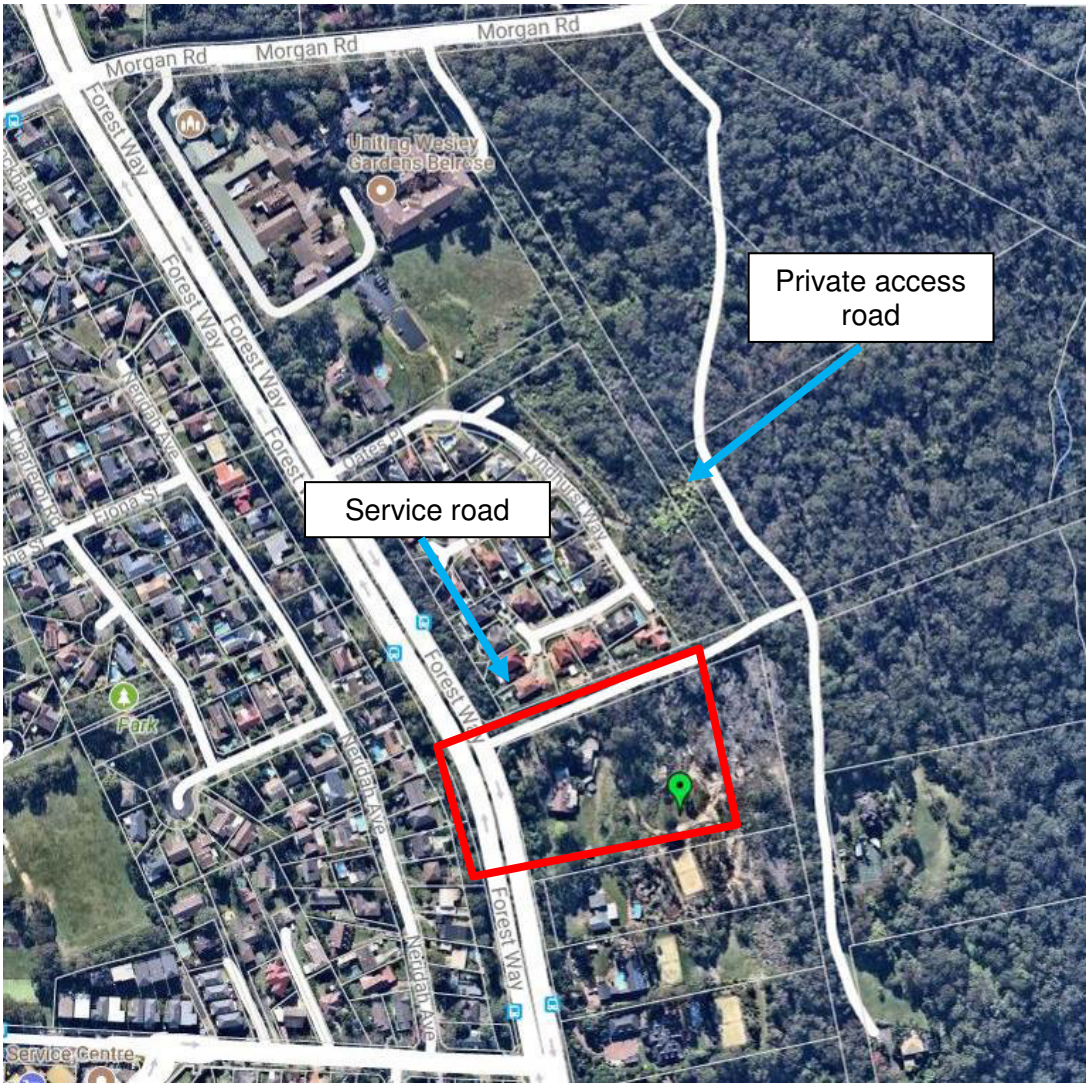


Figure 3.1 - Access

Public access to the facility will be limited to patrons, staff and visitors. The proposal will provide a single entry driveway ramp (1:20 and 1:16) to an entry courtyard with Port Cochere together with entry to a basement carpark as per the original proposal.

In accordance with the revised proposal firefighting access to all aspects of the building and to the rear of the site (for APZ maintenance) has been provided to address the following NSW RFS request:

1. ***Details demonstrating that there is sufficient site access to the eastern elevation of the building to enable firefighting activities and property defence.***

As depicted within the amended site plan (refer: Figure 3.2 below) a four (4m) fire trail is proposed to extend from the internal entrance road along the southern and eastern facades of the building. The fire trail is approximately 140m long and is provided with a turning circle at its termination. The turning head at the fire trails termination can support a Category 1 vehicle (7.8m length) undertaking a three (3) point turn, as depicted in the swept path analysis below.

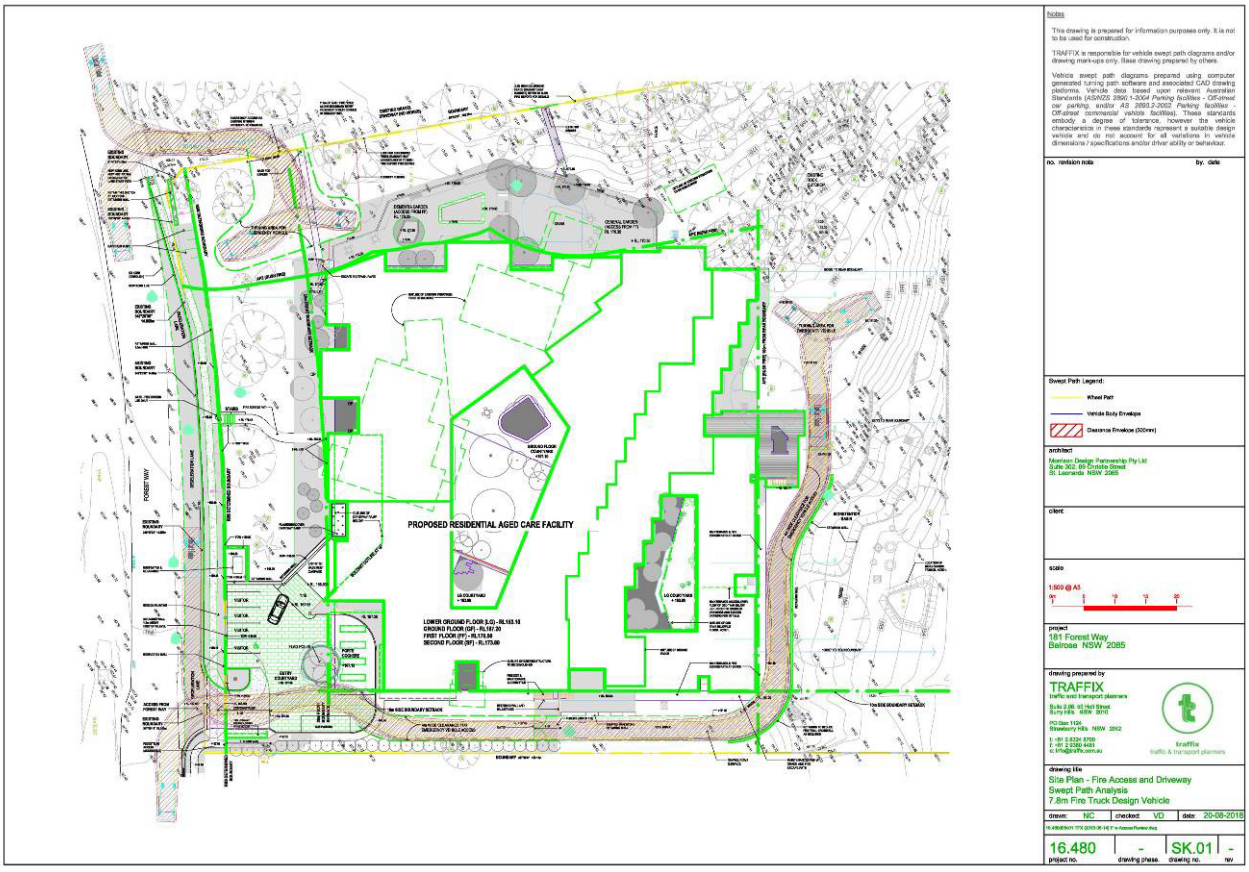


Figure 3.2 – Fire trail (swept path analysis)

This fire trail will provide sufficient site access to the southern, eastern and part northern elevation of the building to enable firefighting activities and property defence.

2. ***Details demonstrating that the proposed access along the road reserve to the site entrance, meets the standard of a fire trail as per 'Planning for Bush Fire Protection 2006'.***

As depicted within the amended site plan above, firefighting access from the road reserve to the north will continue from the existing bitumen driveway with a turning area for fire fighting vehicles provided within the north-western corner of the site. The turning 'T' area will have access handles of 12m capable of supporting a Category 1 tanker. As depicted in the photos below, the existing bitumen driveway on the existing road reserve has a clearway width of

4m wide and consists of a mixture of bitumen and gravel. This road provides access to the site as well as to the powerline easement for easement for maintenance purposes. This access meets the standards required for a fire trail.

Photo 6 – Existing driveway access to the site (right of picture), picture taken looking east

Photo 7 – Existing access looking west towards Forest Way.

Table 3.2 provides detail regarding design / construction and how the 'intent of measures' required by the RFS for internal roads is provided by the development i.e. "*to provide safe operational access for emergency services personnel in suppressing a bush fire, while residents are accessing or egressing an area*".

Table 3.3 outlines the design requirements for the fire trails.

Table 3.2 – Performance criteria for internal roads (*PBP* guidelines pg. 35)

Performance criteria	Acceptable solutions to RFS	Compliance comments
Internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	Internal roads are two-wheel drive, sealed, all weather roads.	Yes.
	Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8m minimum curb to curb) and shoulders on each side, allowing traffic to pass in opposite directions.	A perimeter road is not proposed. Fire fighting access will be provided via the existing and proposed fire trails within and external to the site. The driveway / ramp has a minimum width of 6.5m.
	Roads are through roads. Dead end roads are not more than 100m in length from a through road, incorporate a minimum 12m outer radius turning circle, and are clearly sign posted as a dead end.	N/A
	Traffic management devices are constructed to facilitate access by emergency services vehicles.	Access is to be designed to allow access for fire fighting vehicles (i.e. 4m height clearance).
	A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	The port cochere is to have a minimum height of 4m
	Curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.	Yes.
	The minimum distance between inner and outer curves is 6m.	Yes.
	Maximum grades do not exceed 15^{o} and average grades are not more than 10^{o}.	Yes.

Performance criteria	Acceptable solutions to RFS	Compliance comments
	Cross fall of the pavement is not more than 10°.	Yes
	Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than storm surge).	Yes
	Roads are clearly sign-posted and bridges clearly indicate load ratings.	Yes
	The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).	Yes

Table 3.3 – Performance criteria for fire trails (*PBP* guidelines pg. 24)

Performance criteria	Acceptable solutions	Compliant or not compliant
The width and design of the fire trails enables safe and ready access for fire fighting vehicles.	A minimum carriageway width of 4m with an additional 1m strip on each side of the trail clear of bushes and long grass. Sealed trails have a maximum grade of 15° and not more than 10° for unsealed roads. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches. The cross fall of the trail is not more than 10°. The trail has the capacity for passing by: • reversing bays using the access to properties to reverse fire tankers, which are 6m wide and 8m deep to any gates, with a minimum turning radius of 6m and outer minimum radius of 12m and / or • a passing bay every 200m, 20m long x 3m wide, making a minimum trafficable width of 7m at the passing bay.	Yes – can be made a condition of consent. Portions of the fire trail over 10 degrees is to be sealed. The port cochere is to have a minimum height of 4m Yes Yes, as per figure 3.2

Performance criteria	Acceptable solutions	Compliant or not compliant
Fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by unauthorised persons.	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 through road system at intervals of at least 200m. Fire trails do not traverse a wetland or other land 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.	Yes – can be made a condition of consent.
Fire trails designed to prevent weed infestation, soil erosion and other land degradation.	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 trial construction does not expose acid-sulphate soils.	Yes – can be made a condition of consent.

3.5 Water supplies

Town reticulated water supply is available to the proposed development in the form of an underground reticulated water system.

Table 3.4 outlines the proposals compliance with the performance criteria for reticulated water supply.

Table 3.4 – Performance criteria for reticulated water supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
Water supplies are easily accessible and located at regular intervals.	Access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads. Fire hydrant spacing, sizing and pressures comply with *AS2419.1*. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority, once development has been completed. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. The provisions of public roads in Section 4.1.3 of *PBP* in relation to parking are met.	Complies - can be made a condition of consent.

3.6 Gas

Table 3.5 outlines the required performance criteria for the proposals gas supply.

Table 3.5 – Performance criteria for gas supplies (*PBP* guidelines pg. 37)

Performance criteria	Acceptable solutions	Complies
Location of gas services will not lead to the ignition of surrounding bushland land or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with *AS1596* and the requirements of relevant authorities. Metal piping is to be used. All fixed gas cylinders are to be kept clear of flammable materials and located on the non hazard side of the development. If gas cylinders are to be kept close to the building the release valves must be directed away from the building and away from any combustible material, so that they do not act as a catalyst to combustion. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.	Complies - can be made a condition of consent.

3.7 Emergency and evacuation planning

Table 3.6 outlines the required performance criteria for the proposal's emergency procedures

Table 3.6 – Performance criteria for emergency and evacuation planning (*PBP* guidelines pg.39)

Performance criteria	Acceptable solutions	Complies
An emergency and evacuation management plan is approved by the relevant fire authority for the area.	An emergency / evacuation plan is prepared consistent with the *RFS* Guidelines for the Preparation of Emergency / Evacuation Plan. *Note: The applicant should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of any accommodation of a SFPP*.	Complies - can be made a condition of consent.
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	An emergency planning committee is established to consult with staff in developing and implementing and emergency procedures manual. Detailed plans of all emergency assembly areas including onsite and offsite arrangements as stated within *AS3745* are clearly displayed, and an annual trail emergency evacuation is conducted.	Complies - can be made a condition of consent.

Conclusion & Recommendations

4

4.1 Conclusion

A revised bushfire protection assessment has been undertaken for the proposed construction of a residential aged care facility at 181 Forest Way, Belrose.

The assessment found that bushfire can potentially affect the proposed development from the remnant forest located to the north, forest to the east and tall heath to the south-east of the development resulting in possible ember attack, radiant heat and potentially flame attack.

The assessment has concluded that the proposed development has the potential to provide compliance with the performance criteria as outlined within *PBP* with the revised proposal addressing the NSW RFS request for further information.

The following recommendations are provided to ensure that the development is in accordance with, or greater than, the requirements of *PBP.*

4.2 Recommendations

Recommendation 1 – The development is as generally indicated on the attached Schedule 1 – Plan of Bushfire Protection Measures.

Recommendation 2 – The entire property is to be managed as an APZ with building setbacks provided as shown in Schedule 1 attached.

Future landscaping is to ensure compliance with Appendix 5 of *PBP*. A summary of the guidelines for managing APZs are attached as Appendix 1 to this report and summarise below:

- *Mowing of grass*: Grass needs to be kept short (approximately 5cm in height) and green where adequate water supplies are available.

- *Raking or manual removal of fine fuels*: Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and bark should be removed on a regular basis. Fine fuels can be removed by hand or with tools such as rakes, hoes and shovels.

- *Removal or pruning of trees, shrubs and understorey*: The control of existing vegetation involves both selective fuel reduction (removal, thinning and pruning) and the retention of vegetation. Prune or remove trees so that you do not have a continuous tree canopy leading from the hazard to the asset. Separate tree crowns by 2-5m. A canopy is not to overhang a dwelling unless specifically approved by the RFS. Native trees and shrubs should be retained as clumps in landscape beds and should not exceed a covering of more than 20% of the IPA.

- Trees or tall shrubs may require pruning upon building completion in line with *PBP*. Notwithstanding this, the presence of shrubs and trees close to a building in a bushfire prone landscape requires specific attention to day to day management and owners and / or occupiers should be made aware that whilst landscaping can contribute to a way of life and environmental amenity, the accumulated fuels must be regularly removed.

- Trees may remain within close proximity of a building where it can be demonstrated that the tree is not able to produce a build-up of fuel on the roof of a dwelling due to:

    1. A roof pitch which self sheds leaf litter
    2. Ongoing roof maintenance by staff or contractors
    3. Adequate ember protection has been installed

- Trees that are likely to be structurally unstable such that they could cause a limb to fall would require removal for the RFS to agree to a dwelling in proximity to the trees.

In addition, the following general APZ planning advice is to be followed:

- Ensure that vegetation does not provide a continuous ignition path to the building.

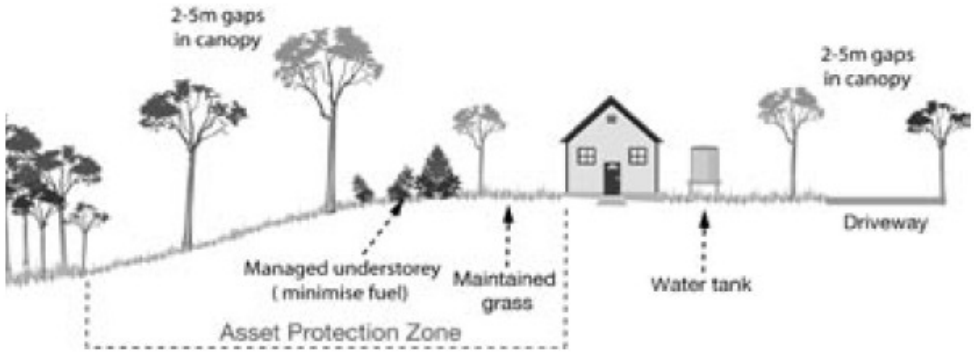
- Plant or clear vegetation into clumps rather than continuous rows.

- Prune low branches 2m from the ground to prevent a ground fire from spreading into trees.

- Locate vegetation far enough away from the proposed building so that plants will not ignite the dwelling by direct flame contact or radiant heat emission.

- Ensure that shrubs and other plants do not directly abut the dwelling. Where this does occur, gardens should contain low-flammability plants and non-flammable ground cover such as pebbles and crushed tiles.

- The following RFS diagram depicts one version of an ideal situation. Divergence from this ideal should not be undertaken without expert advice.



Recommendation 3 – A 2.2m high *Colorbond* fence (radiant heat barrier) is to be constructed along a portion of the northern boundary as shown in Schedule 1 attached.

Recommendation 4 – The proposed building is to comply with BAL 12.5 as outlined *AS3959* with additional construction requirements as listed within Section A3.7 of Addendum Appendix 3 *(PBP).*

Recommendation 5 – Internal public access is to comply with Section 4.2.7 of *PBP*. The Port Cochere is to have a minimum height of 4m.

Recommendation 6 – Fire trail access is to comply with Section 4.1.3 (3) of *PBP*.

Recommendation 7 – Water, electricity and gas supply is to comply with Section 4.2.7 of *PBP*.

Recommendation 8 – An emergency / evacuation plan is to be prepared consistent with the RFS *Guidelines for the Preparation of Emergency / Evacuation Plans.*

Recommendation 9 – The landowner / manager is to be made aware of their liability to manage the development lands for the ongoing protection of themselves and their neighbours (refer Section 63(2) *RF Act*)

Recommendation 10 - Landowners living in bushfire prone areas should familiarise themselves with publications published by the RFS. These are located on the RFS web site www.rfs.nsw.gov.au under 'Publications'.

REFERENCES

Australian Building Codes Board (2010) – *Building Code of Australia*, Class 1 and Class 10 Buildings Housing Provisions Volume 2

Chan, K.W. (2001) – *The suitability of the use of various treated timbers for building constructions in bushfire prone areas*. Warrington Fire Research

Councils of Standards Australia AS3959 (2009) – *Australian Standard Construction of buildings in bushfire-prone areas*

Keith, David (2004) – *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. The Department of Environment and Climate Change

Rural Fire Service (2006) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service

Rural Fire Service (2006) - Bushfire Attack Software on RFS web site

Tan, B., Midgley, S., Douglas, G. and Short (2004) - *A methodology for assessing bushfire attack.* RFS Development Control Service

Plan of Bushfire Protection Measures

S1

Legend

- Lot boundary (source: CAD)
- Contours - 1m (source: LiDAR)
- 2.2m high colorbond fence

Asset Protection Zone (APZ)

- Inner Protection Area
- Outer Protection Area
- Managed land
- Existing private access
- Service road / electrical easement
- Building footprint
- Courtyard
- Terrace
- Proposed fire trail

Aerial source: Nearmap

0 20 40 m

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE	DATE & ISSUE NUMBER	SCALE & COORDINATE SYSTEM
181 Forest Way, Belrose A17171_BF001	29/08/2018 Issue 1	1:2,000 @A3 GDA 1994 MGA Zone 56

TITLE

Schedule 1 - Bushfire Protection Measures

Document Path: N:\GIS STORAGE\N Drive\A16213_ForestWay_Belrose\MXDs\A17171_BF001.mxd

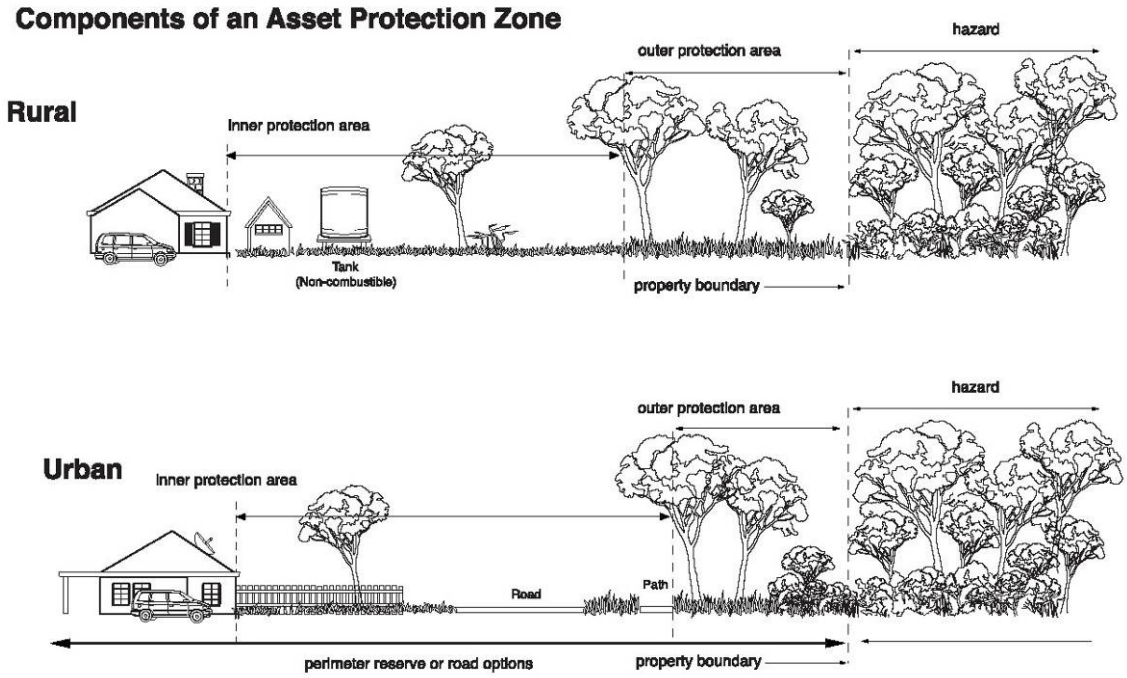
Travers bushfire & ecology
www.traversecology.com.au

Management of Asset Protection Zones

A1

The RFS provides basic advice in respect of managing APZs through documents such as, *Standards for Asset Protection Zones* (RFS, 2005), with landscaping to comply with Appendix 5 of *PBP*.

The APZ generally consists of two subordinate areas, an inner protection area (IPA) and an outer protection area (OPA). The OPA is closest to the bush and the IPA is closest to the dwellings. The property is to be managed to IPA standards only. A typical APZ is graphically represented below:



APZs and progressive reduction in fuel loads (Source: RFS, 2006)

Note: Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought in regard to vegetation removal and retention from a qualified and experienced expert to ensure APZs comply with the RFS performance criteria.

The following provides maintenance advice for vegetation within the IPA and OPA.

Inner protection area (IPA)
Fuel loads within the IPA are to be maintained so it does not exceed 4t/ha.

Trees are to be maintained to ensure;

- Canopy cover does not exceed 15%
- Trees (at maturity) do not touch or overhang the building

- Tree canopies (at maturity) should be well spread out and not form a continuous canopy
- Lower limbs should be removed up to a height of 2m above ground
- Preference should be given to smooth barked and evergreen trees.

Shrubs are to be maintained to ensure;
- Large discontinuities or gaps in vegetation
- Shrubs should not be located under trees
- Shrubs should not form more than 10% of ground cover
- Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of vegetation.

Grass is to be maintained to ensure:
- A height of 10cm or less
- Leaves and debris is removed.

Outer protection area (OPA)

Fuel loads within the OPA are to be maintained so it does not exceed 8t/ha.

Trees are to be maintained to ensure;
- Canopy cover does not exceed 30%
- Trees should have canopy separation

Shrubs are to be maintained to ensure;
- They do not form a continuous canopy
- Shrubs should be no more than 20% of ground cover

Grass is to be maintained to ensure:
- height of 10cm or less
- Leaves and debris is mown, slashed or mulched.

Landscaping to the site is to comply with the principles of Appendix 5 of PBP. In this regard the following landscaping principles are to be incorporated into the development:

- Suitable impervious areas being provided immediately surrounding the building such as courtyards, paths and driveways;
- Restrict planting in the immediate vicinity of the building which may over time and if not properly maintained come in contact with the building;
- When considering landscape species consideration needs to be given to estimated size of the plant at maturity;
- Avoid species with rough fibrous bark, or which retain/shed bark in long strips or retain dead material in their canopies;
- Use smooth bark species of trees species which generally do not carry a fire up the bark into the crown;
- Avoid planting of deciduous species that may increase fuel at surface/ ground level (i.e. leaf litter);
- Avoid climbing species to walls and pergolas;
- Locate combustible materials such as woodchips/mulch, flammable fuel stores away from the building;
- Locate combustible structures such as garden sheds, pergolas and materials such timber garden furniture way from the building; and
- Use of low flammability vegetation species.

Performance Based Assessment

A2

Northern Aspect / radiant heat barrier

NBC Bushfire Attack Assessment Report V2.1

AS3959 (2009) Appendix B - Detailed Method 2

Printed: 8/12/2016 **Assessment Date:** 24/11/2016

Site Street Address: 181 Forest Way, Belrose

Assessor: Mr Admin; admin

Local Government Area: Warringah **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
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: A North BASE

Vegetation Information

Vegetation Type:	Rainforest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	8	**Overall Fuel Load(t/ha):**	10

Site Information

Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	24

Fire Inputs

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

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100

Program Outputs

Category of Attack:	MODERATE	**Peak Elevation of Receiver(m):**	3.66
Level of Construction:	BAL 19	**Fire Intensity(kW/m):**	4960
Radiant Heat(kW/m2):	13.87	**Flame Angle (degrees):**	80
Flame Length(m):	7.44	**Maximum View Factor:**	0.15
Rate Of Spread (km/h):	0.96	**Inner Protection Area(m):**	24
Transmissivity:	0.83	**Outer Protection Area(m):**	0

Run Description:	B North SHEILD		
Vegetation Information			
Vegetation Type:	Rainforest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	2.5	**Overall Fuel Load(t/ha):**	2.1
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	24
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	1.1
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	326
Radiant Heat(kW/m2):	4.08	**Flame Angle (degrees):**	90
Flame Length(m):	2.2	**Maximum View Factor:**	0.044
Rate Of Spread (km/h):	0.3	**Inner Protection Area(m):**	24
Transmissivity:	0.828	**Outer Protection Area(m):**	0
Run Description:	C North FINAL		
Vegetation Information			
Vegetation Type:	Rainforest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	0 Degrees	**Vegetation Slope Type:**	Level
Surface Fuel Load(t/ha):	8	**Overall Fuel Load(t/ha):**	10
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	24
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	3.72
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	4960
Radiant Heat(kW/m2):	9.81	**Flame Angle (degrees):**	90
Flame Length(m):	7.44	**Maximum View Factor:**	0.106
Rate Of Spread (km/h):	0.96	**Inner Protection Area(m):**	24
Transmissivity:	0.828	**Outer Protection Area(m):**	0

North-eastern aspect / reduced flame width

Run Description:	D North-east		
Vegetation Information			
Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	15 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	20	**Overall Fuel Load(t/ha):**	25
Site Information			
Site Slope	0 Degrees	**Site Slope Type:**	Level
Elevation of Receiver(m)	Default	**APZ/Separation(m):**	72
Fire Inputs			
Veg./Flame Width(m):	24	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	100
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	19.45
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	87268
Radiant Heat(kW/m2):	6.68	**Flame Angle (degrees):**	56
Flame Length(m):	46.92	**Maximum View Factor:**	0.078
Rate Of Spread (km/h):	6.76	**Inner Protection Area(m):**	72
Transmissivity:	0.767	**Outer Protection Area(m):**	0

Referral Responses

A3

northern beaches council

28 September 2017

Chriroseph Pty Ltd
94 Chandos Street
ST LEONARDS NSW 2065

Dear Sir/Madam,

Development Application No: DA2017/0697 for Demolition of existing structures and Construction of a new aged care facility including underground parking at 181 Forest Way BELROSE.

I refer to your application that was received by Council on 17/07/2017. An assessment of your application has identified a number of areas of non-compliance and insufficient information that will not allow Council to support this application in its current form.

The following is a list highlighting areas of non-compliance and insufficient information in your application:

General Terms of Approval – NSW Rural Fire Service (RFS)

The issuing of a consent for the proposed development is dependant upon the granting 'General Terms of Approval' by the RFS in accordance with s91 of the Environmental Planning and Assessment Act 1979.

The proposal has been reviewed by the RFS who refuse to grant approval to the proposed development in its current form.

Attached to this correspondence are specific comments made by the RFS.

This is a fundamental issue with the application and will not allow Council to recommend approval of the application nor will it allow the Sydney North Planning Panel, as the consent authority, to grant consent to the application.

Vehicle Access

The application requires concurrence to be issued by the RMS in accordance with s138 of the Roads Act 1993.

The proposal has been reviewed by the RMS who does not grant concurrence to the proposed development in its current form.

Attached to this correspondence are specific comments made by the RMS.

This is a fundamental issue with the application and will not allow Council to recommend approval of the application nor will it allow the Sydney North Planning Panel, as the consent authority, to grant consent to the application.

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f 02 9971 4522

Mona Vale Office:
1 Park Street
Mona Vale NSW 2103
DX 9018 Mona Vale
f 02 9970 1200

Manly Office:
1 Belgrave Street
Manly NSW 2095
f 02 9976 1400

Environmental Concerns

Attached to this correspondence are specific comments made by Council's Natural Environment Unit (Biodiversity).

In summary, insufficient information has been provided to allow a full and proper assessment of the proposed environmental impacts.

The proposal in its current form does not satisfy the objectives of Clause 58 Protection of existing flora under Warringah Local Environmental Plan 2000 (WLEP 2000).

The application cannot be supported in its current form.

Stormwater

Attached to this correspondence are specific comments made by Council's Development Engineers.

In summary, insufficient information has been provided to allow a full and proper assessment of the proposed stormwater management.

The proposal in its current form does not satisfy the objectives of Clause 76 Management of Stormwater under WLEP 2000.

The application cannot be supported in its current form.

Amenity/Side Boundary Setback

The proposal includes a cafe located in the south western corner of the building. The cafe provides outdoor seating which extends towards the southern boundary of the site and within the side boundary setback area.

The side boundary setback area is to be landscaped and free of any structures or site facilities. The proposed outdoor seating area is located within close proximity to the adjoining residential property to the south. This outdoor seating area has the potential to cause unreasonable visual and acoustic impacts on the adjoining property.

Given the size of the allotment and overall building there are opportunities for alternative design options that would accommodate the outdoor seating needs of the cafe without the potential for unreasonable amenity impacts to occur.

The location of site facilities such as outdoor seating for the cafe is not supported within the side boundary setback area. The side boundary setback area along the southern boundary must provide a landscape buffer to adjoining development and be a minimum of 10 metres in width as required under WLEP 2000.

Bushfire Protection

The application is supported by a Bushfire Report (refer to 'Bushfire Protection Assessment' prepared by Travers Bushfire & Ecology dated July 2017).

The report provides recommendations to ensure that the development is in accordance with, or greater than, the requirements of PBP.

The following recommendations have been made where insufficient information has been provided to demonstrate the development is capable of achieving compliance or to undertake an assessment of the impact of such recommendations:

> *'**Recommendation 3** – A 2.2 m high colourbond fence (radiant heat barrier) is to be constructed along a portion of the northern boundary as shown in Schedule 1 attached.'*

No details of the fence have been provided on the architectural plans submitted with the applications. The fence must be included on these plans to enable a full and proper assessment of the proposal.

> ***Recommendation 5** – Access, water, electricity and gas supply is to comply with Section 4.2.7 of PBP.*
>
> *A 4m wide fire trail is recommended extending from the entry driveway parallel to the southern boundary to the rear of the allotment. A second fire trail (4m wide) is also recommended extending from the existing easement in the north towards the north-eastern aspect of the building. A turning head for each fire trail is required to support a three point turn of a Category 1 tanker (7.8m long and 2.4m wide). A locked gate (compatible with RFS key) is to be provided to prevent public access to each of these fire trails.*
>
> *The Port Cochere is to have a minimum height of 4m.*

The Site Plan submitted with the application includes details of the proposed fire trails, however the recommended fire trail parallel to the southern boundary of the site does not extend to the rear of the site and conflicts with structures proposed along this elevation (outdoor seating, stair case, retaining walls etc.).

Therefore insufficient information has been submitted with the application to demonstrate compliance with the recommendations of the Bushfire Protection Assessment.

Warringah Local Environmental Plan 2000

B2 Oxford Falls Valley

The subject site is located within the B2 Oxford Falls Valley locality as identified under WLEP 2000. The proposed development is classified as 'Category 2' development.

In accordance with Clause 12 (3) (b), the consent authority must be satisfied that the development is consistent with the desired future character described in the relevant Locality Statement.

The Desired Future Character Statement (DFC) for the locality reads as follows:

> *'The present character of the Oxford Falls Valley locality will remain unchanged except in circumstances specifically addressed as follows.*
>
> *Future development will be limited to new detached style housing conforming with the housing density standards set out below and low intensity, low impact uses. There will be no new development on ridgetops or in places that will disrupt the skyline when viewed from Narrabeen Lagoon and the Wakehurst Parkway.*

The natural landscape including landforms and vegetation will be protected and, where possible, enhanced. Buildings will be located and grouped in areas that will minimise disturbance of vegetation and landforms whether as a result of the buildings themselves or the associated works including access roads and services. Buildings which are designed to blend with the colours and textures of the natural landscape will be strongly encouraged.

A dense bushland buffer will be retained or established along Forest Way and Wakehurst Parkway. Fencing is not to detract from the landscaped vista of the streetscape.

Development in the locality will not create siltation or pollution of Narrabeen Lagoon and its catchment and will ensure that ecological values of natural watercourses are maintained.'

The proposal in its current form is not considered to be consistent with the DFC statement. Fundamental issues are raised with the proposed bulk, scale and massing of the building, access arrangements and potential impact on the natural environment.

The proposed building bulk, scale and massing is not reflective of detached style housing as required by the DFC

For these reasons the proposal, in its current form, is inconsistent with the DFC Statement and cannot be considered as low intensity or low impact.

This is a fundamental issue with your application and will not allow Council to support the application in its current form.

Building Height

The building height control for the B2 Oxford Falls Valley locality reads as follows:

'Buildings are not to exceed 8.5 metres in height, where height is the distance measured vertically between the topmost point of the building (not being a vent or chimney or the like) and the natural ground level below.'

The proposal does not comply with the 8.5m maximum building height, proposing an overall building height of 6.02m to 10m.

Clause 20 of WLEP 2000 provides the mechanism for consent to be granted to proposed development even if the development does not comply with one or more development standards, provided the resulting development is consistent with the general principles of development control, the Desired Future Character of the locality and any relevant State Environmental Planning Policy.

As detailed earlier within this letter the proposed building height contributes to the proposal's inconsistency with the general principles of development control and inconsistency with the Desired Future Character of the locality and is therefore not supported.

Clause 66 Building Bulk

The objectives of Clause 66 are as follows:

'Buildings are to have a visual bulk and an architectural scale consistent with structures on adjoining or nearby land and are not to visually dominate the street or surrounding spaces, unless the applicable Locality Statement provides otherwise.

In particular:

• side and rear setbacks are to be progressively increased as wall height increases,

• large areas of continuous wall planes are to be avoided by varying building setbacks and using appropriate techniques to provide visual relief, and

• appropriate landscape plantings are to be provided to reduce the visual bulk of new buildings and works.'

As discussed in detail earlier within this letter, the proposal in its current form results in a building that will be visually dominant by way of its bulk and scale when viewed from adjoining or nearby land, Forest Way and surrounding spaces.

The proposal includes areas of long, continuous wall planes that provide little to no visual relief, particularly along the southern elevation of the building.

The proposed building bulk is considered to be excessive and cannot be supported in its current form.

Pre Lodgement Meeting (PLM2016/0097)

Your attention is drawn to the advice given at the time of the pre lodgement meeting held on 12 July 2016 to discuss the proposal.

The concluding comments contained within the notes of the meeting provided the following advice:

'The development, in its current form, does not satisfy the requirement of the DFC that the built form reflects the surrounding "detached style housing" and be of a "low impact and low intensity use". Therefore, the proposal is not considered to pass the test of consistency.

As outlined in the meeting, it is recommended that the design be amended to provide for greater levels of articulation of the built form to be consistent with a detached style character.'

As detailed throughout this letter, the current proposal has not satisfactorily addressed the issues raised at the pre lodgment and further consideration must be given to these fundamental issues before Council is able to support the proposal.

Options available to you

Owing to the fundamental nature of the issues and insufficient information with your application, you are strongly encouraged to withdraw this application and resubmit an application that addresses all of the issues listed above. Council **will not** accept any additional information or amendments to this current application.

If you choose to withdraw this application within seven days of the date of this letter, Council may refund a portion of the development application fees.

Council must receive confirmation of your withdrawal in writing. To speed up the processing of your refund, please supply bank details using the table provided below. Otherwise your refund will be forwarded by way of cheque.

Please note that bank details supplied should match the name listed on the top line of your application tax invoice receipt. If bank details supplied do not match this name, then your refund will be forwarded by way of cheque. Council cannot be held responsible if the bank account details provided by you are incorrect.

Bank	
Account Name	
BSB	
Account Number	

If you have not contacted Council by 6 October 2017, Council will assume that you are not withdrawing this application. No fees will be refunded and we will assess this application in its current form.

If you wish to discuss any issues raised in this letter, please contact Luke Perry on 9942 2111 between 8.30am to 5.00pm Monday to Friday.

Yours faithfully

per

Rod Piggott
Manager Development Assessments

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Telephone: 1300 NSW RFS
e-mail: pes@rfs.nsw.gov.au

Headquarters
Locked Bag 17
Granville NSW 2142

Facsimile: 8741 5433

The General Manager
Warringah Council
Civic Centre, 725 Pittwater Road
DEE WHY NSW 2099

Your Ref: DA2017/0697
Our Ref: D17/2523
DA17080908644 GB

ATTENTION: Luke Perry

29 August 2017

Dear Sir / Madam

Integrated Development for 181 Forest Way Belrose

I refer to your letter dated 27 July 2017 seeking general terms of approval for the above Integrated Development in accordance with Section 91 of the 'Environmental Planning and Assessment Act 1979'.

The service is not in a position to properly assess the application as submitted by Warringah Council on the basis of the information provided. The following will need to be provided for further assessment:

1. Written confirmation from the adjoining land owner/s to the south of the subject site, that they consent to the on going management of their property as an asset protection zone in perpetuity.

   In this regard an easement will be required over adjoining property to ensure that the recently cleared vegetation is not re-established and threaten the aged care facility.

2. Details demonstrating that there is sufficient site access to the eastern elevation of the building to enable fire fighting activities and property defence.

3. Details demonstrating that the proposed access along the road reserve to the site entrance, meets the standard of a fire trail as per 'Planning for Bush Fire Protection 2006'.

From receipt of the required information the Service will respond with its recommendations within 21 days.

If additional information is not received within 100 days the application will be refused on the basis of Requested Information not provided. A formal request for re-assessment would be required after this time.

For any queries regarding this correspondence please contact Garth Bladwell on 1300 NSW RFS.

Yours sincerely

Nika Fomin
Manager, Planning and Environment Services (East)

The RFS has made getting information easier. For general information on 'Planning for Bush Fire Protection, 2006' , visit the RFS web page at www.rfs.nsw.gov.au and search under 'Planning for Bush Fire Protection, 2006'.