BUSHFIRE ASSESSMENT REPORT

NEW MAITLAND HOSPITAL
STAGE 2 – STATE SIGNIFICANT INFRASTRUCTURE APPLICATION

LOT 7314 DP 1162607 &
PART LOT 401 DP 755237
Metford Road, Metford

Date: **2/4/2019**

Prepared for: **Health Infrastructure NSW**

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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

This report has assessed the proposed hospital against the requirements of section 100B of the Rural Fires Act 1997, AS3959 (2009) Building in Bushfire-Prone Areas and Planning for Bush Fire Protection (2006).

This report establishes that the hospital is capable of complying with the acceptable solutions of Planning for Bush Fire Protection (2006).

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Health Infrastructure NSW		
Site Address	Metford Road, Metford	**Lot/Sec/DP**	Lot 7314 DP 1162607 & Part Lot 401 DP 755237
Local Government Area	Maitland City Council	**FDI**	100
Bushfire Prone Land	Yes, mapped bushfire prone land		
Type of development	New Building	**Type of Area**	Urban/Industrial
Special Fire Protection Purpose	Yes	**Flame Temperature**	1200K
Application Complies with DTS Provisions	No. Alternate solution for unsealed fire fighting trail	**Referral to RFS required**	Yes. Bushfire Safety Authority Required

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	West, Northwest	**East**	**Southeast**	**South, Southwest**
AS3959 (2009) Vegetation Structure	Remnant Vegetation < 50 metre fire run towards building	Scrub/Tall Heath	Shrubland/Short Heath	Forest
Asset Protection Zone	68 metres	76 metres	40 metres	70 metres
Accurate Slope Measure	1 degree downslope	1 degree downslope	1 degrees downslope	3 degrees downslope
Slope Range	1 to 5 degrees downslope	1 to 5 degrees downslope	1 to 5 degrees downslope	1 to 5 degrees downslope
PBP (2006) Table A2.6 Minimum Setbacks	40 metres	50 metres	35 metres	70 metres
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5

The above is a description of vegetation surrounding the hospital with a visual representation of vegetation and orientation to the building shown in Figure 1. The 70 metre asset protection zone is only required for the forest with a smaller asset protection zone required for the Shrubland, Forest Remnant and Scrub.

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.2.7 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks have been determined in accordance with Planning for Bush Fire Protection (2006) Table A2.6 and are able to be achieved within the subject site. Construction Asset Protection Zones have been determined in accordance with AS 3959 (2009) Method 1 Simplified Procedure.	Acceptable Solution
Access - Internal Roads	The property access will comply with section 4.2.7 of Planning for Bush Fire Protection (2006) excepting the allowance of a small section of unsealed loop road dedicated for firefighting access.	Alternate Solution
Water Supply	The proposed hydrant network will comply with AS2419.1 and Planning for Bush Fire Protection (2006) section 4.2.7	Acceptable Solution
Electrical Supply	The electrical transmission lines to the local area are located overhead with landscaping onsite to be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002). The electrical supply to the hospital buildings will be located underground.	Acceptable Solution
Gas Supply	Any gas supply to comply with Planning for Bush Fire Protection (2006), AS 1596 -2002 and local government recommendations. Any proposed gas supply will be located underground.	Acceptable Solution
Landscaping	Landscaping to comply with Planning for Bush Fire Protection (2006) Appendix 5.	Acceptable Solution
Emergency and Evacuation Planning	The facility shall have an emergency management plan developed in accordance with AS 4083.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

This report has been prepared in response to the following SEARS requirement - Prepare a bushfire hazard assessment that addresses the specifications and requirements for Special Fire Protection Purpose Development as detailed in Planning for Bush Fire Protection 2006. The assessment acknowledges the requirements of section 100B of the Rural Fires Act (1997) and Planning for Bush Fire Protection (2006) to protect persons, property and the environment from danger that may arise from a bushfire.

Under the provisions of section 100B of the Rural Fires Act (1997) as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation (2008) Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aims and objectives of Planning for Bush Fire Protection (2006) to reduce the risk of ignition of the hospital in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The land is zoned RU2 Rural Landscape and is comprised of two allotments. The proposed development includes the construction of a hospital and associated infrastructure and is declared State Significant Infrastructure.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

The only known significant environmental feature is a drainage line that runs through the property.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site. Ecological studies are being completed on the site.

2.5 ABORIGINAL HERITAGE

Searches of National Parks and Wildlife database identify 1 Aboriginal site is recorded in or near the subject site as defined by National Parks and Wildlife Act 1974.

PHOTOGRAPH 1 – SITE PHOTO

View of the proposed hospital site looking east. The site is a former quarry with significant vegetation removal already having been completed in the past.

PHOTOGRAPH 2 – VEGETATIVE THREAT

View of forest located southwest of the hospital. Eucalypts dominate the upper stratum with a low density understorey of native and exotic shrubs. The shrub layer increases in density around the drainage line.

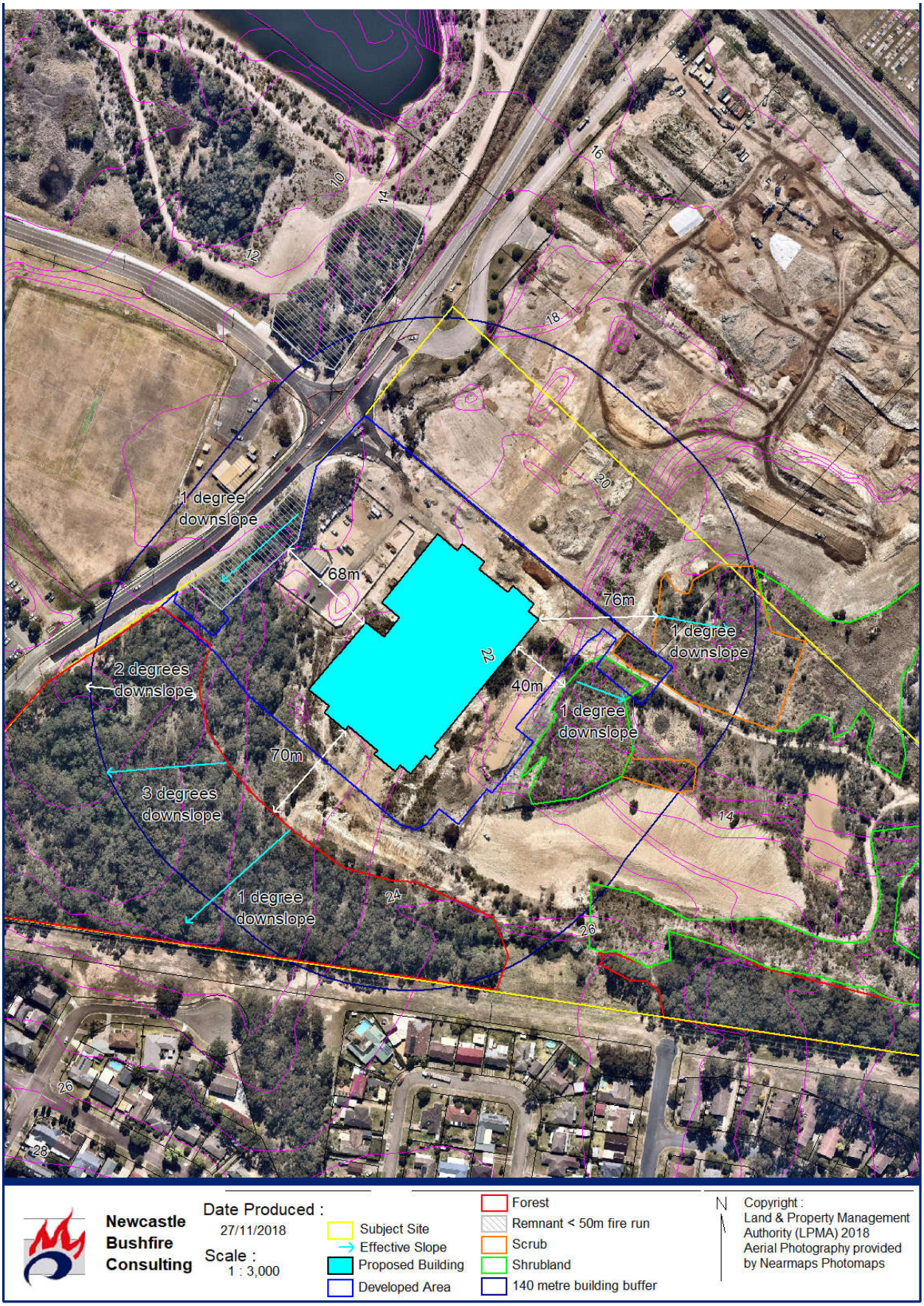

FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Maitland City Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) * to derive vegetation structures listed in Planning for Bush Fire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

* Keith (2004) is the vegetation classification technique used in all bushfire assessments in NSW as per Planning for Bush Fire Protection (2006) Amended Appendix 3.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 1-metre contour data obtained from Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective Slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Table A2.6 (Planning for Bush Fire Protection). The minimum Asset Protection Zone has been demonstrated in Section 1 Executive Summary and Compliance Tables.

The required asset protection zone is available entirely within the subject site.

3.4 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

3.5 HIGH RISE CONSTRUCTION IN BUSHFIRE PRONE AREAS

New South Wales Rural Fire Service Community Resilience Practice Note 2/12 Appendix 1 Clause 1 addresses High-Rise Construction in Bush Fire Prone Areas.

High-rise buildings, for the purposes of Planning for Bushfire Protection are defined as buildings exceeding three (3) stories in height. Such structures have increased external façade surface areas that can be expected to be exposed to greater amounts of radiant heat and also ember attack. Their height can also result in exposure to convective heat which otherwise would not be significant for lower height buildings. Additionally, high-rise buildings are associated with higher populations that make egress from the building(s) more of an issue and also place a higher load on road infrastructure during evacuations due to the potential for higher density populations. External balconies can easily trap embers which can ignite combustible materials.

Location – high-rise buildings should not be located along ridges or along slopes with significant fire runs.

Location Compliance - The vegetation surrounding the site is an isolated pocket of forest with reduced fire runs. The hospital is not located on a ridge.

Existing infrastructure – when high-rise developments are proposed, their impact during potential bush fire emergencies needs to be considered, particularly in terms of evacuating occupants along the road network and the availability of water supplies available for high-rise fire-fighting.

Existing Infrastructure Compliance - The proposed hospital hydrant network will be compliant with AS2419.1 and will not have car parking restricting access to the hydrants. The carparking is located west and north of the building which will improve egress whilst limiting the impact of emergency vehicle access.

External facades – external facades may result in increased exposure to radiant heat and also convection columns. Specialised modelling may be needed and APZs may need to be increased over and above those specified, to account for this.

The vegetation to the south and west is not large enough to develop a large convection column. The building shall be constructed to BAL-12.5 and specialised modelling is not required for this development.

Potential for entrapment - the risk associated with occupant egress is higher in high-rise buildings than for lower-rise structures and therefore the potential for entrapment during a bushfire emergency should be addressed.

Potential for entrapment compliance - The building shall have an emergency management plan prepared with an examination of bushfire risk. The asset protection zones for a special fire protection purpose are significant and evacuation of the

hospital is deemed unlikely given the small area of bushland and the significant asset protection zones.

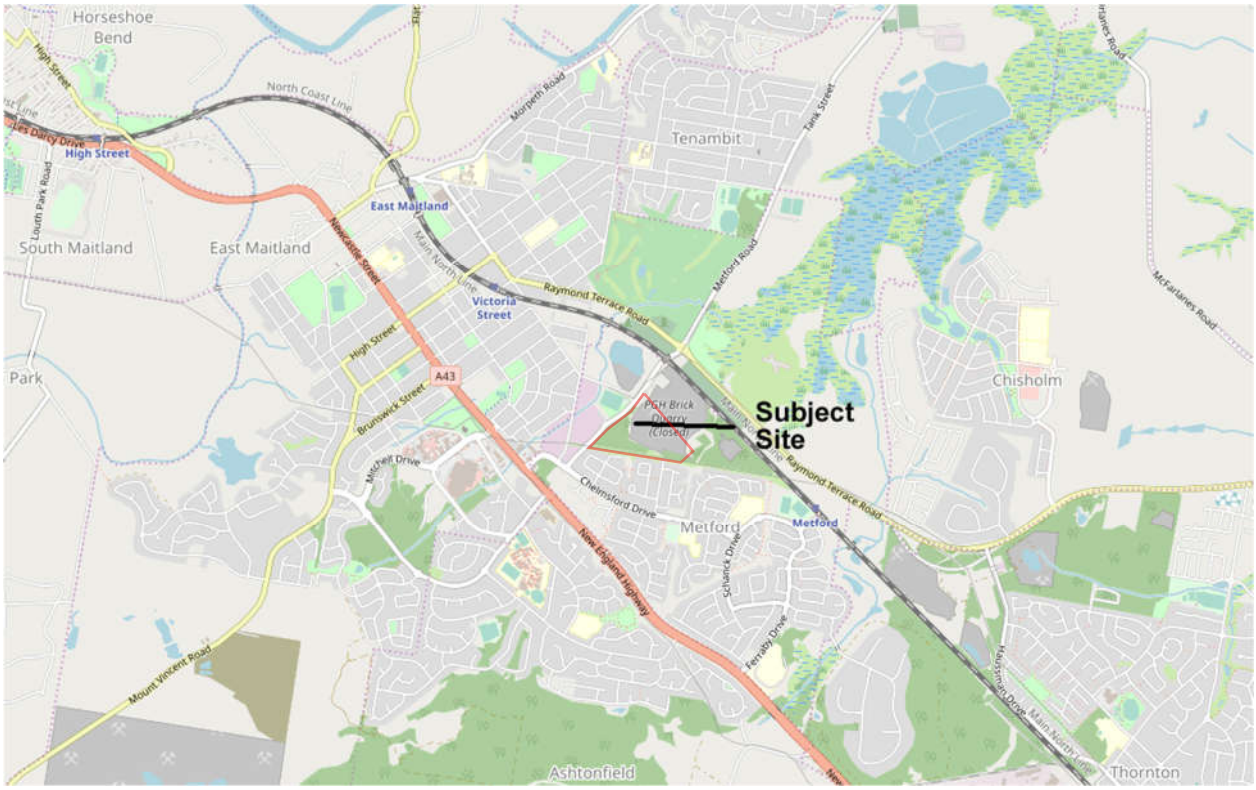

FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available. The hydrant design has been reviewed and is compliant with AS 2419.1 and complies Planning for Bush Fire Protection. The statement of available pressures provided by Hunter Water indicate 50 litres per second at a pressure of 625 kPA.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. Landscaping onsite shall be managed so that no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).

The subject site is proposed to accommodate an electrical kiosk substation where the power supply will connect to the hospital site. The proposed electrical transmission lines servicing the hospital will be located underground.

PHOTOGRAPH 3 – EXISTING SOUTHERN MANAGED LAND

View of existing clearing to the south of the hospital, with the forest located on top of an existing earth berm. There is good access to the south of the forest, along a powerline easement to fight fire.

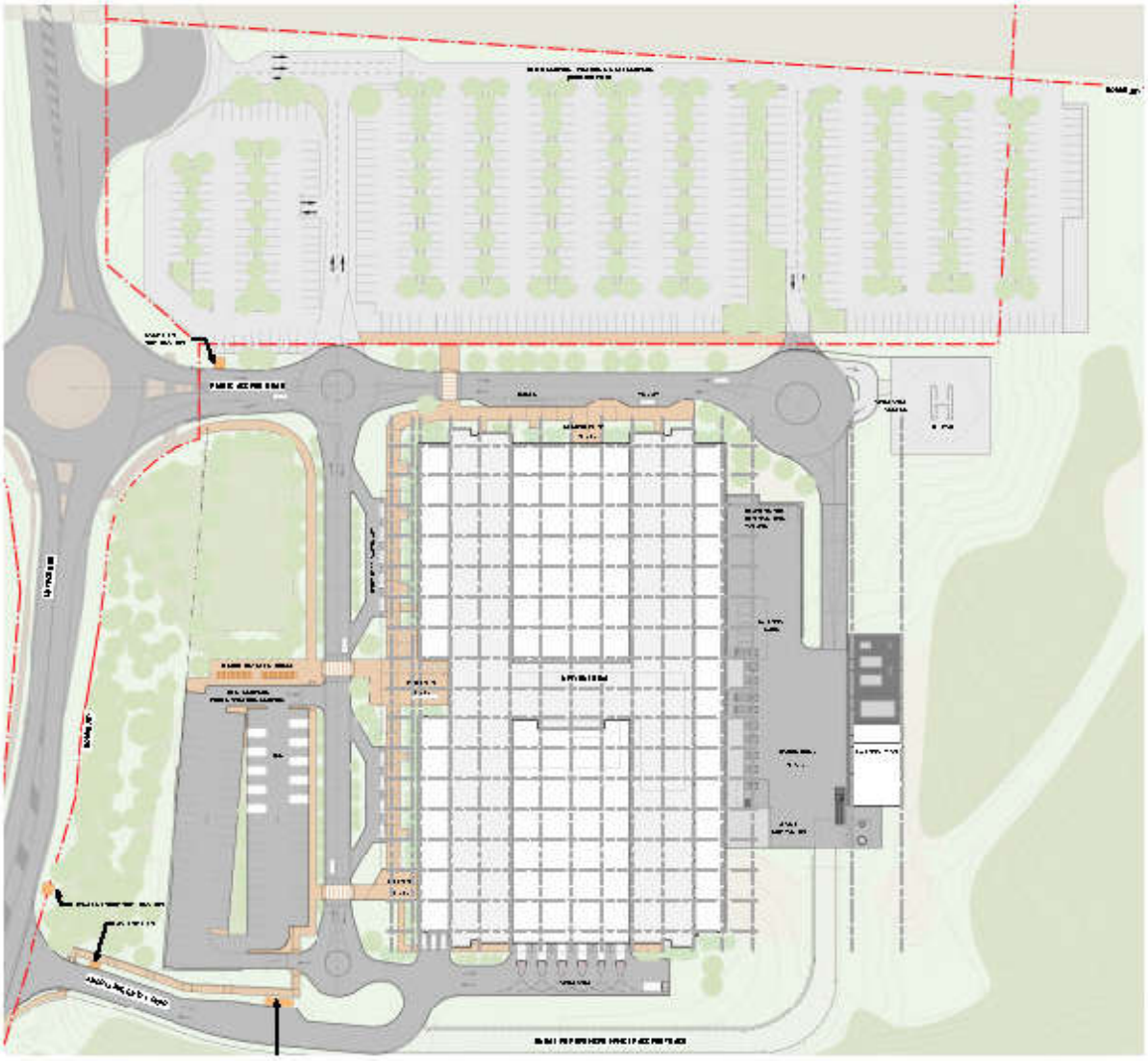

FIGURE 4 – SITE PLAN

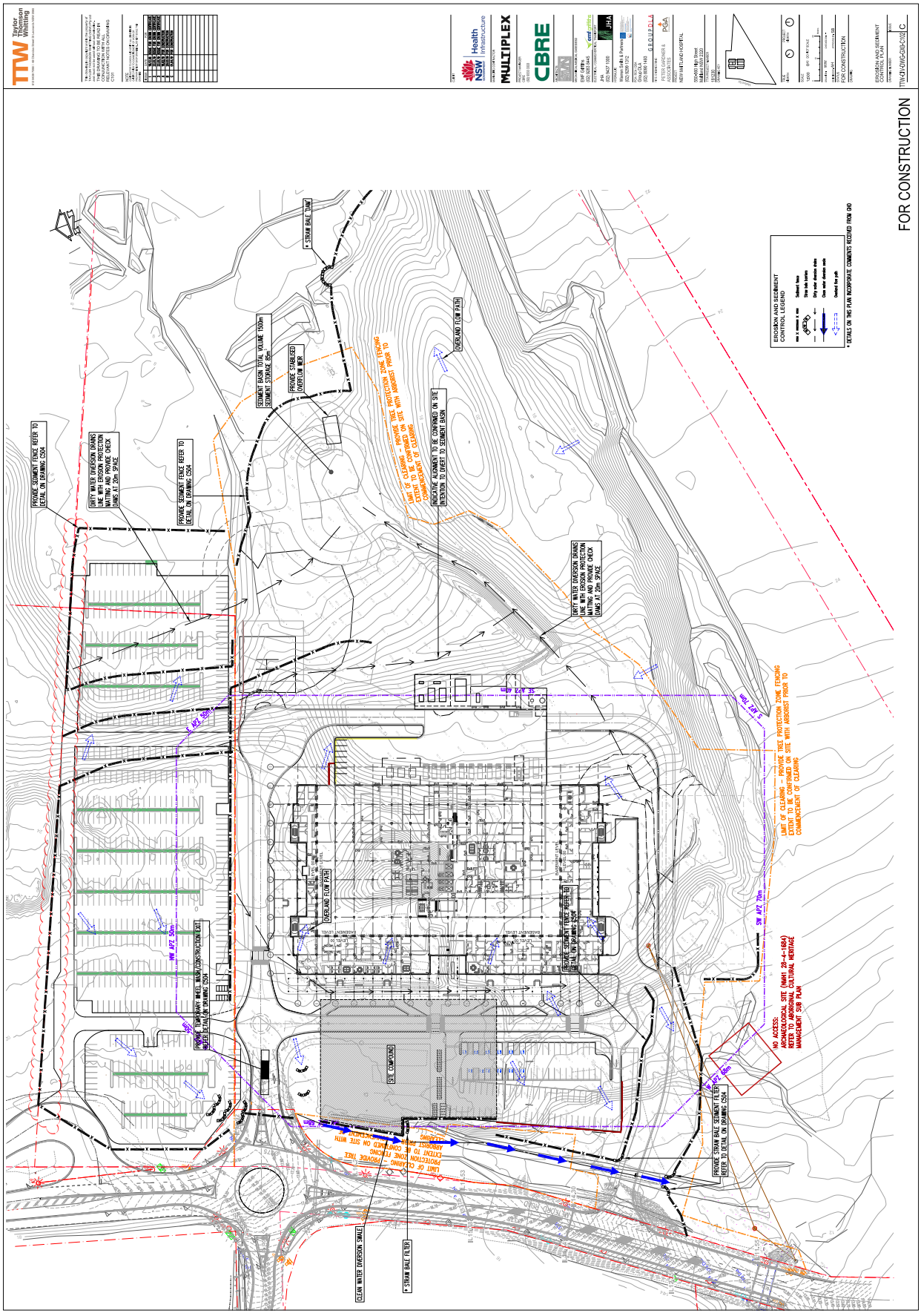

FIGURE 5 – ASSET PROTECTION ZONE

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 (2002) and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer-sheathed, flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

5.0 PROPERTY ACCESS

Public Road Access
The subject site is located on Metford Road being a dual carriageway road interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The existing public road network is deemed adequate to handle increased volumes of traffic in the event of a bushfire emergency. No new public roads are proposed for this development.

Fire Trails
Fire trails do not intersect the vegetation in the local area. An electrical transmission line service road is located along the southern boundary of the site which provides good access to fight fire. No new fire trails are proposed for this development.

Property Access
Property access provides access from the public road system directly to the private land.

Property access roads shall comply with sections 4.1.3 and 4.2.7 of Planning for Bush Fire Protection 2006 as detailed below:

- Internal roads are two-wheel drive, all-weather roads.
- Roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metre outer radius turning circle, and are clearly sign posted as a dead end.
- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Curves have a minimum inner radius of 6 metres and are minimal in number to allow for rapid access and egress.
- The minimum distance between inner and outer curves is 6 metres.

- Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.
- Cross fall of the pavement is not more than 10 degrees.
- Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).
- Roads are clearly sign-posted, and bridges clearly indicate load ratings.
- The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

The provision of a section of unsealed firefighting appliance access section is examined in Section 8.0 Alternate Solution.

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance with appendix 5 of Planning for Bush Fire Protection (2006) and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and, where possible, green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

A bushfire maintenance plan is to be prepared that addresses the following requirements:

a) Contact person / department and details; and
b) Schedule and description of works for the construction of asset protection zones and their continued maintenance.
c) Landscaping shall be managed as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

Due to the height of the hospital and potential increased maintenance issues with screening guttering and the roof drainage system, gutter guards shall not be installed.

The bushfire maintenance plan shall include a regime for ensuring the roof drainage system is maintained free of leaf litter and debris.

7.2 FIRE EMERGENCY PROCEDURES

Arrangements for emergency and evacuation are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.

An Emergency /Evacuation Plan is to be prepared in accordance with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan and comply with Australian Standard AS 4083 'Planning for Emergencies-for Health Care Facilities.'

8.0 ALTERNATE SOLUTION

At the request of the client I have been asked to provide an unbiased safety model for the proposed development. The proposed alternate solution offers compliance with the objectives of Planning for Bush Fire Protection (2006).

Proposed Alternate Solution
The property access shall comply with section 4.2.7 of Planning for Bush Fire Protection 2006 excepting the allowance of an unsealed access connection of the dedicated for firefighting access. The property access shall have gated access as Health Infrastructure do not wish this connection of the property access to be a public thoroughfare.

Alternate Solution Evaluation
The majority of car parking is located west and north of the building.

The existing property access on the southern side of the hospital is restricted to emergency vehicles and is not a public thoroughfare. This is the primary entry and exit point for ambulances.

The basis for the assessment of compliance for this site is Planning for Bushfire Protection 2006 Section 4.2.7 Standards for Bush Fire Protection Measures for Special Fire Protection Purpose Developments.

The specific performance criteria measure is compliance with Planning for Bushfire Protection 2006 Asset Protection Zones which is detailed below:
“internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.”

The proposed design offers compliance with all applicable acceptable solutions excepting the provision of an unsealed property access connection dedicated for through firefighting appliances.

An unsealed property access connection in place of a sealed property access will not reduce the ability for crews to access the hospital or work with equipment about the vehicle.

It is noted that draft Planning for Bushfire Protection 2018 has removed the explicit requirement of a sealed road and Table 6.4b requests a minimum 5.5 width. No kerb and guttering is to be installed and the minimum road width will be complied with as detailed below:

- Minimum 5.5m width, and
- Parking is provided outside of the carriageway width, and
- Hydrants are located clear of parking areas, and
- There are through roads, and these are linked to the internal road system at an interval of no greater than 500m, and
- Curves of roads have a minimum inner radius of 6m, and
- The maximum grade road is 15° and average grade is 10°, and
- The road cross fall does not exceed 3°, and
- A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.

Bushfire Certification

In accordance with NSW RFS Alternate Solutions Practice Note 1/07 (Release 3) this report has been prepared by Phillip Couch identified as a Fire Protection Association, Bushfire Planning and Design - Alternate Solutions accredited practitioner (FPAA BPAD-Level 3) and is a Graduate Fire Engineer with the Institution of Fire Engineers. The loop road connection dedicated for firefighting appliances is deemed to comply with the performance criteria of draft Planning for Bushfire Protection (2018) Non-perimeter access roads are designed to allow safe access and egress for medium rigid firefighting vehicles while occupants are evacuating".

The design complies with the Performance Criteria of Planning for Bushfire Protection.

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Grad Dip Design for Bushfire Prone Areas
FPAA BPAD – Level 3 Accreditation Number BPD-PA-16132

9.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The proposed building works shall comply with BAL-12.5 in accordance with AS 3959-2009 Building in Bushfire-Prone Areas and the construction requirements of Planning for Bush Fire Protection (2006) Appendix 3 (amended May 2010).
2. At the commencement of building works and in perpetuity, the property around the hosiptal for the below distances shall be managed as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for Asset Protection Zones.
    a. West for a distance of 68 metres as an inner protection area;
    b. East for a distance of 50 metres as an inner protection area;
    c. Southeast for a distance of 40 metres as an inner protection area;
    d. South, Southwest for a distance of 60 metres as an inner protection area and 10 metres as an outer protection area;
3. The property access shall comply with section 4.2.7 of Planning for Bush Fire Protection 2006.
4. Water, electricity and gas are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.
5. Landscaping is to be undertaken in accordance with Appendix 5 of Planning for Bush Fire Protection (2006) and managed and maintained in perpetuity. A Bushfire Maintenance Plan shall be prepared for the site. The bushfire

maintenance plan shall include a regime for ensuring the roof drainage system is maintained free of leaf litter and debris.

6. An Emergency /Evacuation Plan is to be prepared in accordance with the NSW Rural Fire Service document Guidelines for the Preparation of Emergency/Evacuation Plan and comply with Australian Standard AS 4083 'Planning for Emergencies- for Health Care Facilities.'

10.0 CONCLUSION

The final recommendation is that there is buildable area onsite for the development with appropriate services and asset protection zones available. The proposed development can comply with the requirements of Planning for Bush Fire Protection 2006 guidelines as required under section 100b of the Rural Fires Act (1997). This report should be referred to NSW Rural Fire Service for the issue of a Bushfire Safety Authority.

11.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bush Fire Protection (2006) and the NSW Rural Fire Services "Standards for Asset Protection Zones." The property owner(s) should obtain these two documents and familiarise themselves with their content.

Generally
Asset Protection Zones (APZ) refer to the area between the bushfire threat and the asset (i.e. building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)
The inner protection area is located adjacent to the asset and is identified as a fuel-free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a building's glazing and vent openings.
2. Avoid planting around entry-ways if the vegetation is flammable.
3. A maximum 20% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3 metres of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Outer Protection Area (OPA)
The Outer Protection Area (OPA) is located adjoining the vegetation. The OPA should be maintained as a fuel-reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Reduce or trim large stands of shrubs

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

12.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

Keith D. (2004) "Ocean Shores to Desert Dunes," Department of Environment and Conservation, Sydney.

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bush Fire Protection

New South Wales Rural Fire Service (2010) Planning for Bush Fire Protection Appendix 3 Amendment

New South Wales Rural Fire Service (2018) Draft Planning for Bush Fire Protection

Rural Fires Act (1997)

Rural Fire Regulation (2008)

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and firefighters.

Planning for Bush Fire Protection (2006) states that notwithstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small, always remains.

AS3959 (2009) Building in Bushfire-Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.