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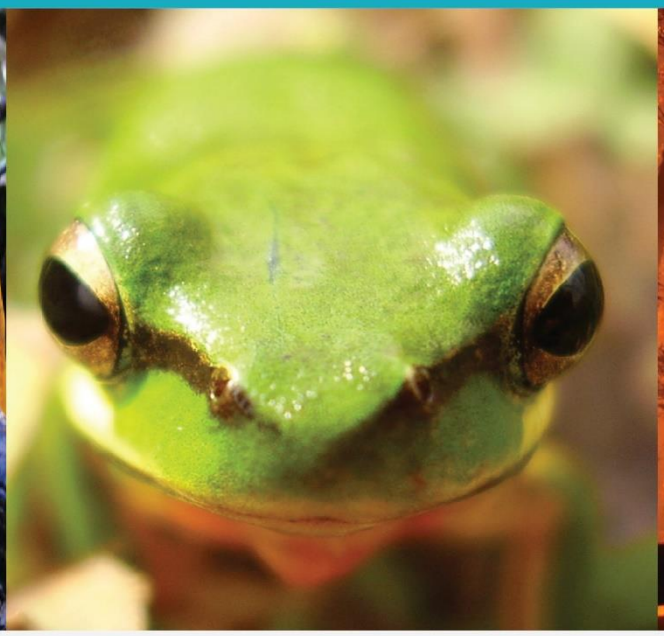


BUSHFIRE PROTECTION ASSESSMENT

Proposed Greenwich Hospital Redevelopment

Lot 3, DP 584287

97-115 River Road

Greenwich

Under Section 100B of the Rural Fires Act (1997)

6 April 2022

(REF: 18TSA08INT)

BUSHFIRE PROTECTION ASSESSMENT

Proposed Special Fire Protection Purpose redevelopment of Greenwich Hospital

Lot 3, DP 584287 97-115 River Road, Greenwich

Report Authors:	Tony Hawkins, M. Bushfire prot.BPAD-L3 48592
Plans prepared:	Sandy Cardow B. Sc.
Checked by:	Michael Sheather Reid
Date:	6/04/22
File:	18TSA08INT

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Disclaimer:

This report has been prepared to provide advice to the client on matters pertaining to the particular and specific development proposal as advised by the client and / or their authorised representatives. This report can be used by the client only for its intended purpose and for that purpose only. Should any other use of the advice be made by any person, including the client, then this firm advises that the advice should not be relied upon. The report and its attachments should be read as a whole and no individual part of the report or its attachments should be relied upon as meaning it reflects any advice by this firm. The report does not suggest or guarantee that a bush or grass fire will not occur and or impact the development. This report advises on policies and specifications published by the NSW Rural Fire Service e.g. Planning for Bush Fire Protection 2019.

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.

EXECUTIVE SUMMARY

This bushfire protection assessment has been undertaken to support a State Significant Development (SSD) application and to address SEARS's requirements for the proposed Redevelopment of Greenwich Hospital at 97-115 River Road, Greenwich.

The proposed development is identified by the NSW Rural Fire Service (NSW RFS) as being a special fire protection purpose (SFPP) development and, as a result, this classification requires the NSW RFS to issue a bushfire safety authority (BSA) in accordance with Section 100b of the *Rural Fires Act 1997 (RF Act).*

This proposal has been assessed in accordance with *Planning for Bush Fire Protection 2019 (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 10kW/m^2. This rating assists in determining the size of the asset protection zone (APZ) to provide the necessary defendable space between hazardous vegetation and a building.

This assessment has found that bushfire can potentially affect the proposed development from the bushland vegetation surrounding the development, resulting in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the minimum setbacks calculated by the use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks for the south western aspect of the development..
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019;*
- Future construction in compliance with the appropriate construction sections of *AS3959-2018*, and *PBP 2019*.
- Emergency management and evacuation in compliance with *PBP* and NSW RFS guidelines for the *Preparation of an Emergency / Evacuation Plan*.

GLOSSARY OF TERMS

AHIMS	Aboriginal Heritage Information System
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 2018*
BAL	*bushfire attack level*
BCA	*Building Code of Australia*
BSA	bushfire safety authority
DA	development application
DLUP	Development Land Use Plan
EEC	Endangered ecological community
EP&A Act	*Environmental Planning & Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
FFDI	forest fire danger index
IPA	inner protection area
LEP	Local Environmental Plan
LGA	local government area
m	metres
NCC	*National Construction Code*
OPA	outer protection area
PBP 2019	*Planning for Bush Fire Protection 2019*
RF Act	*Rural Fires Act 1997*
RFS	NSW Rural Fire Service
SFR	short fire run
SFPP	special fire protection purpose
TBE	*Travers bushfire & ecology*

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1. INTRODUCTION

This Bushfire Protection Assessment is submitted to the Department of Planning, Industry and Environment (DPIE) in support of a State Significant Development Application (SSD-13619238) for the redevelopment of Greenwich Hospital into an integrated hospital and seniors living facility on land identified as 97-115 River Road, Greenwich (the site). The extent of the site is shown below.

The proposal is considered Special Fire Protection Purpose (SFPP) development and is located on land identified as bushfire prone on the Lane Cove bushfire prone land map (refer Figure 2- 1). This triggers a formal assessment by Council in respect of the NSW Rural Fire Service (RFS) policy against the provisions of *Planning for Bush Fire Protection (PBP).*

Figure 2- 1 – Bushfire Prone Land Map

(Source: Planning Portal, 2022)

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 asset protection zones (APZs), construction standards and other specific fire management issues
- review the potential to carry out hazard management over the landscape.

1.2 Proposed development

The subject proposal is for the detailed design and construction of the facility following its concept approval under SSD-8699. Specifically, SSD-13619238 seeks approval for the following:

- Demolition of the existing hospital building and associated facilities at the site;
- Construction of a new hospital facility and integrated healthcare uses and services, including:
  - A new 7 storey main hospital building;
  - Two new 5-6 storey serviced self-care housing buildings (serviced seniors living);
  - A new 2-3 storey respite care building;
- Construction of associated site facilities and services, including pedestrian and vehicular access and basement parking;
- Site landscaping and infrastructure works; and
- Preservation of Pallister House which will continue to host dementia care and administrative functions.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-13619238 were issued on 24 February, 2021. This report has been prepared to respond to the following SEARs:

SEAR	Relevant section of report
21. Bush fire Provide a bush fire assessment that details proposed bush fire protection measures and demonstrates compliance with Planning for Bush Fire Protection (NSW RFS, 2019).	4.1 Conclusion

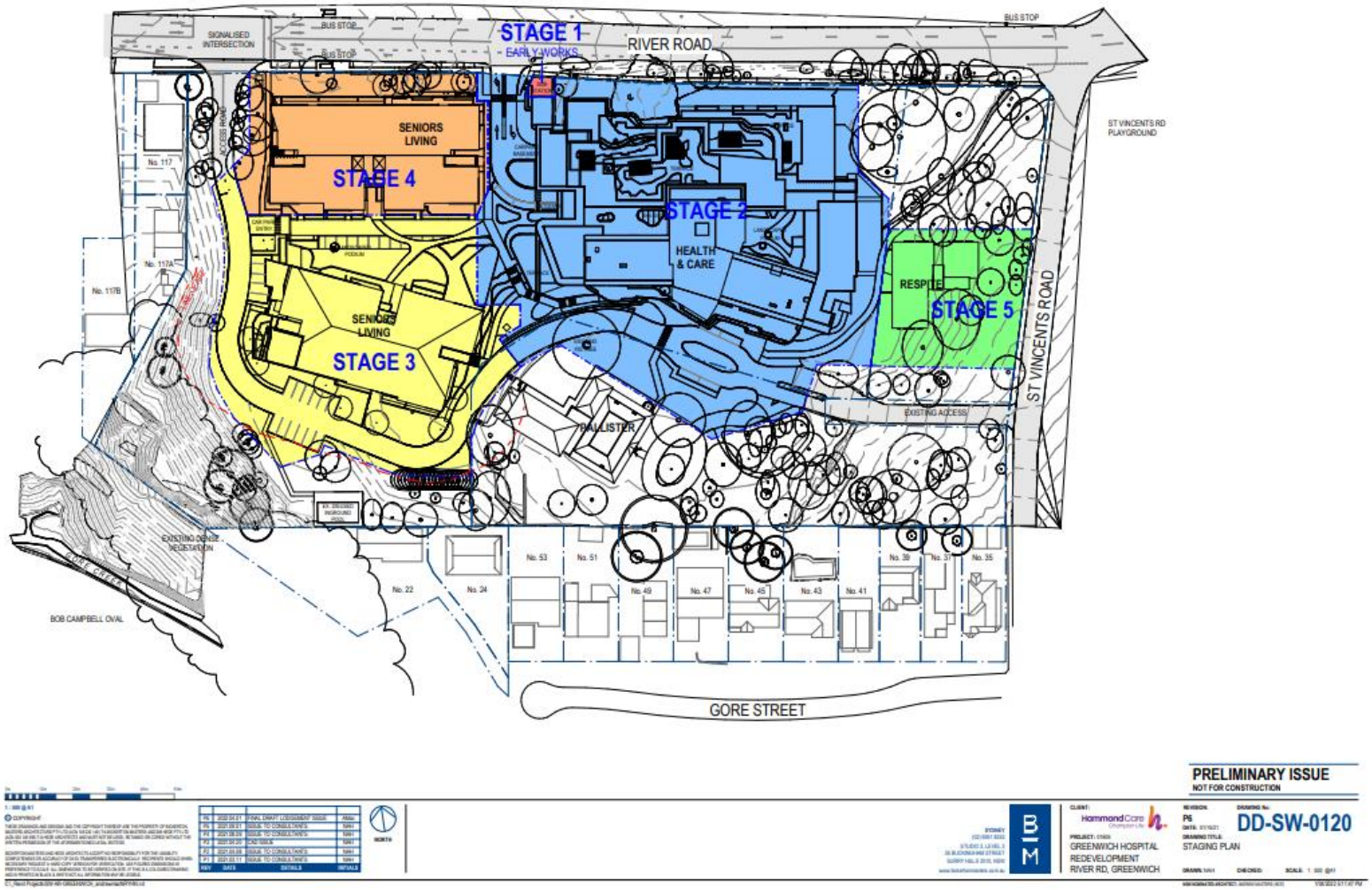

Figure 2- 2 – Staging Plan

(source: Bickerton Masters. Dwg. ref – DD-SW-0120- dated 15/1/2021)

1.3 Information collation

Information sources reviewed for the preparation of this report include the following:

- Site plan, sections etc. prepared by Sandy Cardow B. Sc.
- Client supplied plans
- *NearMap* aerial photography
- Topographical maps DLPI of NSW 1:25,000
- *Australian Standard 3959 Construction of buildings in bushfire-prone areas (2018)*
- *Planning for Bush Fire Protection 2019 (PBP)*

An inspection of the proposed development site and surrounds was undertaken 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.

1.3.1 Pre DA advice

A previous consultant working on this project, Wayne Tucker, of Building Code and Bushfire Hazard Solutions attended a pre DA advice meeting (Ref DOC 17/120690, attached in Appendix 3) regarding this project on 26/10/2017 with representatives of the NSW RFS.

At the meeting, the following assessment methodology was agreed upon by all stakeholders;

- Assessment of the Hazard to the south of the site as rainforest in consideration of the vegetation formations present (based on ecological studies) and narrow vegetation paths available.
- Effective slope to be taken across the hazard (i.e. from the north west due to the short/lack of fire run available directly from the site from the south west resulting from the substantial rock cliff at the southern end of the run and substantial rock walls throughout the corridor limiting ground and mid-storey vegetation.
- APZs to be provided to achieve 10kW/m^2 on the basis of the above.
- Through access to be provided with a perimeter road around the facility.
- New buildings to be constructed to BAL -12.5 standards. No works proposed to Pallister house as this has heritage significance and is only used for administrative purposes.

The above agreed methodology has been accepted for this report.

1.4 Site description

The site is located within 97-115 River road Greenwich, and includes Lot 3, DP 584287.

The development site is located within the Local Government Area (LGA) of Lane Cove Council and to the south of River road Greenwich, the west of St Vincent's road Greenwich and the north of Gore creek reserve. (Refer Figure 2- 3).

The entire site is zoned SP2 Health Services Facilities.

The site slopes down from the north, with a steep cliff type topographic arrangement near the south western boundary (shown as “edge of escarpment” in the schedule 1 map)

Vegetation consists mainly of managed lands across the site, with a small area of bushland in the south west. This area has an abundance of introduced vegetation including many weed species. A portion of this area has been the subject of rehabilitation and slope stabilisation. This work is ongoing.

Vegetation further to the south west, off site, is in relatively good condition and representative of the mapped vegetation type and corresponding fuel loads. This area of vegetation is separated from the weed infested area by the above mentioned cliff drop-off.

Figure 2- 3 – Aerial appraisal

(Source: Planning Portal, 2022)

1.5 Legislation and planning instruments

Is the site mapped as bushfire prone?	Yes
Proposed development type	Special Fire protection Purpose
Is the development considered integrated for the purposes of Section 100B of the *Rural Fires Act 1997?*	Yes
Is the proposal located in an Urban Release Area as defined under Clause 273 of the EP&A Regulations?	No
Zoning	SP2 Health Services Facilities
Significant environmental features	No
Details of any Aboriginal heritage	AHIMS search revealed no recorded Aboriginal Sites. Report attached in Appendix 2
Does the proposal rely on an alternative solution?	Yes

2. BUSHFIRE THREAT ASSESSMENT

To assess the bushfire threat and to determine the required width of an APZ for a development, an assessment of the potential hazardous vegetation and the effective slope within the vegetation is required. 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) if using the simplified acceptable solutions in PBP 2019, or alternatively the vegetation class if adopting the comprehensive vegetation fuel loads (as allowable when undertaking an assessment under Method 2 of AS3959). The hazardous vegetation is calculated for a distance of at least 140m from a proposed building envelope.

The vegetation posing a bushfire threat to the proposed development includes:

Table 2-1 - Vegetation

Vegetation community	***Vegetation formation***	***Vegetation classification***	***Comprehensive fuel loads (t/ha)***	***Acceptable solution fuel loads (t/ha)* (PBP 2019)**
PCT 1841 Coastal enriched sandstone moist forest (managed/planted)	Dry Sclerophyll Forest (shrubby)	Sydney Coastal Dry Sclerophyll Forest	21.3/27.3	22/36.1
From the Pre DA advice provided by the NSW RFS (Dated 10 November 2017, Attached in Appendix 3), the vegetation classification is agreed as **Rainforest** due to the formations present and narrow vegetation paths available. The corresponding fuel loads, adopted for this report, are 10/13.2 t/Ha.				

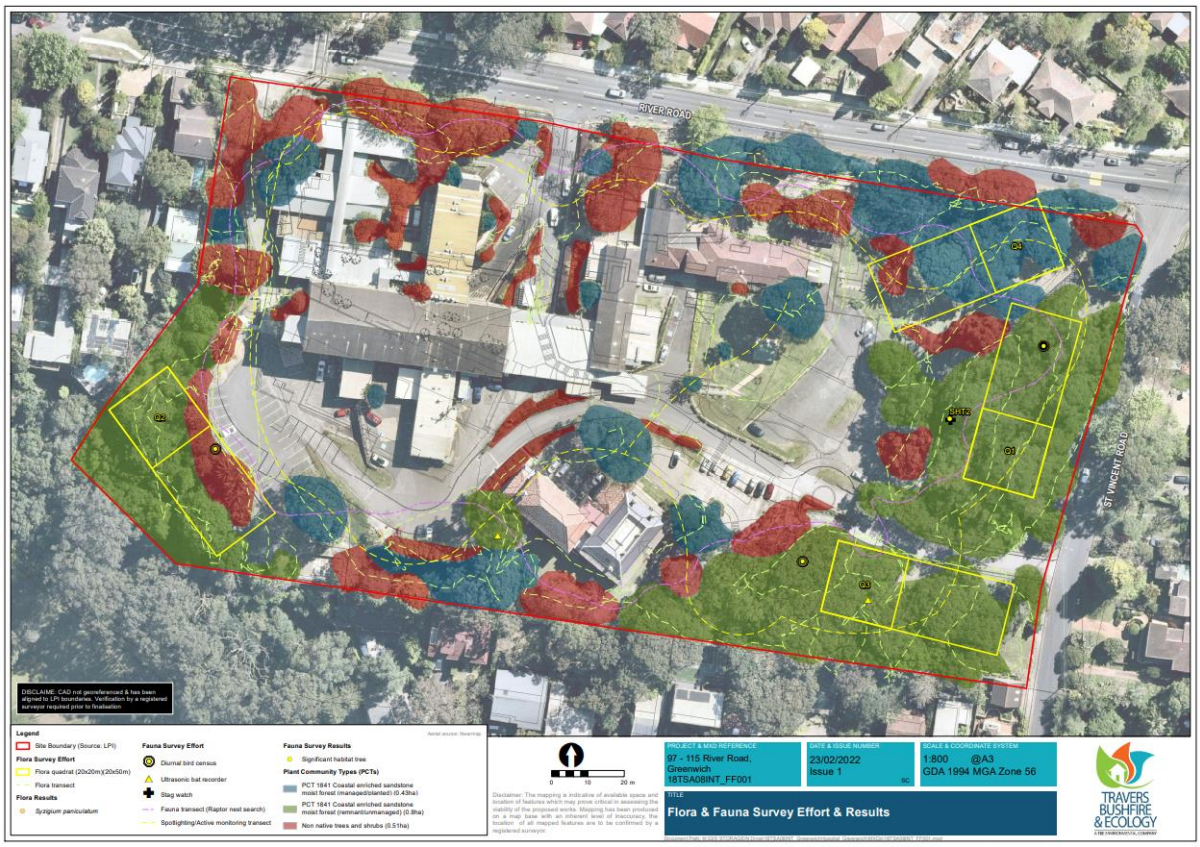

Figure 2- 4 – Vegetation communities

(Source: TBE 2022)

2.2 Effective slope

The effective slope (post earthworks) has been assessed for up to 100m from the development site. 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 vegetation is described in detail within Table 2-2 below.

It should be noted that the slope in this situation is atypical, consisting of a slope divided by a cliff type area of rock face dividing the vegetation area into upper and lower sections. The effective slope for the upper section, north east of the cliff area, provides the greater fire threat potential.

It should be noted that the agreed methodology (Pre DA Advice) of assessing the fire threat in this area is to consider a fire across the hazard slope as the higher potential bushfire threat.

2.3 Bushfire attack assessment

The following assessment has determined the APZ and BAL levels via the following approaches;

- Table A1.12.1 of *PBP 2019*;

- Appendix B Method 2 (alternative solution) of *AS3959 Construction of buildings in bushfire prone areas* (2018); and
- Short fire run methodology as detailed in the NSW RFS document entitled *Short Fire Run Methodology for Assessing Bush Fire Risk for Low Risk Vegetation*.

Table 2-2 provides a summary of the bushfire attack assessment based on SFPP development and the methodologies identified above.

Table 2-2 – Bushfire attack assessment

Aspect	*Vegetation formation within 140m of development*	*Effective slope of land*	*Assessment method used*	*APZ provided (metres)*	*Building construction standards Deemed to satisfy (Table A1.12.5 PBP)*
North-	Managed land	N/A	N/A	N/A	N/A
East	Managed land	N/A	N/A	N/A	N/A
West	Managed land	N/A	N/A	N/A	N/A
South-west	Rainforest (see note Table 2.1)	1: 14.57° upslope across slope (head fire) 2: 32° upslope from flank fire[1]	Performance solution	23	BAL 12.5 (SFPP)
South-east	Managed land	N/A	N/A	N/A	N/A

Note 1: it is recognised that a flank fire may potentially affect the development ((shown as a Short fire run (SFR) in the schedule 1 map)). No accepted methodology exists to assess the impact of such a fire. The results of modelling of the head fire is considered suitable for assessing the impact of the flank fire in this scenario as the intensity of a flank fire is assumed to be lower. The Flamesol modelling results provide a compliant solution.

Note 2 – The modelling predicts a flame length of 22.75m, which is less than the recommended APZ width.

Note 3 – The assessed fire run emanates from a riparian area to the west. This area consists largely of rock formations and a dip in the topographic level. This assessment is based on an assumption that a fire from the North West would be impeded by the riparian area topography and reduced amount of vegetation and form a short fire run to the east.

The flame width has been calculated using the methodology of the NSW RFS guideline; *Methodology for assessing bush fire risk for low risk vegetation*.

The modelled results (Flamesol) are shown in Figure 2-5.

Calculated February 1, 2022, 9:44 am (BALc v.4.9)

Greenwich SW to NE

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	3.27 km/h
Vegetation classification	Rainforest	Flame length	22.75 m
Understorey fuel load	10 t/ha	Flame angle	40 °
Total fuel load	12 t/ha	Panel height	14.62 m
Vegetation height	n/a	Elevation of receiver	7.31 m
Effective slope	14.57 °	Fire intensity	20,332 kW/m
Site slope	0 °	Transmissivity	0.856
Distance to vegetation	23 m	Viewfactor	0.1027
Flame width	5.36 m	Radiant heat flux	9.82 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,200 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 2- 5 - Flamesol modelling results

3. SPECIFIC PROTECTION ISSUES

3.1 Asset protection zones (APZs)

Table 3.1 outlines the proposal's compliance with the performance criteria for APZs.

Table 3-1 – Performance criteria for asset protection zones (PBP 2019 guidelines pg. 43)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Radiant heat levels of greater than 10kW/m² (calculated at 1200K) will not be experienced on any part of the building	The building is provided with an APZ in accordance with Table A1.12.1	☐	☑	23m APZ consisting of existing car park, managed land and a small are of vegetation currently heavily weed infested. The weed area is to be rehabilitated and managed as an Outer Protection Area (OPA).
APZ maintenance is practical, soil stability is not compromised and potential for crown fires is minimised	The APZ is not located on lands with a slope exceeding 18°	☐	☑	Slope of APZ in current vegetated area exceeds 18°. Works have been completed and are ongoing to stabilise and rehabilitate this area. Works should continue with consideration of erosion and land slip risk.
APZs are managed and maintained to prevent the spread of a fire towards the building	The APZ is managed in accordance with the requirements of Appendix 4 of this document, and is wholly within the boundaries of the development site	☑	☐	
	Other structures located within the APZ need to be located further than 6m from the refuge building	N/A	N/A	N/A
Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Landscaping is in accordance with Appendix 4	☑	☐	
Note 1: Section 7.6 of PBP states that all fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.				

3.2 Building protection

Building construction standards (bushfire attack level (BAL) 12.5) for the proposed future buildings located within 100m of forest / woodland vegetation or within 50m of grassland are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)* or NASH Standard and Section 7.5 of *Planning for Bush Fire Protection 2019*.

Building construction standards have been outlined within Table 2.2 and are depicted in Schedule 1 attached.

3.3 Hazard management

APZs are required to be managed in accordance with RFS guidelines *Standards for Asset Protection Zones* (RFS, 2005), with landscaping design to comply with Appendix 4 of *PBP*.

It is recommended that the entire site, with the exception of the currently vegetated area to the south west of the site (OPA) be managed as an Inner Protection Area (IPA).

A summary of the guidelines for managing APZs (including landscaping guidelines) is attached as Appendix 2 to this report.

3.4 Access for firefighting operations

Access to the development will be via multiple access points on River Road and St. Vincent's road.

The main access point is located over 100m from any bushfire prone vegetation and provides safe egress options to the north and then east or west along River Road.

An existing perimeter roadway between the hazard vegetation and proposed buildings will be retained and upgraded where necessary.

The existing road varies in width from 6.5 to 8 metres and has several constrictions of short length which vary from 5.6m to 6m. The constrictions are offset by car park areas where the access is considerably wider and where different pathway options are available.

Table 3-2 – Performance criteria for access within Residential Subdivisions (PBP Guidelines)

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
ACCESS	Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.	SFPP access roads are two-wheel drive, all-weather roads.	☑	☐	Complies, will be a condition of consent.
		Access is provided to all structures	☑	☐	Complies.
		Traffic management devices are constructed to not prohibit access by emergency services vehicles.	☑	☐	Complies, will be a condition of consent.
		Access roads must provide suitable turning areas in accordance with Appendix 3.	☑	☐	All access roads are through roads.
		One-way only public access roads are no less than 3.5mm wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.	☑	☐	Complies, will be a condition of consent.
ACCESS	The capacity of access roads is adequate for firefighting vehicles.	The capacity of road surfaces and any bridges / causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.	☑	☐	Complies, will be a condition of consent.
	There is appropriate access to water supply.	Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression.	☑	☐	Complies, will be a condition of consent.
		Hydrants are provided in accordance with *AS 2419.1:2005.*	☑	☐	
		There is suitable access for a Category 1 fire	☑	☐	N/A

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		appliance to within 4m of the static water supply where no reticulated supply is available.			
PERIMETER ROADS	Perimeter roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	There are two-way sealed roads.	☑	☐	Complies, will be a condition of consent
		Parking is provided outside of the carriageway width.			
		Hydrants are located clear of parking areas.			
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.			
		Curves of roads have a minimum inner radius of 6m.			
		The maximum grade road is 15° and average grade is 10°.			
		The road crossfall does not exceed 3°.			
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.			
NON-PERIMETER ROADS	Non-perimeter access roads are designed to allow safe access and egress for firefighting vehicles while occupants are evacuating	Minimum 5.5m width kerb to kerb.	☑	☐	Complies, will be a condition of consent.
		Parking is provided outside of the carriageway width.	☑	☐	Complies, will be a condition of consent.
		Hydrants are located clear of parking areas.	☑	☐	Complies, will be a condition of consent.
		There are through roads, and these are linked to the internal road system at an interval of no greater than 500m.	☑	☐	There are no dead-end roads proposed.
		Curves of roads have a	☑	☐	Complies, will be

Performance criteria		Acceptable solution	Acceptable solution	Performance solution	Comment
		minimum inner radius of 6m.			a condition of consent.
		The maximum grade road is 15° and average grade is 10°.	☑	☐	Complies.
		The road crossfall does not exceed 3°.	☑	☐	Complies.
		A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	☑	☐	Complies, will be a condition of consent.

3.5 Water supplies

The intent of measures is to provide adequate services of water for the protection of buildings during and after the passage of bushfire. Table 3-3 outlines the proposal's compliance with the acceptable solutions for reticulated water supply.

Table 3-3 – Performance criteria for reticulated water supplies (PBP guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Adequate water supplies is provided for firefighting purposes.	Reticulated water is to be provided to the development, where available.	☑	☐	Complies, will be a condition of consent.
	A static water supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed	☐	☐	N/A
	Static water supplies shall comply with Table 5.3d.	☐	☐	N/A
Water supplies are located at regular intervals. The water supply is accessible and reliable for	Fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard *AS 2419.1:2005.*	☑	☐	Complies, will be a condition of consent.
	Hydrants are not located within any road carriageway.	☑	☐	Complies, will be a condition of consent.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
firefighting operations.	Reticulated water supply to urban subdivisions uses a ring main system for areas for areas with perimeter roads.	☑	☐	Complies, will be a condition of consent.
Flows and pressure are appropriate.	Fire hydrant flows and pressures comply with the relevant clauses of *AS 2419.1:2005.*	☑	☐	Complies, will be a condition of consent.
The integrity of the water supply is maintained.	All above-ground water service pipes are metal, including and up to any taps.	☑	☐	Complies, will be a condition of consent.
	Above ground water storage tank shall be of concrete or metal	☑	☐	Complies, will be a condition of consent.

3.6 Gas

The intent of measures is to locate gas so as not to contribute to the risk of fire to a building. Table 3-4 outlines the required acceptable solutions for gas supply.

Table 3-4 – Performance criteria for gas supplies (PBP Guidelines)

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
Location of gas services will not lead to the ignition of surrounding bushland or the fabric of buildings.	Reticulated or bottled gas bottles are to be installed and maintained in accordance with *AS/NZS 1596 (2014)*, the requirements of relevant authorities and metal piping is to be used.	☑	☐	Complies, will be a condition of consent.
	All fixed gas cylinders are to be kept clear of flammable materials to a distance of 10m and shielded on the hazard side.	☑	☐	Complies, will be a condition of consent.
	Connections to and from gas cylinders are metal.	☑	☐	Complies, will be a condition of consent.
	Polymer sheathed flexible gas supply lines are not used.	☑	☐	Complies, will be a condition of consent.

Performance criteria	Acceptable solutions	Acceptable solution	Performance solution	Comment
	Above ground gas service pipes are metal, including and up to any outlets.	☑	☐	Complies, will be a condition of consent.

3.7 Electricity

The intent of measures is to locate electricity so as not to contribute to the risk of fire to a building. Table 3-5 outlines the required acceptable solutions for the subdivision's electricity supply.

Table 3-5 – performance criteria for electricity services (PBP guidelines)

Performance criteria	Acceptable Solutions	Acceptable solution	Performance solution	Comment
Location of electricity services limit the possibility of ignition of surrounding bushland or the fabric of buildings.	Where practicable, electrical transmission lines are underground.	☑	☐	Complies, will be a condition of consent.
	Where overhead electrical transmission lines are proposed: lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	☑	☐	Complies, will be a condition of consent.

3.8 3.8 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

Performance criteria	Acceptable Solutions	Acceptable solution	Performance solution	Comment

Performance criteria	Acceptable Solutions	Acceptable solution	Performance solution	Comment
A bush fire emergency and evacuation management plan is prepared	A bush fire emergency management and evacuation plan is prepared consistent with the: • The NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan* • NSW RFS *Schools Program Guide* (where applicable) • Australian Standard *AS 3745:2010 Planning for emergencies in facilities*; and Australian Standard *AS 4083:2010 Planning for emergencies – Health care facilities* (where applicable),	☑	☐	Complies, will be a condition of consent.
Note: A copy of the Bush Fire Emergency Evacuation Plan should be provided to the Local Emergency Management Committee for its information prior to occupation of the development.				
Suitable management arrangements are established for consultation and implementation of the emergency and evacuation plan.	An Emergency Planning Committee is established to consult with residents (and their families in the case of aged care accommodation and schools) and staff in developing and implementing an Emergency Procedures Manual. Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as stated in AS 3745 are clearly displayed, and an annual (as a minimum) trial emergency evacuation is conducted.	☑	☐	Complies, will be a condition of consent.

4. CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

This bushfire protection assessment has been undertaken for the proposed redevelopment of Greenwich Hospital located at Lot 3, DP 584287, Greenwich, NSW. This assessment has found that bushfire can potentially affect the proposed development from the extensive bushland vegetation surrounding the development, resulting in future buildings being exposed to potential radiant heat and ember attack.

In recognition of the bushfire risk posed to the site by the surrounding bushland, *Travers bushfire & ecology* propose the following combination of bushfire measures;

- APZs in accordance with the use of an alternative solution to determine minimum APZ and bushfire attack level (BAL) setbacks
- Provision of access in accordance with the acceptable solutions outlined in *PBP 2019*;
- Water, electricity and gas supply in compliance with the acceptable solutions outlined in *PBP 2019;*
- Future building construction in compliance with the appropriate construction sections of *AS3959-2009*, and *PBP 2019*.
- Emergency management and evacuation in compliance with *PBP* and 'NSW RFS guidelines for the *Preparation of an Emergency / Evacuation Plan*.

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 - APZs are to be provided to the proposed development as outlined in Table 2-2 and as generally depicted within SCHEDULE 1.

Recommendation 3 – APZs are to be maintained in perpetuity and managed as outlined in Appendix 4 of *Planning for Bush Fire Protection 2019* and the NSW RFS document *'Standards for asset protection zones'.*

Recommendation 4 - Building construction standards (BAL 12.5) for the proposed future buildings located within 100m of forest / woodland vegetation or within 50m of grassland are to be applied in accordance with *AS3959 Construction of buildings in bushfire prone areas (2018)* or NASH Standard and Section 7.5 of *PBP.*

Recommendation 5 - A Bushfire Emergency Management and Evacuation Plan is to be prepared to comply with Section 6.8.4 of *PBP.*

Recommendation 6 - Access is to comply with the acceptable solutions outlined in Section 5.3.2 of *Planning for Bush Fire Protection 2019.*

Recommendation 7 - Water, electricity and gas supply is to comply with Section 5.3.3 of *Planning for Bush Fire Protection 2019.*

Recommendation 8 - Fencing is to comply with Section 7.6 of PBP. All fences in bush fire prone areas should be made of either hardwood or non-combustible material. However, in circumstances where the fence is within 6m of a building or in areas of BAL 29 or greater, they should be made of non-combustible material only.

5. 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 bush fire-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 (2019) - *Planning for bushfire protection – a guide for councils, planners, fire authorities and developers*. NSW Rural Fire Service.

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

NSW RFS. *Methodology for assessing bush fire risk for low risk vegetation*.

SCHEDULE 1. PLAN OF BUSHFIRE PROTECTION MEASURES

RIVER ROAD

25m

SFR

SFR 14.57° Up

DISCLAIMER: CAD not georeferenced & has been aligned to LPI boundaries. Verification by a registered surveyor required prior to finalisation

Legend

- Site Boundary (Source: LPI)
- Contour 1m (source: LiDAR)
- Escarpment edge
- Drainage area
- Access road
- Building (proposed)
- Cleared/managed land
- Asset Protection Zone (APZ)

Aerial source: Nearmap

0 10 20 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
97 - 115 River Road, Greenwich 18TSA_BF002	25/02/2022 Issue 1 KM	1:600 @A3 GDA 1994 MGA Zone 56

TITLE

Schedule 1 - Bushfire Protection Measures

Document Path: N:\GIS STORAGE\N Drive\18TSA08_RiverRoad_Greenwich\MXDs\18TSA_BF002.mxd

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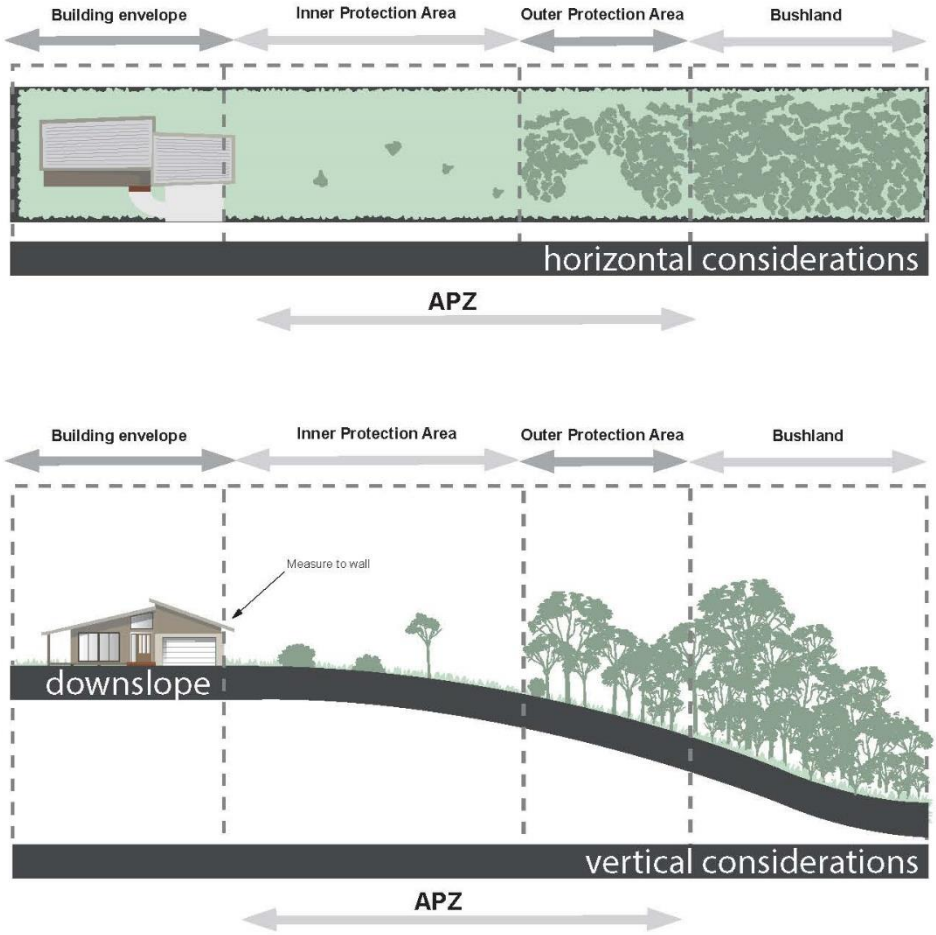
A TBE ENVIRONMENTAL COMPANY

APPENDIX 1. MANAGEMENT OF ASSET PROTECTION ZONES

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 4 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: PBP, 2019)

> **Note:** Vegetation management as shown is for illustrative purposes only. Specific advice is to be sought regarding 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. The APZ is to be maintained in perpetuity and should be undertake regularly, particularly in advance of the bushfire season.

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

Shrubs are to be maintained to ensure;

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings;
- shrubs should not be located under trees;
- shrubs should not form more than 10% of ground cover; and
- 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:

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed (litter fuel within the IPA should be kept below 1cm)

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%
- Canopies should be separated by 2 to 5m

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:

- Grass should be kept mown to a height of less than 100mm: and
- Leaves and debris should be removed.

General advice for landscaping is provided below:

- 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 into 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 away from the building; and

- Use of low flammability vegetation species.

APPENDIX 2. **AHIMS REPORT**

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Greenwich
Client Service ID : 662126

TBE

Date: 23 February 2022

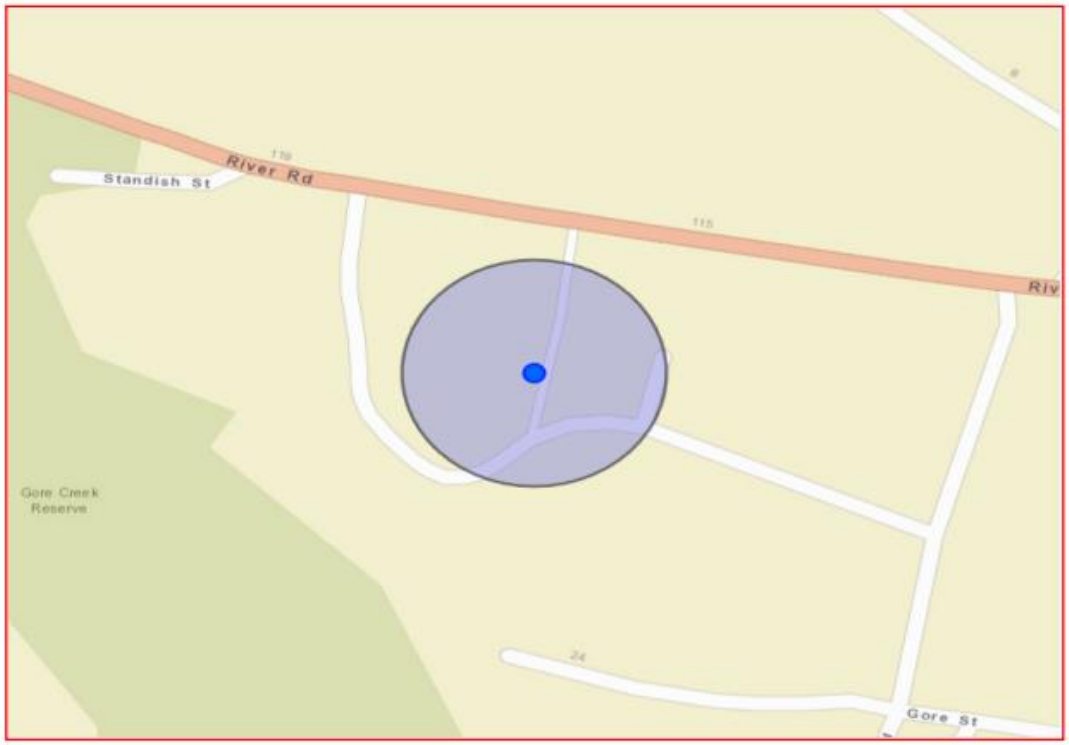
52 The Avenue,
Kariong New South Wales 2250
Attention: Tony Hawkins

Email: thawkins@traversecology.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 97-115 RIVER ROAD GREENWICH 2065 with a Buffer of 50 meters, conducted by Tony Hawkins on 23 February 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

APPENDIX 3. **PRE DA ADVICE**

NSW RURAL FIRE SERVICE

NSW GOVERNMENT

PRE-DA ADVICE MEETING SUMMARY

Attendees:	Wayne Tucker, Building Code & Bushfire Hazard Solutions Jason Maslen, Team Leader, Development Assessment and Planning
Subject:	Greenwich Hospital redevelopment – River Road, Greenwich DOC17/120690
Time and date:	11:00 26/10/2017 **Location:** Site

Details of the proposal

☑ SFPP

Redeveloping of an existing non-for-profit hospital involving:

- Replacement and expansion of the existing ageing hospital facilities and small residential aged care facility;
- Construction of new independent living units (approximately >80) to provide financial support to the redevelopment of the hospital

Bush fire protection issues discussed

☑ Hazard Assessment

- Assessment of the hazard to the south of the site as rainforest in consideration of the vegetation formations present (based on ecological studies) and narrow vegetation paths available.
- Effective slope to be taken across the hazard (i.e. from the north-west) due to the short / lack of fire run available directly towards the site from the south-west resulting from the substantial rock cliff at the southern end of the run and substantial rock walls throughout the corridor limiting ground and mid-storey vegetation.

☑ Asset Protection Zones

- APZs to be provided to achieve 10kW/sqm on the basis of the above.

☑ Access

- Through-access to be provided with a perimeter road around the facility.

☑ Access

- New buildings to be constructed to BAL-12.5 standards. No works proposed to Pallister House as this has heritage significance and is only used for administration purposes.

Documentation / plans referenced

Draft site plan; Draft ecological assessment plan.

Advice Provided

- No objection is held in principle to the proposed approach. A bush fire report shall be submitted with the development proposal which clearly outlines the above and provides information to support the hazard assessment (such as photos and detailed plans showing slope transects).

Disclaimer

RFS advice is based on information provided and policy and legislative requirements applicable at the time. The advice should be copied into or referenced in, any subsequent development application.

All efforts are made to identify issues of relevance and likely concern with the preliminary proposal. However, the comments and views in this document are based only on the plans and information submitted for preliminary assessment and discussion at the pre-DA meeting. You are advised that: -

- The views expressed may vary once detailed plans and information are submitted and formally assessed in the development application process, or as a result of issues contained in submissions by interested parties;
- Given the complexity of issues often involved and the limited time for full assessment, no guarantee is given that every issue of relevance will be identified;
- Amending one aspect of the proposal could result in changes which would create a different set of impacts from the original plans and therefore require further assessment and advice; and,
- The Pre-DA advice given does not bind Council officers, the elected Council members, or other parties to the DA process.

Signed:

Jason Maslen
Team Leader, Development Assessment and Planning Officer

Nika Fomin
Manager
Planning and Environment Services

Date: 10 November 2017