

BUSHFIRE PROTECTION ASSESSMENT

FOR THE

WAHROONGA ESTATE REDEVELOPMENT

INCORPORATING THE

SYDNEY ADVENTIST HOSPITAL,
WAHROONGA.



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Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
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EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited, at the request of the *Johnson Property Group*, on behalf of the *Australasian Conference Association*, has undertaken the bushfire consultancy to inform the concept planning process, under Part 3A [State Environmental Planning Policy – Major Projects SEPP] of the *Environmental Planning & Assessment Act 1979*, on the bushfire protection measures required for the redevelopment of the Sydney Adventist Hospital, Wahroonga, comprising the following land parcels.

Within the Ku-ring-gai Local Government Area:

- Part Lot 62 in DP 1017514 – [No. 185,148 & 172 Fox Valley Road];
- Lots 3 – 6 in DP 834964 – [Nos. 158 – 164 Fox Valley Road];
- Lots 7 & 8 in DP 834966 – [Nos. 166 & 168 Fox Valley Road];
- Vol. 4506 Fol. 44 known as 172a Fox Valley Road;
- Lots 1- 4 in DP 834963 – [Nos. 130 136 Fox Valley Road];
- Part Lot 2 in DP 965637 [Vol 16721 Folio 104] – known as No. 153 Fox Valley Road;
- Lots 7 – 8 in DP 834961 – [Nos. 155 – 157 Fox Valley Road];
- Lots 1 – 4 in DP 834967 – [Nos. 159 – 167 Fox Valley Road];
- Lot 1 in DP 834961 – [No. 169 Fox Valley Road];
- Lot 1 – 2 in DP 834960 - [Nos. 171 – 173 Fox Valley Road];
- Lots 1 – 2 in DP 834968 – [Nos. 191 – 193 Comenarra Parkway];
- Lots 50 – 52 in DP 880017 – [Nos. 195 – 201 Comenarra Parkway];
- Lots 1 – 6 in DP 834965 – [Nos. 203 – 213 Comenarra Parkway];
- Lots 1 – 12 in DP 834969 – [Nos. 64 – 80 & 73 – 77 Mt Pleasant Avenue];
- Part Lot 53 in DP 880017 – [No. 79 Mt Pleasant Avenue]; and Lots 50 – 61 in DP 1017514 – [Nos. 82 – 104 Mt Pleasant Avenue.

Within the Hornsby Local Government Area:

- Lot 2 in DP 410875;
- Lots 46 – 53 in DP 15946 – [No. 53 – 67 Ferndale Road].

The Wahroonga Estate contains approximately 65 hectares of land and accommodates existing urban development centred along Fox Valley Road; vacant/underutilised land around the curtilage of the existing buildings, including inefficient at-grade parking and urban bushland loosely connected to the Lane Cove National Park and recreation reserve to the south-west, beyond the Comenarra Parkway.

The Wahroonga Estate consists of a wide range of uses which together form a unique living, working community. The existing uses on the site consist of:

- Sydney Adventist Hospital & San Specialist Clinic;
- Fox Valley General Practitioner and Dentist Clinic;
- Pacific Regional Headquarters of the Adventist Church of Australia [ACA] and Media Network Centre, The Adventist Development and Relief Agency [ADRA];
- Seventh-Day Adventist Churches;
- Primary School;
- Normanhurst Adventist Retirement Village [including the Esther Somerville Nursing Home and Elizabeth Lodge Seniors Hostel];
- Fox Valley Community Centre;
- Childcare Centre;
- Mission Hostel and housing; and
- Staff Housing & Student Accommodation.

The proposed redevelopment of the site includes:

- Upgrade of the Sydney Sanitarium Hospital;
- Provision of low to medium to high density dwellings for hospital /church staff accommodation and seniors living housing and private residences;
- Provision of new retail floor space;
- Retention and expansion of existing commercial space;
- Relocation of the Avondale College of Nursing;
- Provision of a new K – 12 School;
- Protection and enhancement of ecological conservation corridors with opportunities for passive recreation and;
- Provision of on site stormwater management.

The majority of the site is zoned 5(a) Special Uses [Hospital] and 5(a) [Church] with a small area of vacant Residential 2(a) zoned land located in the south-eastern corner of the site and a narrow band of existing residential 2(a) zoned development located along the northern side of Mt Pleasant Avenue. The Coups Creek corridor and tributary is zoned 6(a) Private Open Space whilst the B2 – B3 Freeway corridor separates the 5(a) [Church] zoned land from the 2(a) Residential land in the south-eastern corner of the Estate.

The vegetation within the Estate varies from managed landscaped gardens/open mown lawns adjoining the existing facilities and within the cleared areas to Open Forest in the Coups Creek and Lane Cove River corridors and the undeveloped south-eastern corner of the Estate. A narrow band of EEC vegetation [Sydney Blue Gum Forest] is located to the east of the existing development along the eastern side of Fox Valley Road with a small pocket of Sydney Blue Gum Forest located to the northwest of the Hospital precinct and off the end of Elizabeth Street, to the south of Coups Creek.

The topography of the land within the Estate ranges from steep sided ridgelines to the Coups Creek and Lane Cove River corridors and the gully system in the south-eastern corner of the Estate to gently sloping land to the northwest of Fox Valley Road and within the Retirement Village/residential precinct along Mt Pleasant Ave.

Existing residential development adjoin all aspects of the Estate except for:

- A narrow corridor of undeveloped land within the B2 – B3 Freeway corridor to the northeast of the eastern boundary;
- A parcel of vacant bushland within the Loreto School grounds, to the north of the existing residential development along Mt Pleasant Avenue;
- The Public Reserve [within Hornsby LGA] to the west of the Lane Cove River corridor [west of the existing Retirement Village on Mt Pleasant Avenue and a short length of the Lane Cove National Park to the southwest of the Estate, beyond The Comenarra Parkway.

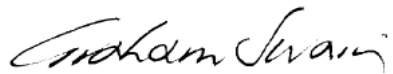
The unmanaged forest vegetation within the Estate has been mapped by Ku-ring-gai Council, in accordance with Section 146 of the *Environmental Planning & Assessment Act 1979*, as Category 1 Bushfire Prone Vegetation with the 100 metre wide buffer zone to this vegetation extending across much of the developed areas of the Estate. The Certified Bushfire Prone Land Map excludes Seniors Living SEPP Developments from that part of the Estate shown by blue cross hatching on the map.

The Director General's Environmental Assessment Requirements includes, under Key Assessment Requirements, subheading 7 – Bushfire, the following requirements:

- Demonstrate compliance with *Planning for Bushfire Protection 2006*, with particular regard to ensuring Special Fire Protection purpose developments are located away from the bushland interface; and
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone.

The DGRs also require an appropriate and justified level of consultation should be undertaken with the NSW Rural Fire Service during the preparation of the environmental assessment, having regard to any previous consultation. This requirement has been addressed with the NSW Rural Fire Service and an initial meeting took place on the 4th July 2008 with an on site inspection and meeting held on the 16th July 2008. Following this site inspection further survey of the Coups Creek corridor was undertaken to identify the physical location of the riparian corridor and Asset Protection Zone setbacks along this creek. A further meeting was held at the NSW Rural Fire Service Headquarters on the 23rd September 2008 to discuss the Master Plan proposal for the redevelopment of the Hospital Precinct and the Revised Concept Plan for the redevelopment of the site.

This report undertakes an assessment to address the Director General's Requirements [DGRs] and determines the deemed-to-satisfy bushfire protection requirements for the future development within the Estate, in accordance with the provisions of *Planning for Bushfire Protection 2006*, and provides recommendations on the provision of Asset Protection Zones to the buildings; emergency access/egress; fire-fighting access and water supplies; construction standards of the buildings, the management of the Asset Protection Zones/residual vegetation and evacuation protocols necessary to address the bushfire risk to the future occupants of the Estate and to address the aim and objectives of *Planning for Bushfire Protection 2006* and the advice provided by the NSW Rural Fire Service.



Graham Swain,
Managing Director,
Australian Bushfire Protection Planners Pty Limited.

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SECTION 1

INTRODUCTION

1.1 Development Proposal.

Johnson Property Group [JPG], on behalf of the *Australasian Conference Association*, has submitted an application under Clause 6 of the State Environmental Planning Policy – Major Projects [Major Projects SEPP] for the comprehensive redevelopment of the Australasian Conference Association Wahroonga Estate to accommodate the expansion of the Sydney Adventist Hospital together with the provision of new educational and community facilities, residential dwellings and a village retail centre.

The proposal aims to upgrade and expand the health facilities and services; increase the total number of dwellings through a combination of residential densities; provide retirement living including independent living, a hostel and nursing home; provide expanded retail, commercial and recreational opportunities and retain quality open space and bushland.

A Preliminary Assessment Report has been submitted to the Department of Planning [DoP] for consideration of the project under Major Project classification.

The Director General issued on the 9.4.2008, under Major Project No. MP07_0166 (Concept Plan), the Director Generals Requirements [DGRs] for the preparation of the Environmental Assessment for the project.

The DGRs include, under Key Assessment Requirements, subheading 7 – Bushfire, the following requirements:

- Demonstrate compliance with *Planning for Bushfire Protection 2006*, with particular regard to ensuring Special Fire Protection purpose developments are located away from the bushland interface; and
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone.

These requirements reflect the advice provided to DoP from the NSW Rural Fire Service in the Service's response to DoP dated 13th March 2008.

The DGRs also require an appropriate and justified level of consultation should be undertaken with the NSW Rural Fire Service during the preparation of the environmental assessment, having regard to any previous consultation.

To address the Director Generals Requirements [DGRs], further studies of the site, including identification of physical constraints [riparian corridors and topography] and environmental constraints such as vegetation communities and Endangered Ecological Communities (EEC) have been undertaken.

These constraints, combined with the requirement to comply with *Planning for Bushfire Protection 2006* has resulted in a revised Concept Plan being prepared.

A copy of the proposed Concept Plan is shown as Figure 1 below.

Figure 1 – Proposed Concept Plan.



The revised Concept Plan retains the vegetated riparian corridor to the Lane Cove River, located on the western boundary of the Estate, within Coups Creek and also the gully system in the south-eastern corner of the Estate.

Included in these corridors is the vegetated land which exceeds eighteen [18] degrees slope. Similarly, the corridor of EEC [Blue Gum Forest] vegetation is retained along the eastern aspect of the existing development to the east of Fox Valley Road and a small patch of Sydney Blue Gum Forest located within to the Coups Creek corridor.

The revised plan provides for 'infill' residential development on the vacant land between the existing dwellings on The Comenarra Parkway [eastern end] and redevelopment of the existing dwellings on The Comenarra Parkway [western end] with residential infill development on Fox Valley Road, adjacent to the north-eastern boundary of the Estate and to the area of the Estate north of Mt Pleasant Ave, adjoining the bushfire prone vegetation within the Loreto School grounds.

A new residential precinct is located in the central eastern portion of the Estate, to the southeast of the EEC corridor. Further residential development precincts occur on both sides of Fox Valley Road to replace the existing housing stock and occupy the open ground to the northeast of the existing Churches on the north-western side of Fox Valley Road.

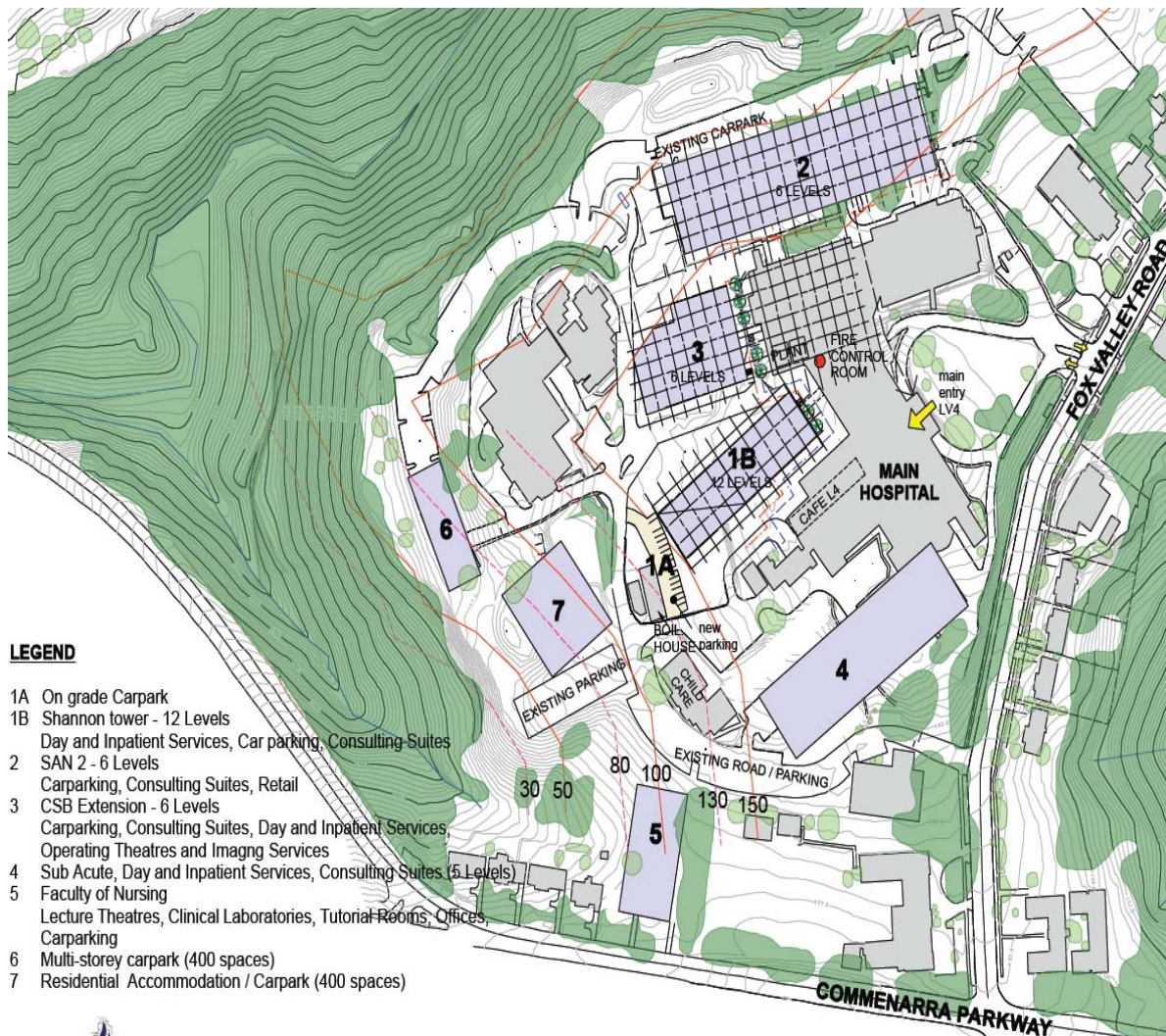
A new residential precinct is located in the area to the west of the existing School [proposed Village Centre], between The Comenarra Parkway and the Hospital precinct.

On the Mt Pleasant side of the Estate, new residential development will replace the existing housing stock located between Mt Pleasant Ave and the adjoining residential development to the north of the Estate. A new residential precinct is planned to the northwest of the access road to the existing retirement village precinct. The existing multi-storey buildings within the retirement village will be adaptively used and extended.

The existing School and accommodation precinct on both sides of Fox Valley Road, north of its intersection with The Comenarra Parkway will be replaced with a Village Centre [retail] precinct whilst a new K – 12 School complex is located to the northwest of Fox Valley Road, in the north-eastern corner of the Estate.

The Hospital precinct will be expanded and will include ancillary land uses [ancillary to the main Hospital – i.e. Doctors Consulting Rooms, Offices, carparking etc] located adjacent to the Coups Creek corridor. The new Faculty of Nursing is to be located to the north of The Comenarra Parkway, between the existing housing stock and the new residential precinct.

Figure 2 – Copy of Hospital Master Plan Layout.



The revised Concept Plan provides Asset Protection Zones to the future development precincts commensurate with the type of vegetation, gradient of the land and proposed landuse.

1.2 Aim of this Report.

The aim of this report is to address the Director General's Environmental Assessment Requirements [DGRs] which includes under "Key Issues, subheading 7 – Bushfire", the following requirements:

- Demonstrate compliance with *Planning for Bushfire Protection 2006*, with particular regard to ensuring Special Fire Protection purpose developments are located away from the bushland interface; and
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone.

The DGRs also require an appropriate and justified level of consultation should be undertaken with the NSW Rural Fire Service during the preparation of the environmental assessment, having regard to any previous consultation.

1.3 Statutory Requirements.

This report has been prepared having regard to the following legislative and planning requirements:

1.3.1 Legislation.

1.3.1 Legislation.

Environmental Planning and Assessment Act - 1979 (EPA Act)

Planning and development within NSW is regulated by the *Environmental Planning & Assessment Act, 1979* (EPA Act). Part 3A [Major Projects] of the Act commenced on the 1st August 2005 and consolidated the assessment and approval regime for all major projects previously addressed under Part 4 [Development Assessment] or Part 5 [Environmental Assessment] of the Act.

1.3.2 Planning Policies.

Planning for Bushfire Protection – 2006. [Rural Fire Service]

This document provides guidance on the planning and development control processes in relation to bushfire protection measures for rural residential and residential subdivision, “*Special Fire Protection*” and Class 5 – 8 and 10 buildings in bushfire prone areas.

The document provides deemed-to-satisfy specifications on the provision of Asset Protection Zones to residential and “*Special Fire Protection*” developments; defendable space requirements to other developments and access/water supply provisions for developments in bushfire prone areas.

Provision for the assessment of construction standards to buildings and management / maintenance of the Asset Protection Zones/defendable space to buildings is also provided.

1.4 Documentation reviewed in this Assessment.

To achieve the aim of this report, a review of information relevant to the property was undertaken. Information sources reviewed included the following documents:

- Site Survey Plan prepared by Mepstead & Associates;
- The Wahrenoga Estate Master Plan compiled by Glendinning Minto & Associates Pty Ltd, dated April 2004;
- Flora & Fauna Assessment prepared by Conacher Travers Pty Ltd, 2004;
- Bushfire Protection Report prepared by Conacher Travers Pty Ltd, 2004;

- Bushfire Management Plan prepared by Australian Bushfire Protection Planners Pty Limited, May 2005;
- Bushland Plan of Management prepared by Keystone Ecological, May 2005;
- Weed Management Plan prepared by Urban Bushland Management Consultants, April 2005;
- Ku-ring-gai Council Riparian Policy, December 2004;
- Survey Plan, prepared by Mepstead & Associates, of the certified extent of the stream in the south-eastern corner of the Estate;
- Preliminary Environmental Assessment prepared by JPG;
- Preliminary Concept Plan – February 2008;
- Plan of Vegetation Communities prepared by Cumberland Ecology;
- Plan of Hollow Bearing Trees prepared by Cumberland Ecology;
- Slope Analysis prepared by Urbis;
- Revised Concept Plan prepared by Urbis;
- Master Plan of Hospital Precinct prepared by DTB Architects/Coffey Projects, dated 18.9.2008;
- Ku-ring-gai Council Bushfire Prone Land Map;
- *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service;
- Australian Standard AS3959 *Construction of Buildings in Bushfire Prone Areas*;
- *Rural Fires Regulation 2002*.

1.5 Site Inspection.

Graham Swain of *Australian Bushfire Protection Planners Pty Limited* first inspected the site and surrounding areas in October 2002 with follow up inspections in November / December 2003 and numerous inspections undertaken since that date as part of the preparation of previous reports including the April 2004 Conacher Travers Bushfire Report and the preparation of the Fire Management Plan prepared by Australian Bushfire Protection Planners Pty Limited [2005].

Additional site inspections have been completed as part of the preparation of the revised Concept Plan. An inspection of the site was undertaken with the NSW Rural Fire Service on the 16.7.2008.

General slopes were assessed using an inclinometer and portable Global Positioning System [GPS] plotted relevant positions within the estate. Field assessment was undertaken to determine the landform, slopes, aspect, drainage, vegetation types and adjoining landuse. The identification of existing bushfire protection measures and visual appraisal of bushfire hazard and potential fire paths were also undertaken.

1.6 Authority Consultation.

In accordance with the Director Generals Requirements, a meeting with officers of the Development Control Division of the NSW Rural Fire Service was held on the 4th July 2008.

This consultation occurred between Ms Nika Foman and Mr Corey Shackleton, Development Control Officers. A follow up meeting was held with the NSW Rural Fire Service Development Control Officers Mr Lew Short & Mr Corey Shackleton on site on the 16th July 2008.

The site meeting included an inspection of the site and discussions on the proposed land uses and their locations relevant to the provision of Asset Protection Zones; access provisions and the matter of evacuation of the site during bushfire events in the local area.

A further meeting took place at the NSW Rural Fire Service Headquarters on the 23.9.2008 to review the Master Plan for the Hospital Precinct and the amended Concept Plan for the Estate.

General consensus was reached on the locations of the proposed land uses, extensions to the Hospital precinct and retirement village precinct and the location of the new school.

The recommendations within this report reflect the result of the meetings with the NSW Rural Fire Service and conform to the recommendations provided by the Development Control Officers.

SECTION 2

PROPERTY DESCRIPTION

2.1 Location and Adjoining Landuse.

The property is located at Wahroonga in the northern suburbs of Sydney and traverses the Local Government Areas of Hornsby and Ku-ring-gai with an approximate area of 65 hectares. Fox Valley Road bisects the Estate into two distinct sections, the larger being approximately two thirds of the Estate which is located to the northwest of Fox Valley Road.

The southern boundary is formed by a 1.2 km. length of The Comenarra Parkway extending to the east from Lane Cove River to the western edge of Warwick Place. Both residential and commercial development occupies the land to the south of The Comenarra Parkway with the exception of a 200 metre stretch on the western end which links with the Lane Cove National Par. This section of the southern boundary of the Estate, opposite The Lane Cove National Park, contains the western end of the Coups Creek riparian corridor.

The western boundary, which follows the Lane Cove River, adjoins an unnamed bushland reserve and the rear of residential development on Pine Street, Blue Gum Street, Capella Place and Mt Pleasant Avenue where it intersects with the northern boundary of the Estate. The northern boundary nominally runs along the rear boundary of the residential development fronting Mt Pleasant Avenue. It continues east, crossing Mt Pleasant Avenue, following the northern boundary of Lot 1, which faces Mt Pleasant Avenue and again continues along the rear of the existing residential development which has access off Redgrave Road, Ferndale Road and Nicholas Crescent.

A short section of Coups Creek of approximately 75 metres forms the eastern section of the northern boundary before it intersects with the eastern boundary. Part of the northern boundary also serves as the boundary between Hornsby and Ku-ring-gai Local Government Areas. The landuse to the north of the northern boundary is predominantly residential with the Loreto Ladies College adjoining a short section to the west of Mt Pleasant Avenue.

The eastern boundary is broken in direction and like the northern boundary follows the rear boundary of residential development that fronts Elizabeth Street, crosses Fox Valley Road, running between residential developments. It then continues again behind residential development that faces Georgina Close, Campbell Drive and Warwick Close where it meets the eastern end of the southern boundary on The Comenarra Parkway. A section of the B2 – B3 Freeway corridor adjoins the eastern boundary from the rear of the existing residential development on the southern side of Fox Valley Road.

Except for this corridor, the existing landuse to the east of the Estate is residential.

Figure 3 – Aerial Photograph of Estate.



The Estate is complicated by many changes of direction of boundary alignments, differing zoning, two Local Government Areas, significant watercourses and the separation of the site by a major arterial roadway [Fox Valley Road]. Therefore, for the purpose of clarity, this report examines three precincts which have been established utilising distinct and natural features of the Estate. The zones are nominated as:

(1) Northwest Precinct:

This precinct occupies the area from Coups Creek, west to the Lane Cove River and north to the Estate boundary and contains the existing Retirement Village complex, residential development to the north of Mt Pleasant Avenue and the residential development on Ferndale Road, Redgrave Road and Nicholas Crescent;

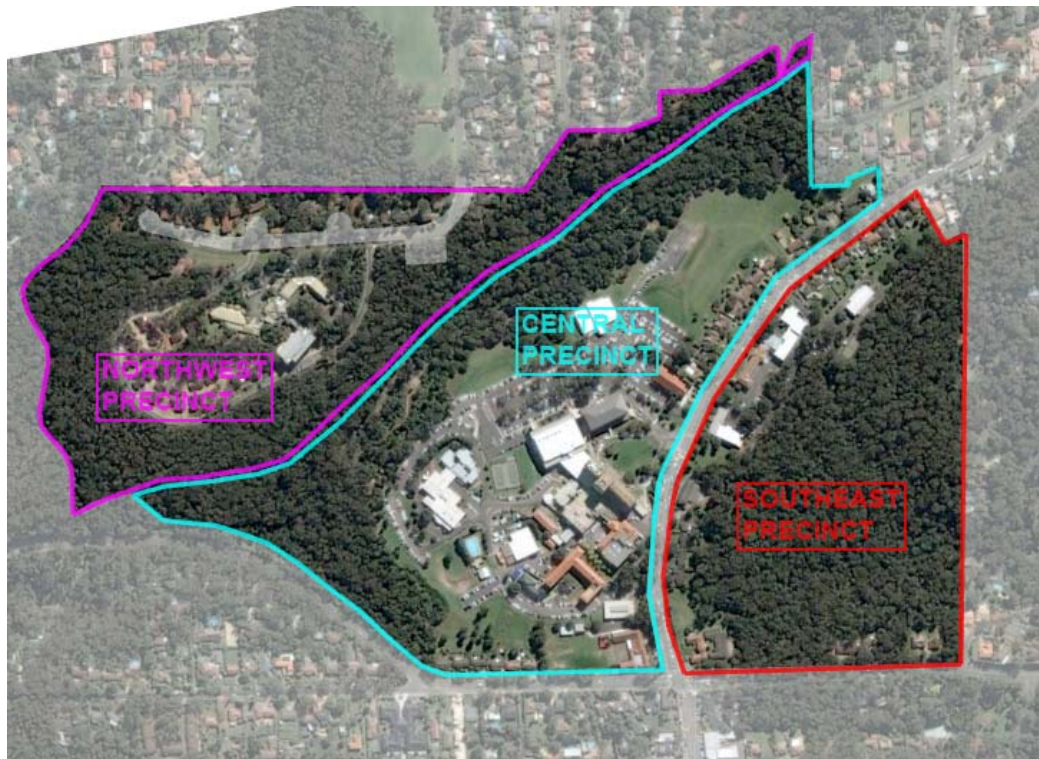
(2) Central Precinct:

This precinct occupies the area northwest from Fox Valley Road to Coups Creek, extending from the terminus of Elizabeth Street in the east to The Comenarra Parkway in the south and contains the Hospital precinct, School, Churches and residential development.

(3) ***Southeast Precinct:***

This precinct occupies the area southeast of Fox Valley Road, extending to the eastern boundary and The Comenarra Parkway in the south and contains existing residential development, Offices and accommodation buildings located along the south-eastern side of Fox Valley Road. The remainder of this zone contains vacant land, save for a small cluster of existing residential development located along The Comenarra Parkway boundary.

Figure 4 – Aerial Photograph of the Estate showing Report Precincts.



2.2 Precinct Descriptions.

2.2.1 Northwest Precinct.

The northwest precinct is irregular in shape and has three distinct boundary lines. The western boundary extends along a section of the upper reaches of the Lane Cove River, from The Comenarra Parkway to the northern boundary of the Estate, to the rear of the existing residential development north of Mt Pleasant Avenue. The northern boundary proceeds to the east along the rear of this residential development, extending across Mt Pleasant Avenue continuing along the rear of the residential properties on Redgrave Road, Ferndale Road and Nicholas Crescent.

The northern boundary then falls off to the south to meet Coups Creek which in turn forms the last 75 metres of the precinct.

Coups Creek forms the south-eastern boundary of the precinct and flows to the southwest where it intersects with the Lane Cove River and The Comenarra Parkway on the western boundary of the Estate.

Two major structures, Elizabeth Lodge Hostel and Esther Somerville Nursing Home occupy the ridge between Coups Creek and Lane Cove River with residential development located to the north of Mt Pleasant Avenue. Cleared areas surround the existing retirement village precinct and the residential development contains managed landscaped gardens whilst the Coups Creek and Lane Cove River corridors are heavily forested and contain management/walking tracks.

Topography & Drainage:

The northwest precinct has a distinct escarpment edge to the ridge plateau bordered by steep slopes and cliff lines which fall into the riparian corridors of the Lane Cove River and Coups Creek. Slopes within the riparian corridors exceed 18 degrees [33%] decreasing to 10 – 15 degrees below the escarpment whilst slopes above the escarpment range from 0 – 10 degrees.

Drainage is by overland flow or managed stormwater lines that feed into detention ponds/drains that flow into the Lane Cove River and Coups Creek. *[Refer to Figure 5 – Slope Analysis].*

Vegetation Communities:

The forest vegetation within the northwest precinct is predominantly Dry Sclerophyll Open Forest on the dryer escarpments to the Coups Creek and Lane Cove River corridors and Wet Sclerophyll Open Forest within the damper riparian corridor of the two watercourses. Management of exotic weed species is ongoing in both corridors.

[Refer to Figure 6 – Vegetation Communities].

Adjoining Landuse:

Approximately two thirds of the western boundary adjoins a section of unnamed reserve which extends to the west from the Lane Cove River to Myrtle Street. This vegetated reserve is approximately 3 hectares in area and contains unmanaged Low Open Forest.

The northern boundary adjoins existing residential development, except for a short length of undeveloped bushland within the Loreto Ladies College. This bushland contains an area of approximately 4.3 hectares of Low Open Forest.

2.2.2 Central Precinct.

The Central Precinct is irregular in shape and contains land to the southeast of Coups Creek, extending to Fox Valley Road and south to The Comenarra Parkway. This precinct is mostly cleared of vegetation except for the riparian corridor to Coups Creek and to the gully line adjoining The Comenarra Parkway, within the south-western corner of the Estate.

This precinct contains the Hospital Precinct, school, Church and Community Centre, residential development and associated infrastructure.

Topography & Drainage:

This precinct has mostly undulating topography within the existing development precincts with some steep areas falling in to the riparian corridor to Coups Creek and the gully in the southwest. Slopes within the riparian corridor to Coups Creek, between The Comenarra Parkway boundary to behind the Community Centre building, exceed 18 degrees with the eastern section of the corridor displaying slopes of 5 – 15 degrees.

Slopes beyond the riparian corridor, across the developed area of the precinct, range from 5 – 10 degrees with localised pockets of 10 – 15 degree slopes [*Refer to Figure 5 – Slope Analysis*].

Drainage is by overland flow and formed stormwater systems that flow into Coups Creek.

Vegetation Communities:

The forest vegetation within the central precinct is predominantly Dry Sclerophyll Open Forest on the dryer escarpment to Coups Creek and the gully line in the southwest of the Estate and Wet Sclerophyll Open Forest within the damper riparian corridor of the watercourses. Management of exotic weed species is ongoing in both corridors. A small pocket of Blue Gum High Forest is located adjacent to the western end of Elizabeth Street and to the south-eastern side of Coups Creek, adjacent to the Jacaranda Lodge / Materials Store building.

Landscaped gardens and lawn areas occupy the cleared/developed sections of the central precinct. [*Refer to Figure 6 – Vegetation Communities*].

Adjoining Landuse:

The land adjoining the north-eastern boundary of the precinct [Estate] and to the south of the southern boundary, beyond The Comenarra Parkway, contains existing residential development. Existing development within the south-eastern precinct adjoins the south-eastern boundary of the precinct.

2.2.3 Southeast Precinct.

The southeast precinct is irregular in shape and has Fox Valley Road as the north-western boundary. The north-western boundary intersects with the eastern boundary on Fox Valley Road with the eastern boundary extending to the south between residential development and then runs south, along the western boundary to the adjoining residential development fronting Georgina Close, Campbell Drive and Warwick Close where it intersects with the southern boundary of the Estate, on The Comenarra Parkway.

The southern boundary of the precinct [Estate] then extends west to the Fox Valley Road intersection. This precinct contains several Administrative Buildings, residential development, accommodation buildings and recreational areas which occupy a narrow band of development along the south-eastern side of Fox Valley Road.

Topography & Drainage:

The topography of the land within this precinct falls from Fox Valley Road gradually increasing in slope as it falls into the gully system in the south-eastern corner of the Estate. Slopes within the gully line exceed 18 degrees with extensive areas of 10 – 18 degree slopes bordering the southern aspect of the riparian corridor and the central section of the precinct.

Slopes of 5 – 10 degrees are located adjacent to Fox Valley Road and within the north-eastern section of the precinct [*Refer to Figure 5 – Slope Analysis*].

Drainage is by overland flow directly into the gully system within the south-eastern corner of the Estate.

Vegetation Communities:

The southeast precinct contains Dry Sclerophyll Forest on the upper slopes and Wet Sclerophyll Open Forest in the damper riparian corridor to the gully system. This area of the Estate is largely undisturbed with walking tracks and a fire trail extending into the forested area. Weed management is ongoing. A narrow band of Blue Gum High Forest and Turpentine forms a corridor of EEC vegetation along the rear of the existing development to the southeast of Fox Valley Road. [*Refer to Figure 6 – Vegetation Communities*].

Adjoining Landuse:

Lands adjoining the north-eastern, eastern and southern boundaries of the precinct contain existing residential development. A narrow band of vacant land, within the B2 – B3 Freeway [abandoned] corridor adjoins the north-eastern corridor of the precinct.

Figure 5 – Slope Analysis.

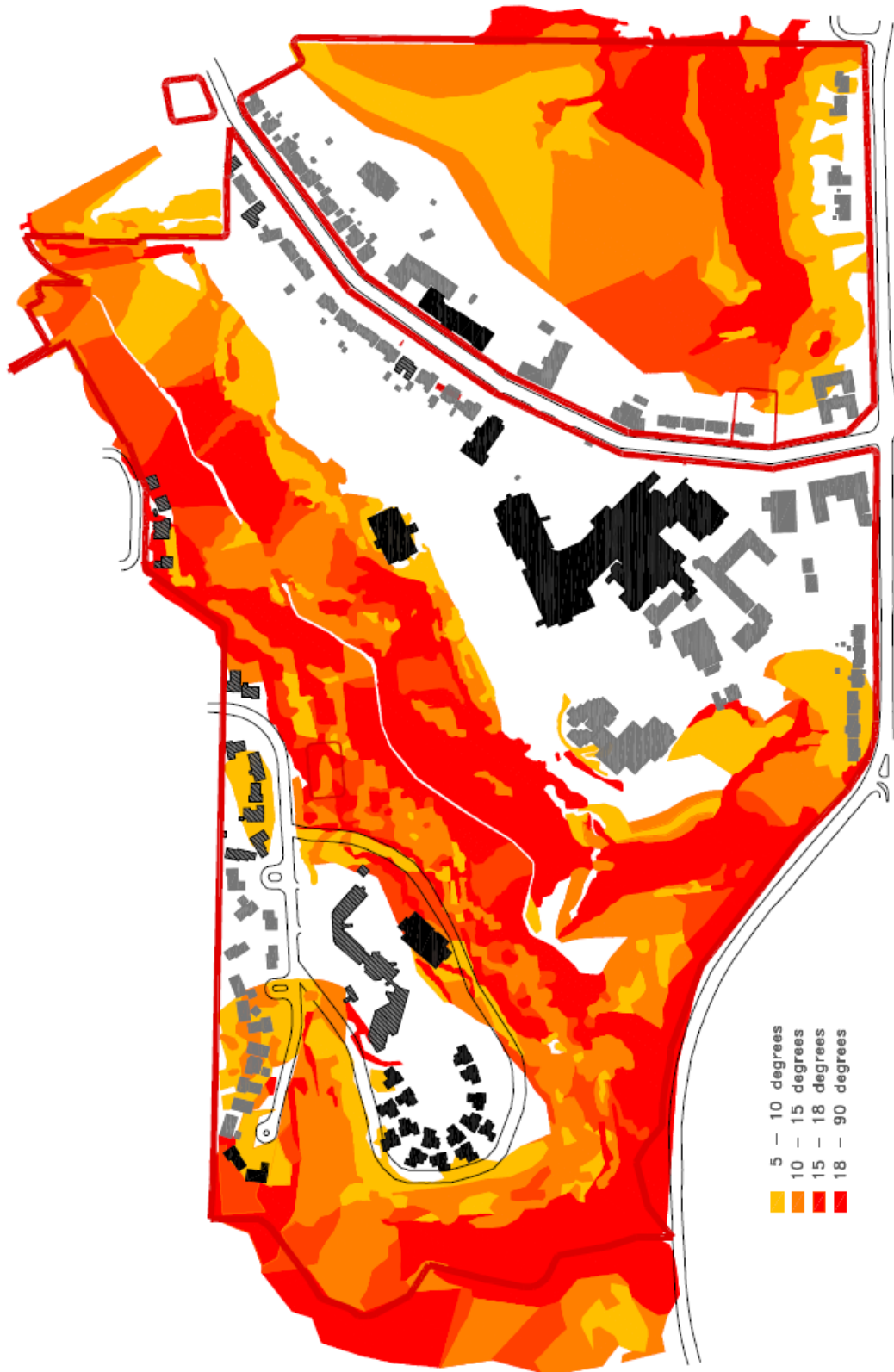
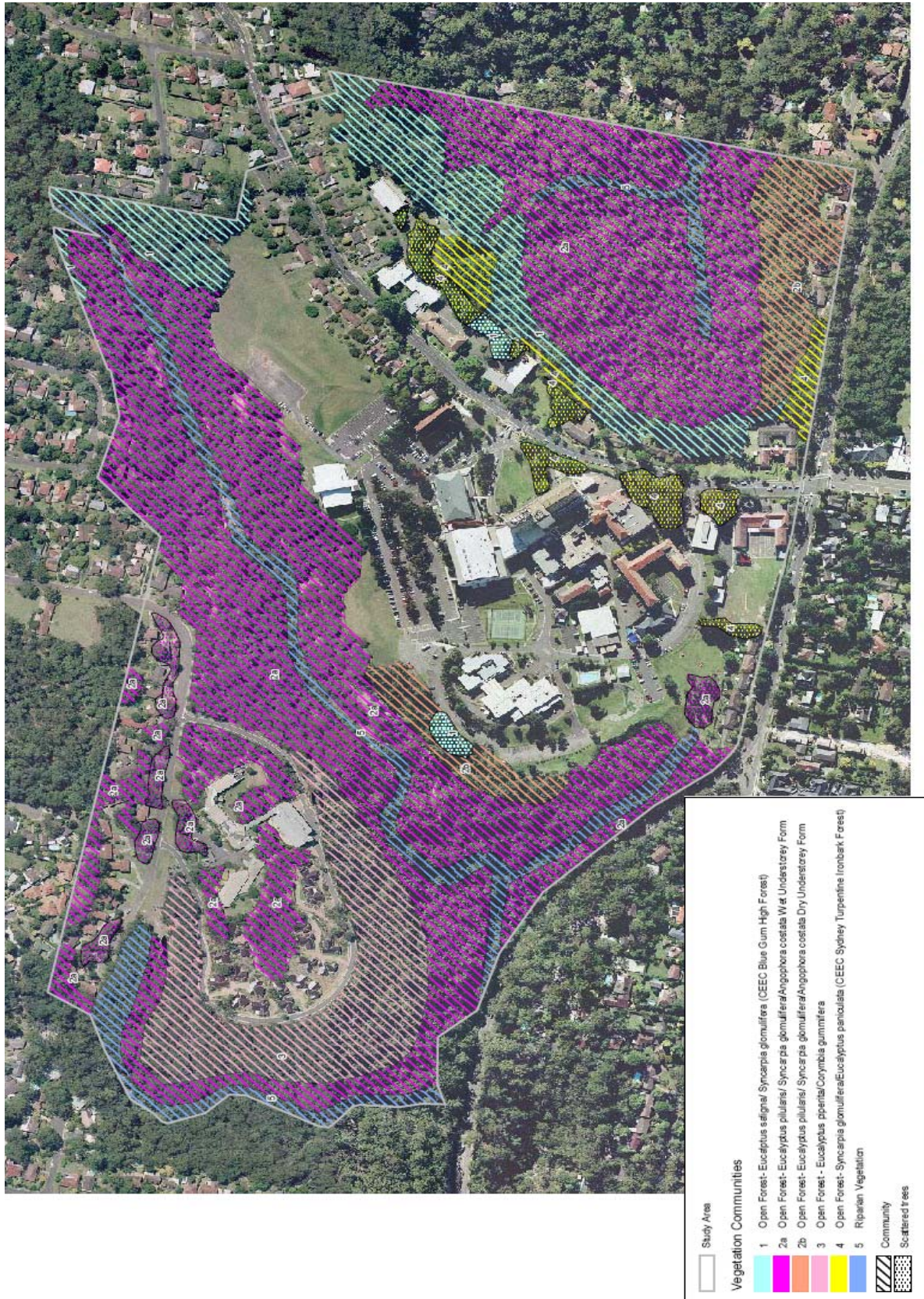


Figure 6 – Vegetation Communities.



2.3 Significant Environmental Features within the Estate.

The Wahroonga Estate does not contain areas of SEPP 14 Wetland; SEPP 44 Koala Habitat; land of geological interest; land slip areas, or National Parks Estate. The Estate contains the following environmental features:

- ***Riparian Corridors:***

The Estate contains the riparian corridor to Coups Creek and tributaries, the Lane Cove River and tributary an unnamed tributary to Twin Creeks, which is located in the south-eastern corner of the Estate.

Coups Creek has been defined as third order stream with a 40 metre wide Core Riparian Zone [CRZ] plus a 10 metre buffer to both sides, extending for most of its length, reducing to a second order stream [20m + 20m + 10m buffers] for approximately a 200 metre length within the north-eastern corner of the Estate. The tributary to Coups Creeks, which extends to the southeast along The Comenarra Parkway, has been defined as a first order stream with a 10 metre CRZ plus a 10 metre buffer to both sides of the stream.

The Lane Cove River has been defined as a third order stream with the 40 metre CRZ and 10 metre buffer zone located within the western section of the Estate. A tributary to the river extends to the east, along the southern aspect of the western end of Mt Pleasant Avenue and has been defined as a first order stream [10m CRZ + 10m buffer].

The unnamed tributary to Twin Creeks, within the south-eastern corner of the Estate, has been defined as a second order stream with a 20 metre CRZ and a 10 metre buffer zone to both sides. [*Refer to Hyder Consulting Drawing No. SKC004 – Ku-ring-gai Environmental Corridors*].

The Coups Creek and Lane Cove River riparian corridors are being managed to remove the existing weed infestation and will remain the primary source of the bushfire risk to development within the Estate. Asset Protection Zones will not extend into these zones.

- ***Steep Land:***

The undeveloped sections of the Estate contain topography that is deemed to be steep land [> 18 degrees] and are therefore not suitable or permitted to be utilised for the creation of Asset Protection Zones. These areas are predominantly located within the defined riparian corridors of the Lane Cove River, Coups Creek and the tributary of Twin Creeks, although isolated areas of slopes greater than 18 degrees occur within each zone, predominantly following localised changes in gradient and rock outcrops, beyond the defined riparian corridors. These localised steep lands can be maintained by hand and are therefore not excluded from the Asset Protection Zone criteria.

2.4 Known Threatened Species, Population or Ecological Community within the Estate.

Conacher Travers Pty Ltd undertook a detailed Flora & Fauna Assessment within the Estate in 2004 which identified six vegetation communities within the site.

Further examination of the Flora and Fauna within the Estate has been undertaken by Cumberland Ecology, with six similar vegetation communities identified within the Estate. These are shown on Figure 6 – Vegetation Communities and include the following communities:

- 1 - Open Forest – *Eucalyptus saligna* and *Syncarpia glomulifera* - [CEEC Blue Gum High Forest];
- 2a - Open Forest – *Eucalyptus pilularis* / *Syncarpia glomulifera* / *Angophora costata* – wet understorey form;
- 2b - Open Forest – *Eucalyptus pilularis* / *Syncarpia* – dry understorey form;
- 3 - Open Forest – *Eucalyptus piperita* / *Corymbia gummifera*;
- 4 - Open Forest – *Syncarpia glomulifera* / *Eucalyptus paniculata* - [CEEC Sydney Turpentine Ironbark Forest]; and
- 5 - Riparian Vegetation.

Cumberland Ecology has redefined the extent of these communities on the site. [Refer to Cumberland Ecology Flora & Fauna Report].

The corridor of Blue Gum High Forest and Sydney Turpentine Ironbark Forest to the southeast of the existing development on Fox Valley Road has been retained in the revised Concept Plan. Similarly, the small pocket of Blue Gum High Forest to the northwest of Jacaranda Lodge has been retained and the area to the west of Elizabeth Street will be retained with the existing management practices so as to provide part of the Asset Protection Zone to the new school precinct.

2.5 Details and location of Aboriginal relics or Aboriginal place.

The AMBS heritage report states:

‘Site 45-6-2040 is regarded as being of low archaeological significance. However, the study area has numerous sandstone shelter outcrops within vegetated creekline areas. These have been subject to relatively low levels of disturbance, particularly in comparison to the surrounding region. Therefore, there is potential for relatively intact archaeological deposits to be present, particularly beneath shelters’.

SECTION 3

BUSHFIRE MANAGEMENT RESPONSIBILITIES

Bushfire management within the Estate is the responsibility of:

3.1 Ku-ring-gai and Hornsby Council.

The Ku-ring-gai & Hornsby Council have responsibility, under Section 66 of the *Rural Fires Act*, to issue a notice in writing requiring an owner / occupier of any land within their LGA to carry out bushfire hazard reduction works on that land. Section 100E of the *Rural Fires Act* requires Councils to issue bushfire hazard reduction certificates for hazard reduction to be undertaken on private lands.

3.2 New South Wales Rural Fire Service.

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation. *Section 73* of the *Rural Fires Act (1997)* enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown. *[Note: The Estate is not located within a NSW Rural Fire Service Fire District].*

3.3 New South Wales Fire Brigade.

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within the Estate and through Mutual Aid Agreements, receive assistance from the NSW Rural Fire Service, particularly for hazard reduction operations within the site. Hazmat management within New South Wales is the responsibility of the NSW Fire Brigade.

3.4 Hornsby / Ku-ring-gai Bush Fire Management Committee.

The Hornsby / Ku-ring-gai Bushfire Management Committee has the responsibility for planning for co-ordinated bushfire fighting activities / hazard management activities on a local government level. It is not an operational organization, a fire fighting organization or a funding source for fire management activities.

The Bush Fire Management Committee is supported by the following provisions of the Rural Fires Act 1997:

- **Section 52** requires each Bush Fire Management Committee to prepare a draft bush fire management plan for their local areas which includes a plan of operations and a bush fire risk management plan.

- **Section 54** of the Act specifies that a draft bush fire risk management plan is to 'set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State'. A draft bush fire risk management plan may also restrict or prohibit the use of fire or other fire hazard reduction activities in all or specified circumstances or places to which the plan applies.

3.5 Public Authorities & owners/occupiers of land.

The Rural Fires Act, 1997 provides several legislative opportunities to require Public Authorities land owners and occupiers to manage hazardous fuels. These are listed below:

- **Section 63(1)** states that it is the duty of a public authority to take any practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of a bushfire on or from:
 - (a) any land vested in or under its control or management, or
 - (b) any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.
- **Section 63(2)** states that 'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'.
- **Section 66(1)** states that a local authority of an area may, by notice in writing, require the occupier or owner [not being a public authority] of any land within the area to carry out bushfire hazard reduction work specified in the notice on the land.
- **Section 66(2)** states that the local authority must serve a notice under this section if required to do so by a bushfire risk management land applicable to the land that is in force.
- **Section 87** allows the removal of hazards in the bush fire danger period by the provision of a permit system. The permits are valid for 21 days, excluding TOBAN days. Section 10 permits are not required to adhere to Part V provisions of the EPA Act 1979 in the assessment of impact, except for public authorities. An owner/occupier of private land must obtain from the NSW Rural Fire Service, a bushfire hazard reduction certificate before undertaking hazard reduction works on that land (Section 100E of the Rural Fires Act 1997).

3.6 Fuel Management within the Estate.

The Estate contains, and will continue to retain, areas of vegetation which will be subject to the risk of a future bushfire event. A Fire Management Plan was prepared by *Australian Bushfire Protection Planners Pty Limited* [April 2005] and has been adopted by the Australasian Conference Association in recognition of its legislative requirements to minimise the chance of fire starting within the forest vegetation on the Estate and spreading and endangering the adjoining neighbours.

The need is also recognised for the revision of the plan in recognition of the changing nature of future development within the site which will reduce the area of unmanaged vegetation and potential levels of bushfire threat and therefore the area which will require on-going fuel management.

SECTION 4

BUSHFIRE RISK

4.1 Introduction.

Risk has two elements: Likelihood, which is the chance of a bushfire occurring and consequence, the impact of a bushfire when it occurs. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets). Bushfires will always occur within unmanaged Australian native bushland. Bushfire Management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

Many options are available to reduce the risk of bushfires starting, spreading and causing damage; reducing the unintended negative consequences of options taken to control risk; and the failure to achieve bushfire management programs.

The Australian Standard AS/NZS 4360:2004, and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. The consequences of bushfire management activities alone and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and,
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

Planning to reduce the likelihood and consequence of bushfires must take into account the full range from small local fires within the riparian corridors/retained vegetation to landscape-wide severe fires that may occur in the Lane Cove National Park to the southwest of the Estate. Historically, there are patterns and trends in which fires, especially severe fires that cause significant damage to built and/or natural assets, start and spread.

For the purpose of analysing fire risk, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of combustible fuels;
- Exposure of vulnerable assets;
- A combination of weather conditions that generate a forest danger index of Very High or greater. Typically, within the Estate, prevailing adverse fire weather will have a strong south-westerly influence as the Estate will not be affected by major fire events burning from the northwest and west due to the adjoining residential development and small areas of retained vegetation.

4.2 Bushfire Risk within the Estate.

The level of Bushfire Risk on a development is determined by undertaking an assessment of Fire History, Ignition/Fire Sources, Weather and the availability of Bushfire Fuels.

4.2.1 Fire History.

Natural fires have not impacted the bushland areas within the Estate for many years. The 1994 Lane Cove River bushfire did not impact upon the site with the most recent bushfire to burn out parts of the Lane Cove National Park, to the south of The Comenarra Parkway, occurring during the 2003 bushfire season. In August 2002 a fire which was started by a children's campfire, burnt out a small area of vegetation between the Adventist Retirement Village and the upper reaches of the Lane Cove River.

A hazard reduction burning program was undertaken in 2000 in the bushland in the south-eastern corner of the Estate. This hazard reduction burn was undertaken within the framework of the Hornsby/Ku-ring-gai Bushfire Management Committee's Bushfire Risk Management Plan with future hazard reductions planned, as recommended in the Fire Management Plan.

4.2.2 Ignition / Fire Sources.

Causes of bushfire ignition are either natural or by human activity. Human activity can be categorised as:

- Malicious – including arson;
- Careless – such as escaped campfires, children and burning off without a permit; and
- Accidental – uncommon, but includes motor vehicle accidents/ignition by farm machinery/work operations [welding etc.].

The only natural cause of bushfire ignition is lightning.

A review of the causes of bushfire ignitions within the Lane Cove National Park has found that this natural phenomenon has a negligible incidence within the vegetation to the southwest of The Comenarra Parkway. However, arson has been found to be the likely cause of the most recent bushfire occurrences.

4.2.3 Climate.

- ***Temperatures & Humidity.***

The fire season in the Sydney Metropolitan Area corresponds with the summer months' high temperatures and low rainfall, and can occur from September to April with a proclaimed bushfire danger period from October to March. There is significant variability in temperature and rainfall from year to year. Fire seasons may be serious in three out of every 15 years, but this can also vary considerably.

Bushfire risk management, planning and operations must take into account the likelihood of severe fire weather and the challenges it presents. Extreme and uncontrollable bushfires typically occur when the fire danger rating is over 50, a rating of Extreme.

Many of the major property loss events in NSW have occurred at fire danger ratings over 70, on a scale of 0 to 100. The Very High and Extreme Forest Fire Danger conditions mainly occur between November and March. Among the projected changes in climate, as a result of global warming, is that southern Australia will see greater variability in its climate with hotter and drier droughts are possible.

As the temperatures increase, the Forest Fire Danger indices will also increase, perhaps leading to a trend of larger, more intense fires in the landscape. Climate change remains a complex issue and only one of a range of factors that may be creating an environment conducive to large-scale fires.

- **Wind.**

Wind is also an important factor in bushfire behaviour as it influences the rate of spread of the fire front and spreads burning embers / sparks, providing ignition sources for spot fires ahead of the main fire front.

The shape of the Lane Cove River corridor and Coups Creek valley and the adjoining land-form influences the direction and speed of the prevailing wind and therefore the speed and direction of fire runs within these valleys. Strong southwest winds have the potential to spread embers into these vegetated corridors from fires burning in the Lane Cove National Park, south of The Comenarra Parkway.

However, these are not the prevailing summer winds with this wind direction occurring mostly during the cooler winter months of June/July with the winds in August shifting to the west thence northwest during the summers months.

Whilst south-westerly winds do occur during the summer bushfire danger season, they are notably for short periods of duration – normally under 30 minutes, during which time they have the ability to change the direction of a run of a fire burning under predominant north-westerly or westerly winds. It is this short period that the vegetation within the Estate is most at risk of ignition from a major fire event in the National Park Estate to the south of The Comenarra Parkway as there is the potential for fire and embers to breach the separation that this road provides to the vegetation in the Lane Cove River and Coups Creek corridors within the Estate.

4.2.4 Slope.

Slope is a critically important factor when assessing fire risk and likely fire behaviour. The rate of fire propagation doubles up a slope of 10 degrees (18%) and increases almost fourfold up a slope of 20 degrees (40%).

The rate of progress downslope tends to slow at a corresponding rate however wind direction in the lee of the hills/ridgelines tends to be unpredictable and can cause fires to change direction unpredictably.

The average slope of the Lane Cove River/Coups Creek corridors is < 5 degrees) to the south and southwest, however gully lines to the river/creek increase the slopes to each side of the corridor to 15 - >18 degrees. Bushfires entering the riparian corridors from the southwest will spread upslope, initially impacting upon the land to the southwest of the Retirement Village thence extending along the Coups Creek corridor.

4.2.5 Potential Fire Paths.

The following figures provide an indication of the potential direction of fire which may occur within the Lane Cove River / Coups Creek corridors.

Figure 7 – Potential Southwest Fire Path.

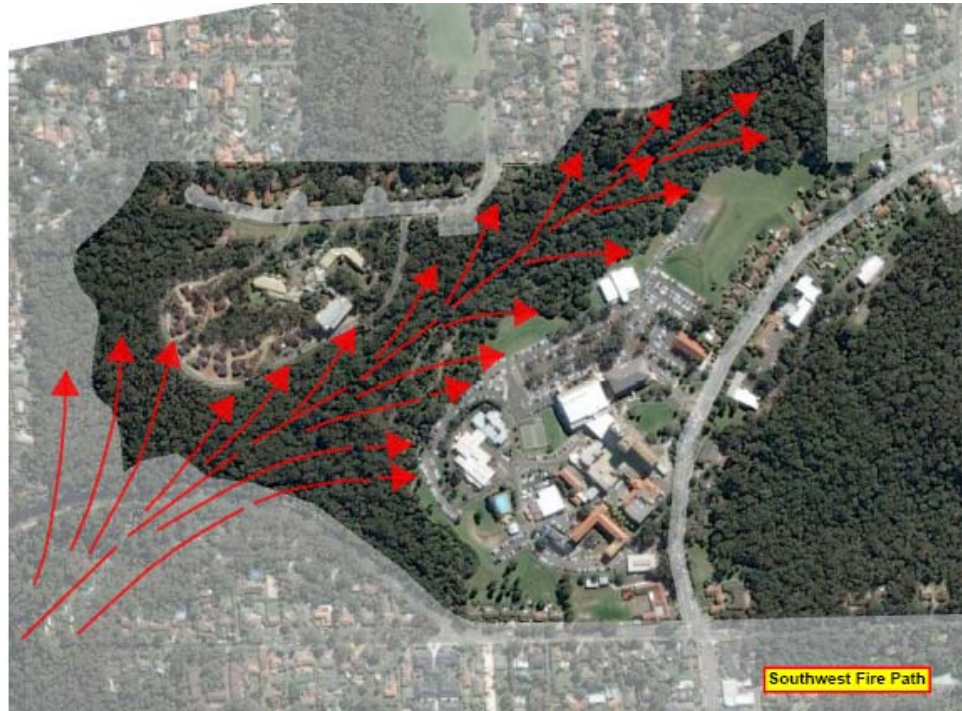


Figure 8 – Potential Northwest Fire Path



4.2.6 Bushfire Fuels.

Combustible fuel is a critical element in bushfire risk management, as it is the one factor relating to fire behaviour that can be managed. It is for this reason that the ACA commissioned the preparation of the Fire Management Plan for the Estate with the aim to manage and minimise the amount of combustible fuels which are available in the retained vegetation within the Estate.

In an unmanaged landscape there are three 'types' of fuel that contribute to bushfire hazard. They relate to the distribution and nature of combustible material within a vegetated environment and are defined by the Overall Fuel Hazard Guide – Third Edition (NRE May 1999), as:

- Elevated fuel load
- Surface fine fuels; and
- Bark.

Elevated material is defined as shrubs, heath and suspended material greater than 0.5 metres above ground. The level of bushfire hazard depends on fuel continuity, height, amount of dead material, foliage thickness and flammability of live foliage. Flammability of vegetation is at the highest when composition is fine, it contains a lot of dead material, is dense vertically and horizontally and has low moisture content.

Surface fine fuels are defined as the litter bed and vegetation up to 0.5 metres above the ground. Grasses add to the surface fine fuels and therefore need to be taken into account when assessing the hazard. The risk is higher where greater depth and volume of litter and surface material are present – where there is no active fuel management program in place to reduce the availability of dry, combustible fuels within the landscape.

Bark has the potential to travel significant distances in a fire situation (spotting) and act as a ladder between surface fuels and the forest crown. Bark contributes to fire hazard when it is loose and fibrous, present in large quantities and in long loose ribbon forms.

An overall Fuel Hazard for vegetation within the Estate can be determined, based on the combination of these three contributing fuel hazards. However, the level of hazard will vary significantly over time and will depend on the cycle of fuel management undertaken as defined by the Fire Management Plan.

The Fuel Hazard will therefore vary from low – moderate to moderate – high, dependant on the time lapsed since the last management activity.

The aim of the Fire Management Plan is to minimise the amount of combustible fuels available to burn within the retained vegetation on the site whilst recognizing the ecological constraints that exist to management practices in some of the vegetation communities [e.g. Blue Gum High Forest].

4.3 Assessment of Bushfire Risk to the Estate.

Major bushfires have occurred in the Lane Cove National Park, to the southwest of the residential development to the south of The Comenarra Parkway in 1994 and 2003. Neither of these fires impacted the site directly, impacted the vegetation within the site or the facilities on the site.

A small localised fire occurred in the Lane Cove River corridor to the west of the Retirement Village in August 2002 and was attributed to an escape from a children's camp fire. This fire was quickly brought under control and did not threaten buildings or residents.

Whilst there is a bushfire risk to the Estate, it is difficult to quantify the level.

The northwest precinct is most at risk due to exposure of the south-western aspect of the precinct to the unmanaged vegetation within the Lane Cove National Park located to the south of The Comenarra Parkway. The risk is mitigated by the provision and management of the Asset Protection Zones to the existing buildings and implementation of the recommendations of the Fire Management Plan.

The Hospital [central] precinct is separated from direct impact of a fire event in the Lane Cove National Park by the managed landscaped gardens which occupy the residential development to the southwest and south of The Comenarra Park and to the southeast of the Estate. The potential impact from a fire event in the National Park will be burning embers and smoke.

Fires occurring in the Coups Creek corridor, burning under south-westerly wind influences, will "push" the fire along the creek corridor, rather than towards the Hospital precinct. The risk of such fires, on this precinct, will be low as the impact will be from smoke. Should a fire burn from the west or northwest, across the riparian corridor, the risk from such fire event will be moderate with resultant moderate – high levels of radiant heat, smoke and ember attack with the level of risk dependant on weather conditions and available fuels.

The provision of fire protection measures such as appropriate widths of Asset Protection Zones / Defendable Spaces [dependant on landuse] and construction standards to future buildings will reduce the potential bushfire risk to this precinct.

Fires occurring in the south-eastern corner of the Estate, in its present state, have the potential to pose a low – moderate level of risk to the existing residential development adjoining the eastern boundary of the Estate and the buildings along the eastern/south-eastern side of Fox Valley Road. An active management plan is in place to mitigate this risk and the proposed development of this precinct, whilst retaining the EEC vegetation and the vegetation within the gully, will further modify/remove some of the bushfire prone vegetation and therefore lower the risk.

The existing residential development to the east and south of the eastern precinct remove potential bushfire risk to future development in this part of the Estate.

SECTION 5

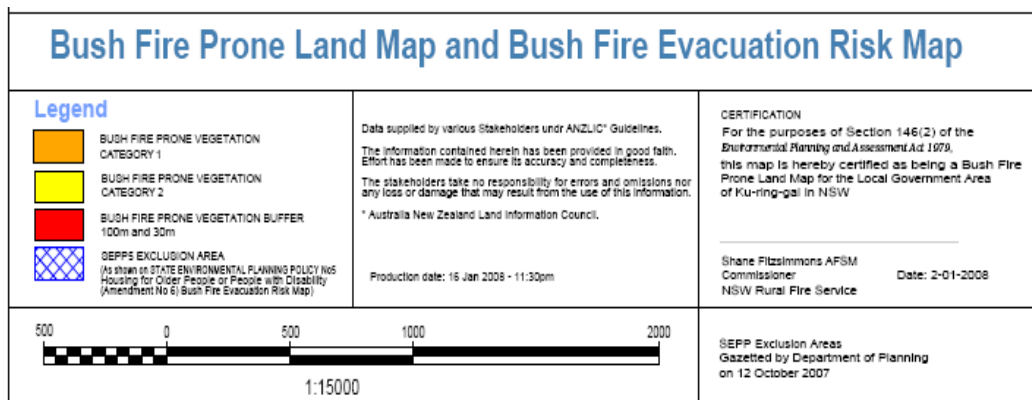
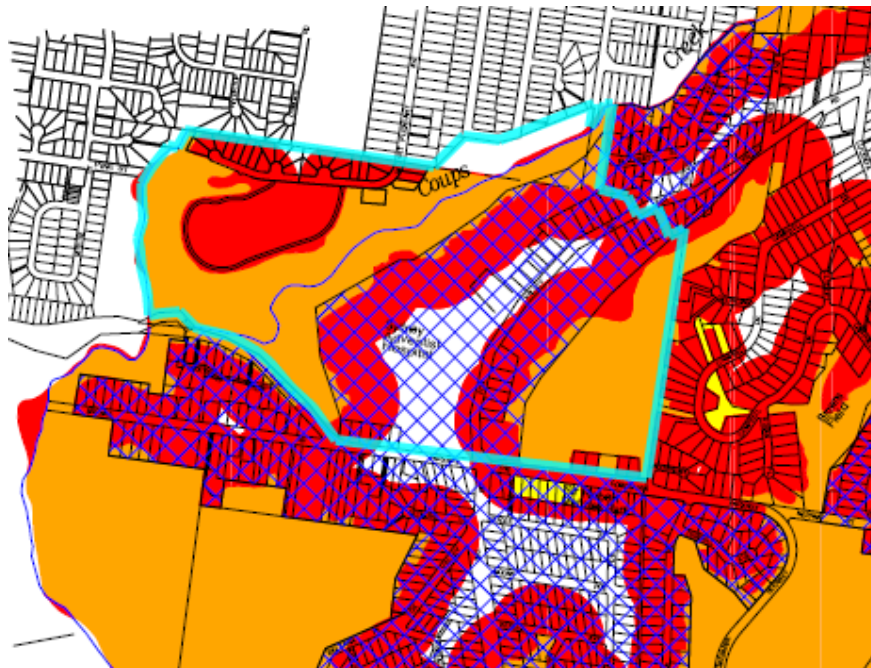
BUSHFIRE PRONE LAND MAP

5.1 Introduction.

The Commissioner of the NSW Rural Fires Service certified, in accordance with Section 146 of the *Environmental Planning & Assessment Act 1979*, the Ku-ring-gai Bushfire Prone Land Map on the 2nd January 2008.

This map identifies the areas which have been determined by Ku-ring-gai Council to contain either Category 1 or 2 Bushfire Prone Vegetation and are therefore deemed to be bushfire prone. An extract of the Ku-ring-gai BFPLM showing the Estate is shown as Figure 9 below.

Figure 9 – Extract of the Ku-ring-gai Bushfire Prone Land Map.



The map also records the extent to which the 100 metre wide buffer zone to the Category 1 Bushfire Prone Vegetation extends beyond the line of the vegetation which is deemed to be bushfire prone and also triggers the necessity for the development on the site meeting the deemed-to-comply provisions of *Planning for Bushfire Protection 2006* as required by the Director Generals Requirements [DGRs].

5.2 SEPP 5 [Seniors Living] Exclusion Area.

The Certified Bushfire Prone Land Map identifies an area within the site, shown as the blue cross hatching, which is identified as a “SEPP 5 Exclusion Zone” – “As shown on State Environmental Planning Policy No. 5 – Housing for Older People with Disability (Amendment No. 6) Bushfire Evacuation Risk Map)”.

The hatching restricts development of SEPP Seniors Living Developments [only] within the hatched area however the existing zoning of the property consists of the following zones as defined by the Ku-ring-gai Local Environmental Plan [LEP]:

- 5(a) Special Uses – (Hospital) which permits the development of hospital buildings, nursing homes and ancillary buildings;
- 5(a) Church which permits the development for Church use;
- 6(b) Private Recreation (Coups Creek corridor); and
- 2(c) Residential.

Consent to undertake construction of hospital buildings and nursing homes /aged care facilities on the area of the Estate zoned 5(a) Special Uses – (Hospital) is an approved landuse under the Ku-ring-gai Local Environmental Plan and therefore the construction of Nursing Homes and Aged Care developments are not excluded by the hatching on the Bushfire Prone Land Map [provided that they incorporate Asset Protection setbacks which are compliant with *Planning for Bushfire Protection 2006*].

5.3 Evacuation.

One of the specific objectives identified by *Planning for Bushfire Protection 2006* for ‘Special Fire Protection Purpose Developments’ is the provision of safe emergency evacuation procedures.

The bushfire risk assessment in Section 4 of this report identifies the potential level of risk from a bushfire event to development within the Estate.

The north-western precinct contains an existing Retirement Village complex which is more at risk from direct fire impact than development within the Central and Southeast precincts.

The existing development within the northwest precinct is protected by existing Asset Protection Zones/fuel management programs which will mitigate the potential level of bushfire risk to the existing buildings exposed to the fire path from the southwest. New development within this precinct will occur either within the northern area of the existing Retirement Village precinct, therefore ensuring increased separation from the bushfire threat, or to the north of the existing village and protected by Asset Protection Zones to widths which comply with *Planning for Bushfire Protection 2006*.

The recently constructed buildings within the existing retirement village precinct include building protection measures which will further minimise the effects of a bushfire on these buildings.

Evacuation of the retirement village precinct is not normally recommended, especially to a facility which is located within a well managed landscape, capable of reducing the bushfire risk and with buildings constructed and equipped to withstand the impacts of bushfires [ember & smoke attack] as the environment in which the occupants reside is deemed to provide a safe refuge to shelter during a bushfire event in the bushfire prone vegetation within the Lane Cove River / Coups Creek corridors.

Evacuation of this precinct, if required, can be implemented via a safe exit route along Mt Pleasant Road to Pennant Hills Road or alternately via the proposed link from Mt Pleasant Avenue to Osborne Avenue.

The Central Precinct contains the Hospital precinct which is shielded, from direct impact of a fire occurrence in the Lane Cove National Park, by the adjoining residential development, within the Estate and to the south of The Comenarra Parkway, providing a separation of more than 250 metres to the closest bushfire prone land within the National Park.

The topography of the land to the south of The Comenarra Parkway and the central precinct falls steeply to the south with the bushfire prone vegetation in the National Park located below the “crest” of the ridgeline which is located to the south of the Estate, therefore shielding the buildings within the central precinct from direct impact of radiant heat given off by a bushfire burning in the National Park.

The Hospital precinct will contain “non-core” Hospital uses such as carparking, services buildings, offices, Doctors Consulting Rooms and out-patients which will be located between the core Hospital Buildings and the Coups Creek corridor, thus reducing the bushfire risk to the Patients within the Hospital, from a fire occurrence in this corridor. With the protection measures built into the ancillary and Hospital buildings, including the provision of smoke filters to the fresh air intakes to the air-conditioning, the evacuation of the Hospital will not be required during bushfire events in the local area.

The carpark and ancillary buildings will be located beyond the defined flame zone length and will be designed and constructed to withstand the potential levels of radiant heat at this setback distance. These protection measures will provide security to the occupants, removing the need for evacuation of these buildings.

The southern portion of the Central Precinct contains a new Village Centre on the corner of Fox Valley Road and The Comenarra Parkway, a new Faculty of Nursing Building/Student Accommodation/Hostel and infill residential development along The Comenarra Parkway to the west. This portion of the Central precinct is secure from the impact of fire events occurring in the Lane Cove National Park to the south, being separated by at least 150 metres by existing residential development.

The new Faculty of Nursing and residential development will be established with requisite “Special Fire Protection” and “residential” width Asset Protection Zones to the vegetation in the narrow riparian corridor that flows to the northwest, connecting with Coups Creek whilst the residential infill development will be upgraded to address the potential levels of bushfire threat. This area of the Central precinct will not be impacted by severe bushfires which will trigger the need for evacuation of the students of the Faculty of Nursing and the residential development.

The Central Precinct also contains Church / Community Facilities, additional housing and the new K – 12 School which is located to the northwest of Fox Valley Road, northeast of the Hospital precinct. The school is located adjacent to the eastern boundary of the Estate. This location has been chosen due to the separation provided from the Lane Cove National Park to the south [> 700 metres] and the low bushfire risk posed by the vegetation within the upper reaches of Coups Creek, removing the need to relocate the students due to direct bushfire threat.

Furthermore, the evacuation plan prepared for the School will address the protocols for the relocation of students, due to illness [asthma] during prolonged periods of smoke impact.

The new residential precinct is protected from direct impact of bushfire occurrences in Coups Creek by the Hospital precinct to the south and the Church/Community Facilities and the Asset Protection Zone along Coups Creek, therefore ensuring that the future residents will not need to relocate during fire events in Coups Creek, with the only evacuation that maybe deemed necessary being for medical emergencies.

The bushfire risk within the southeast precinct will be substantially reduced by the proposed development within this precinct.

The vegetation remaining will continue to be isolated from bushfire prone vegetation in the local area, by the adjoining residential development and will constitute a low level of risk to the surrounding development. This risk will be further reduced with the management of the vegetation and the provision of an Asset Protection Zone to the adjoining development.

Existing residential development occupies the land to the south of The Comenarra Parkway and therefore this precinct will not be directly impacted by fire occurrences in the Lane Cove National Park, located further to the south. Therefore, evacuation of this precinct will be limited to people with respiratory ailments such as asthma.

In summary, whilst the development proposal will increase the number of people living and working within the Estate, the location and layout of the facilities as proposed by the revised Concept Plan and the proposed Hospital Master Plan, combined with the provision of bushfire protection measures including Asset Protection Zones, construction standards to buildings [commensurate with the level of bushfire attack] and the management of the residual vegetation on the land within the Estate will remove the need for large scale evacuation of the Estate due to bushfire threat.

The likely trigger for targeted evacuation of residents in the residential precincts [including the Student Accommodation] and the children at the new School will be for medical emergencies. The Hospital / Ancillary Hospital / Commercial facilities / retail development within the central and southeast precinct will not be exposed to a level of risk which will trigger the evacuation of these facilities and the likely threat, being smoke, will be addressed by filtration of the air-conditioning systems, therefore removing the need to relocate the occupants of these facilities.

Evacuation of the central and southeast precinct will be limited to medical emergencies from the various land uses [except the Hospital] and these evacuations will not impede the evacuation of the residents who are located within the residential development further to the south and who may need to be evacuated due to direct exposure to the risk from bushfires occurring in the Lane Cove National Park.

The Retirement Village within the northwest precinct will be the most affected facility on the Estate, due to its exposure to the Lane Cove National Park.

This exposure has been addressed in the provision of Asset Protection Zones to the facilities adjoining the vegetation, construction standards to buildings and the active fuel management of the vegetation surrounding the facility. It is therefore not likely that evacuation will be required, however if it is deemed necessary by the Emergency Services, safe evacuation can be implemented, via Mt Pleasant Avenue and the proposed future link via Osborne Avenue.

This will not impact on the traffic flow on Mt Pleasant Avenue [& Osborne Avenue]; Fox Valley Road or The Comenarra Parkway.

SECTION 6

ASSESSMENT OF FIRE PROTECTION MEASURES TO THE FUTURE DEVELOPMENT WITHIN THE ESTATE

6.1 Introduction.

The Director General issued DGRs for the Environmental Assessment under Part 3A of the *Environmental Planning & Assessment Act* and requires that the development demonstrate compliance with the requirements of *Planning for Bushfire Protection 2006*, including:

- Ensuring Special Fire Protection purpose developments are located away from the bushland interface;
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zones.

6.2 Compliance with the requirements of *Planning for Bushfire Protection 2006*:

The objectives of *Planning for Bushfire Protection 2006* are:

- (i) Afford occupants of any building adequate protection from exposure to a bushfire;
- (ii) Provide for a defensible space to be located around buildings;
- (iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- (iv) Ensure that safe operational access and egress for emergency service personnel and residents is available;
- (v) Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zones; and
- (vi) Ensure that utility services are adequate to meet the needs of fire-fighters and others assisting in bushfire fighting.

The document identifies six core bushfire protection requirements. These are:

- (1) Provision of Asset Protection Zones / Defendable Spaces in accordance with the specific landuse, the predominant bushfire prone vegetation type within 140 metres of the development and the topography of the land containing the bushfire prone vegetation;
- (2) Access for fire fighting operations;
- (3) Water Supplies for fire fighting operations;

- (4) Construction standards of buildings located within 100 metres of the bushfire hazard interface, dependant on specification landuse, the predominant bushfire prone vegetation type within 140 metres of the development and the topography of the land containing the bushfire prone vegetation;
- (5) Emergency Planning;
- (6) Landscape Management – in particular the management of the Asset Protection Zones / Defendable Spaces and residual bushfire prone vegetation.

The document also identifies types of development and provides deemed-to-satisfy fire protection measures for residential development [Class 1, 2 & 3 buildings]; “Special Fire Protection Developments [Hospitals, Nursing Homes / Retirement Villages / Schools / Childcare Centres & Tourist Accommodation]; Industrial / Commercial Development and residential and Special Fire Protection “infill” development.

In reference to the proposed development within the Estate, as shown on the revised Concept Plan, the proposed residential development along The Comenarra Parkway “infill” the existing residential development. Similar redevelopment of the existing residential development on Mt Pleasant Avenue is also classified as infill development.

The proposed upgrade / expansion [alterations & additions] to the existing Nursing Home precinct on Mt Pleasant Avenue is also deemed to be “infill development” as defined by Section 4.2.5 of *Planning for Bushfire Protection 2006*.

Similarly, alterations and additions to the existing buildings within the Hospital precinct are also defined as “infill development” within the meaning of Section 4.2.5 of *Planning for Bushfire Protection 2006*.

However, the Rural Fire Service, in these circumstances, seeks to achieve a better outcome than the present circumstance provides – this can be achieved through the provision of defendable spaces and increased construction standards to the buildings.

The protection of Class 5 – 10 buildings is also considered under Section 4.3.6(f) of *Planning for Bushfire Protection 2006*, with general fire safety construction standards required under the provisions of the Building Code of Australia taken as acceptable solutions to construction of this type of building, however, the aim and objectives of *Planning for Bushfire Protection 2006* apply in relation to the provision of fire fighting access and water supplies, emergency planning and landscape / vegetation management.

6.2.1 Provision of Asset Protection Zones / Defendable Spaces:

Appendix 2 of *Planning for Bushfire Protection 2006* provides a methodology to determine the Asset Protection Zones for development located within or within 100 metres of bushfire prone vegetation. This methodology the following to be assessed for each landuse within the Estate:

- (a) *Determine vegetation formations as follows:*
 - Identify all vegetation in all directions from the development for a distance of 140 metres;
 - Consult Table A2.1 to determine the predominant vegetation type; and
 - Select the predominant vegetation formation as described in Table A2.1.
- (b) *Determine the effective slope of the land under the predominant vegetation Class.*
- (c) *Determine the appropriate fire [weather] area in Table A2.2.*
- (d) *Consult Table A2.4 for residential development and Table A2.5 for Special Fire Protection development and determine the appropriate setback [Asset Protection Zone / Defendable Space] for the assessed land use, vegetation formation and slope range.*

The following section examines these prerequisites and provides a summary of this assessment and the resultant widths of the Asset Protection Zones / Defendable Spaces for the development precincts as shown on the revised Concept Plan and Hospital Master Plan. The Fire Danger Index [FDI] for the site is 100.

(A) NORTHWEST DEVELOPMENT PRECINCT.

(1) *Retirement Village / Nursing Home:*

The existing Adventist Retirement Village [Self Care Units] will remain within the south-western portion of this precinct without any change to the location of the buildings. The maintenance of the land between the perimeter road and the riparian buffer zone to the Lane Cove River and Coups Creek will provide for an increase in the width of the Asset Protection Zone to the west and southwest of the existing buildings [in accordance with a request from the Rural Fire Service]. The residual bushland to the west, southwest and south will be fuel managed in accordance with the Fire Management Plan.

The existing Esther Somerville Nursing Home & Elizabeth Lodge Hostel buildings will be upgraded with an expansion into the existing Carpark and open space area to the north, towards Mt Pleasant Avenue.

These alterations and additions are infill development which will not reduce the existing separation to the bushland in Coups Creek to the south and within the Lane Cove River riparian corridor to the west. Access to these buildings will be directly off Mt Pleasant Avenue.

(2) *Residential Development between Mt Pleasant Avenue and the northern Estate boundary – eastern end:*

This precinct contains existing dwellings which adjoin an area of unmanaged forest vegetation on land within Loreto Ladies College to the north. A six metre wide managed fire break extends along the southern boundary of the College. The southern aspect to this precinct overlooks bushland within the Coups Creek corridor. This bushland contains a walking track and water supply main easement, both of which are managed and therefore provide an extension of the Asset Protection Zone, beyond the road carriageway, with a total width Asset Protection Zone of 45 metres to the south.

The proposed redevelopment of this precinct consists of conversion of the existing single dwelling houses to dual occupancy landuse with a setback of 15 metres from the unmanaged vegetation within the Loreto Ladies College.

(3) *New Residential Development between Mt Pleasant Avenue and the northern Estate boundary – western end:*

This precinct is located to the west of the above residential precinct, up to the last two existing dwellings at the western end of Mt Pleasant Avenue, which will remain as individual dwellings. The proposed new residential development within this precinct will consist of medium density residential units with a 15 metre wide Asset Protection Zone provided to the north of the units which are located adjacent to the unmanaged forest vegetation within the Loreto Ladies College [Topography: > 5 degrees upslope to the north – APZ includes the width of the managed fire break within the Loreto Ladies College].

No setback is required to the north of the new development where it adjoins the existing residential development to the north. The managed curtilage on the existing, retained dwelling on the western end of Mt Pleasant Avenue provides the requisite Asset Protection Zone setback from the vegetation in the upper reaches of the Lane Cove River.

The south-western aspect to this precinct consists of a narrow corridor of forest vegetation in the riparian corridor to the eastern tributary to the Lane Cove River. The width of the vegetated corridor is less than 50 metres with proposed residential development and Asset Protection Area occupying the land to the south of the corridor. Therefore, the predominant vegetation is classified as “rainforest” for the purpose of determining the width of Asset Protection Zone.

The existing separation provided by Mt Pleasant Avenue, combined with the front building alignment setback, will provide the requisite 25 metre wide deemed-to-satisfy Asset Protection Zone to the south of this new development precinct.

(4) *New Residential precinct to the northwest of the existing Adventist Retirement Village:*

This new residential precinct occupies the vacant land to the northwest of the existing perimeter road to the Adventist Retirement Village and, combined with the provision of a 25 metre wide Asset Protection Zone, will occupy the land up to the riparian corridor to the tributary to the Lane Cove River.

The Asset Protection Zone to the west of the Adventist Retirement Village provides the deemed-to-satisfy setback to the west of this new residential precinct.

(B) CENTRAL DEVELOPMENT PRECINCT.

(1) *Village Centre / Retail Development Precinct – west of the Fox Valley Road / The Comenarra Parkway intersection:*

This development precinct replaces the existing School and is protected on all sides by existing/proposed development and will not be exposed to a bushfire threat.

(2) *Faculty of Nursing and Residential Development to the west of the Village Centre and north of The Comenarra Parkway:*

This new development precinct replaces some of the existing residential development and vacant land to the north of The Comenarra Parkway and extends to the west of the Village Centre so as to provide an > 90 metre wide separation [Asset Protection Zone] to the vegetation at the head of the narrow riparian corridor to the Coups Creek tributary for the Faculty of Nursing and a 40 metre wide separation for the residential development.

All remaining aspects of this precinct are protected by existing/proposed development and will not be exposed to a bushfire threat.

(3) *Infill Residential Development to the north of The Comenarra Parkway – western end:*

This precinct contains existing residential dwellings that are located adjacent to the vegetation within the riparian corridor to the Coups Creek tributary. These dwellings will remain in their present location with a defensible space provided to the west of these buildings. Future redevelopment will consist of alterations and additions to the existing dwellings under the infill provisions of *Planning for Bushfire Protection 2006*.

(4) *Hospital Precinct:*

The expansion of the existing Hospital and ancillary land uses occupies a large parcel of land extending west from Fox Valley Road to the Coups Creek corridor and with the Faculty of Nursing/residential development, south to The Comenarra Parkway.

The only exposure that this precinct has to a future bushfire threat is from the vegetation in Coups Creek and its eastern tributary. The potential fire paths have been described in Figures 8 & 9. The most significant exposure on this precinct will occur to the area east of the junction of Coups Creek and its eastern tributary, north of The Comenarra Parkway.

The vegetation within the Coups Creek corridor consists of Wet & Dry Sclerophyll Open Forest on slopes which exceed 18 degrees within the section of corridor between the Hospital precinct and the Retirement Village/Nursing Home precinct therefore the core Hospital land use housing the Medical Wards will be located beyond the requisite width of Asset Protection Zone [100m] as required by Table A2.6 of *Planning for Bushfire Protection 2006*.

The ancillary, non Special Fire Protection buildings that support the operations of the Hospital, i.e. Administration, Doctor's Consulting Rooms, Offices, Service Buildings and the proposed multi-storey Carpark buildings will be located within the 100 metre wide Asset Protection Zone provided to the core Hospital buildings, with a defendable space of > 50 metres provided between the ancillary buildings and the unmanaged bushland in the riparian corridors.

This width has been determined, based on the advice of the NSW Rural Fire Service that the ancillary buildings should be located beyond the flame zone length. [The effective slope of the land in the Coups Creek corridor is < 15 degrees downslope in the direction of the fire path from the southwest].

It is proposed to construct residential accommodation above the Carpark buildings with this component of the building located beyond the residential development setback width as defined by *Planning for Bushfire Protection 2006*.

(5) Church / Community Facilities:

This precinct is located to the northeast of the Hospital precinct and contains the existing Church and Community Centre with future expansion of this landuse contained to the area between the existing buildings. Additions to the existing Community Centre will occur within the foundation space to the building, under the "infill" provisions of *Planning for Bushfire Protection 2006*.

Relocation of the occupants of the Community Centre, to a safe refuge zone on site may be necessary during fire events in the Coups Creek corridor.

(6) New Residential Development Precinct:

This precinct is located to the northeast of the existing Church precinct, extending from Fox Valley Road to Coups Creek with the requisite residential development Asset Protection Zone setback to the forest vegetation within the Coups Creek riparian corridor. All remaining aspects are not exposed to a bushfire threat.

(7) New K – Y12 School Site:

The new School site is located to the northeast of the residential precinct, northwest of Fox Valley Road, in the northeast of the Estate. This location provides maximum protection to the facility/students, teachers and visitors from a bushfire event in the Lane Cove National Park which is located more than 700 metres to the southwest. The only bushfire threat to this location is from a fire occurrence in the narrowed section of riparian corridor to Coups Creek.

The Asset Protection Zone setback of 70 metres [Slope of < 5 degrees downslope] is provided by the playing fields and managed open space [which will retain the existing Blue Gum trees] to the northwest of the school buildings. The bushfire threat to the School, from a fire advancing under a south-westerly wind influence along the Coups Creek corridor, will be eliminated by the managed Asset Protection Zone and the Church / Community Facilities and residential landuse to the southwest of the school site.

All remaining aspects of the school site are protected by existing/proposed residential development.

(C) SOUTHEAST DEVELOPMENT PRECINCT.

(1) *Infill Residential Development along The Comenarra Parkway:*

This precinct is located along the northern side of The Comenarra Parkway, within the south-eastern corner of the Estate and contains existing residential development with vacant land located between the existing dwellings. The development proposal is for new dwellings to be erected on the vacant land under the “infill development” provisions of *Planning for Bushfire Protection 2006*.

It is proposed to construct a new loop road along the northern side of the existing and proposed dwellings so as to provide access from Warwick Place to the new residential precinct to the north. This will also increase the width of the Asset Protection Zone to the north of this residential infill precinct. The scarpline and lower benches to the north of the proposed loop road will also be managed to provide a 60 metre wide Asset Protection Zone to the north of the existing/future dwellings.

(2) *Village Centre / Retail Development Precinct – east of the Fox Valley Road / The Comenarra Parkway intersection:*

This development precinct replaces the existing short term accommodation “Special Fire Protection” buildings on the north-eastern corner of Fox Valley Road and The Comenarra Parkway intersection and is protected to the west and south by existing/proposed development and will not be exposed to a bushfire threat from these aspects.

The narrow corridor of EEC [Blue Gum Forest] vegetation extends along the eastern aspect of the retail precinct with the new buildings located so that a 10 metre wide defendable space is provided between the new buildings and the retained vegetation.

(3) *Existing Residential Accommodation, southeast of Fox Valley Road.*

This precinct contains existing single dwelling houses and a medium density building, opposite the existing Hospital precinct. The existing buildings adjoin the narrow band of EEC vegetation with the proposed loop access road and managed Asset Protection Zone further to the east. Due to the location of the EEC vegetation redevelopment of this precinct will only include refurbishment/reconstruction of the existing buildings under the “infill” development provisions of *Planning for Bushfire Protection 2008*.

(4) *Commercial Precinct:*

This precinct occupies the corridor of existing development along the south-eastern side of Fox Valley Road with the narrow band of EEC vegetation to the east. New commercial buildings constructed within this precinct will be located so that a 10 metre wide defendable space is provided between the buildings and the narrow corridor of retained EEC vegetation.

(5) *New Residential Development Precinct – Southeast of EEC corridor:*

This precinct occupies the land to the southeast of the corridor of EEC vegetation and the eastern boundary of the Estate. Existing residential development adjoins the precinct to the east with the riparian corridor to the gully line to the south and southeast.

The gradients of the land within the riparian corridor exceed 18 degrees therefore a 60 metre wide Asset Protection Zone is provided to the south-eastern aspect of the future dwellings. The corridor of EEC vegetation is less than 50 metres wide and on an upslope gradient of > 5 degrees, therefore an Asset Protection Zone of 10 metres is provided to the future dwellings adjoining the EEC vegetation.

(6) *New Residential Development Precinct – Southeast of Fox Valley Road – northeast of Commercial Precinct:*

This precinct replaces the existing single dwelling house landuse located along the south-eastern side of Fox Valley Road and will include medium density unit development.

The proposed K – Y12 School is located to the northwest of this precinct with existing residential development to the northeast and the Commercial Precinct to the southwest. The south-eastern aspect consists of the vegetation within the EEC corridor with new and existing residential development extending further to the southeast. The width of the retained vegetation in the EEC corridor is less than 50 metres wide, on a downslope gradient to the southeast. Therefore, an Asset Protection Zone of 15 metres is provided between the future residential development and the EEC vegetation.

6.2.2 Access for Fire-Fighting Operations.

The existing Public Road access to the Estate consists of Fox Valley Road, The Comenarra Parkway and Mt Pleasant Avenue.

Fox Valley Road and The Comenarra Parkway are two-way arterial roads whilst Mt Pleasant Avenue is a local dead-end road which connects to Pennant Hills Road. All three roads are constructed to the deemed-to-satisfy public road specifications as defined by Section 4.1.3(1) of *Planning for Bushfire Protection 2006*.

Fox Valley Road currently accommodates parking along both sides of the road however the re-development on the Estate will provide off-street carparking which will enable Fox Valley Road to be extended to four traffic lanes with an improved intersection at The Comenarra Park. These new traffic arrangements will impact emergency access to the Estate [and neighbouring areas] and improve evacuation routes for residents living in the area to the south of The Comenarra Parkway.

The Comenarra Parkway extends to the west and east from its intersection with Fox Valley Road and passes through bushland vegetation which may be involved in a fire event that has the potential to close this road. The road closure is not likely to occur simultaneously due to the projection of the residential development to the south of The Comenarra Parkway.

Should this road closure eventuate, alternate safe emergency service access is available from the Pacific Highway and Fox Valley Road, thus permitting fire fighting appliances from Hornsby NSWFB & Rural Fire Service and Pymble NSWFB & Ku-ring-gai NSW Rural Fire Service to access the Estate. Safe egress from the Estate is available via this road network.

The revised Concept Plan provides for the construction of a new loop road which provides access to the new K – Y12 school precinct then provides a perimeter road to the northwest of the residential and Church and Hospital precinct, returning to Fox Valley Road, along the southern edge of the Hospital Precinct. This road will be a two-way carriageway with a formed width of 8.0 metres and constructed to the deemed-to-satisfy standards of Section 4.1.3(1) of *Planning for Bushfire Protection 2006*.

A second loop road extends from Fox Valley Road, through the new residential precinct within the south-eastern corner of the Estate. This new road connects to Warwick Place thence to The Comenarra Parkway. This road will be a two-way carriageway with a formed width of 8.0 metres and constructed to the deemed-to-satisfy standards of Section 4.1.3(1) of *Planning for Bushfire Protection 2006*.

6.2.3 Water Supplies for Fire-Fighting Operations:

The existing facilities within the Estate are serviced from water mains located on Fox Valley Road, The Comenarra Parkway and Mt Pleasant Avenue. A fire service main is provided to the Hospital precinct and the Retirement Village/ Nursing Home.

Future extension of the Hospital will include extension of the existing fire fighting water service. The new fire fighting water service to the Hospital shall also include the provision of an on-site static water supply for fire-fighting operations, in addition to the mains supply.

The residential new development within the Estate will be connected to the existing mains supply which will include the provision of Fire Hydrants installed in accordance with the specifications of Australian Standard A.S 2419.2 and have a minimum flow rate of 10 litres / second.

Fire hydrants shall be accessible and located such that a tanker can park within a maximum distance of 20 metres from the hydrant and the habitable building must be located such that a fire at the furthest extremity can be attacked by fire-fighters using two 30 metre hose lines and a 10 metre water jet. A clear unobstructed path between the hydrant and the most distant point of the building cannot exceed 90 metres.

Hydrant locations within road carriageways shall be delineated by blue markers placed on the hydrant side of the centreline of the road pavement.

Future redevelopment of the aged care precinct on Mt Pleasant shall include the provision of an on-site static water supply for fire-fighting operations, in addition to the mains supply.

6.2.4 Construction Standards of Buildings:

Part 2.3.4 of the Building Code of Australia [BCA] states that Class 1 buildings that are constructed in a *designated bushfire prone area* must be designed and constructed to reduce the risk of ignition from a bushfire while the fire front passes. Part GF5.1 of the BCA states that a Class 2 or 3 building constructed in a *designated bushfire prone area* is to provide a resistance to bushfires in order to reduce the danger to life and minimize the risk of the loss of the building.

Australian Standard A.S. 3959 -1999 is the enabling standard that addresses the performance requirements of both Parts 2.3.4 and Part GF5.1 of the Building Code of Australia.

The BCA does not specify deemed-to-comply construction standards for Class 4 – 10b buildings however Appendix A3.6 of *Planning for Bushfire Protection 2006* provides the following procedure for determining bushfire attack at construction stage for a building within a designated bushfire prone area:

- (a) *Determine vegetation formation types and sub-formation types around the building;*
- (b) *Determine the separation distance between each vegetation formation and the building;*
- (c) *Determine the effective slope of the ground for each vegetation formation;*
- (d) *Determine the relevant FDI for the Council Area;*
- (e) *Match the relevant FDI, appropriate vegetation formation, separation distance and effective slope to determine the category of bushfire attack.*

Five categories of Bushfire Attack are determined. They are:

- Low:

Insignificant ember attack, radiation heat or is greater than 100 metres from all woody vegetation.

- Medium: (Level 1 Construction AS3959-1999).

Significant ember attack with radiation heat no greater than 12.5 KWm²,

- High: (Level 2 Construction AS3959-1999).

Significant ember attack and possible flame contact, radiation heat greater than 12.5 KWm² and no greater than 19 KWm²

- Extreme: (Level 3 Construction AS3959-1999).

Significant ember attack and possible flame contact, radiation heat greater than 19 KWm² and no greater than 29 KWm²

- Flame Zone:

Within the Flame Zone and / or greater than 29 KWm² (Construction outside scope of AS3959-1999).

A review of the construction standards to the future buildings within the Hospital precinct has been undertaken in cooperation with the NSW Rural Fire Service with the following levels of construction identified:

- **Core Hospital Buildings [e.g. Wards]**

Radiant heat rating on exterior of building not more than 10kWm² or building shielded by a non core building which provides protection against radiant heat from a bushfire fire source feature;

- **Non Core Hospital Buildings [e.g. Consulting Rooms / Administration / Offices]**
Radiant heat rating on exposed elevations shall not exceed Flame Zone levels of radiant heat.
- **Ancillary Hospital Buildings [e.g. Carparking buildings/Service Buildings]**
Non combustible construction with defendable space provided.
- **New “Special Fire Protection Purpose” buildings [e.g. Faculty of Nursing – additions to the Aged Care Facility, School]**
Radiant heat rating on exterior of building shall not exceed more than 10kWm².
- **New Residential Buildings within the Estate**
The level of construction of the buildings within the proposed new residential precincts and modifications to the existing residential development within the Estate shall comply with the construction standards as defined by Appendix 3 of *Planning for Bushfire Protection 2006*. The maximum level of radiant heat to which the new development [excluding “infill” development] shall be exposed to shall not exceed 29 kWm² [Level 3 construction].

6.2.5 Emergency Planning.

Each of the individual land uses on the Estate will be required to prepare a site specific Evacuation Plan.

Evacuation principles have been addressed in Section 5.3 of this report.

It is further recommended that, upon approval of the Concept Plan, an Emergency Liaison Committee be established by the Australian Conference Association [ACA]. The purpose of the committee shall be to co-ordinate the preparation of the various Estate Evacuation Plans, implement evacuation drills and reviews of the individual Evacuation Plans. The Chair Person of the Committee shall also attend the Local Emergency Management Committee meetings and bring to those meetings and the Emergency Service Combat Agencies/support Welfare Agencies the emergency planning protocols and issues related to the various land uses within the Estate.

The Committee/Chair Person shall also be responsible for implementing annual inspections of the facilities on the Estate by the Emergency Service Combat Agencies.

6.2.6 Landscape Management - in particular the management of the Asset Protection Zones / Defendable Spaces and residual bushfire prone vegetation.

The intention of landscape management is to prevent flame contact with a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimize the potential for wind driven embers to cause ignition and to reduce the effects of smoke on residents / patients / visitors and fire-fighters.

Careful attention shall be given to species selection of landscaping within the Estate, their location relative to their flammability, avoidance of continuity of vegetation [separation horizontally and vertically] and ongoing maintenance to remove flammable fuels. Methods of bushfire hazard management include mowing of lawns and manual removal of combustible material, particularly within the landscaped areas and hazard reduction burning within the residual vegetation on the site.

It is recommended that a Section 88B Instrument, under the provisions of the Conveyancing Act of 1919, shall be created on the title of the lots which are impacted by the provision of the Asset Protection Zone and which are not managed or owned by the Estate.

It is also recommended that the existing Estate Fire Management Plan shall be amended to progressively address the management protocols required to address the provision of Asset Protection Zones to the new development within the Estate managed land and to address the fuel management [hazard reduction] of the areas of residual vegetation within the Estate and also the Lane Cove River/Coups Creek corridors. The Estate Fire Management Plan shall also address the protocols required to manage the eastern tributary to Coups Creek and the vegetation within the valley in the south-eastern corner of the Estate.

A copy of the Estate Fire Management Plan shall be provided to the Hornsby District Office of the NSW Rural Fire Service and the NSW Fire Brigade.

It is recommended that a sub-committee be established from the members of the Emergency Liaison Committee to over-see the implementations of the recommendations of the Estate Fire Management Plan with the Chair Person of the sub-committee responsible for liaison with the Hornsby Ku-ring-gai Bushfire Management Committee and attendance at Bushfire Management Committee meetings.

SECTION 7

CONCLUSION

A Concept Plan approval is being sought, under Part 3A [Major Projects] of the *Environmental Planning & Assessment Act 1979* for the redevelopment of the Sydney Adventist Hospital, Wahroonga.

The Director General issued on the 9.4.2008, under Major Project No. MP07_0166, the requirements for the preparation of the Environmental Assessment for the project which under 'Key Assessment Requirements' – Item 7 requires that the development demonstrate compliance with *Planning for Bushfire Protection 2006*, including:

- Ensuring Special Fire Protection purpose developments are located away from the bushland interface;
- Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone.

These requirements reflect the advice provided to DoP from the NSW Rural Fire Service in the Service's response to DoP dated 13th March 2008.

This report has therefore reviewed the proposed redevelopment of the Estate against the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* and the requirements contained in Section 7 of the DGRs, including consultation with the Development Control Officers of the NSW Rural Fire Service to obtain their advice on the location of the core and non-core Special Fire Protection Purpose Development within the Hospital Precinct and the requisite Asset Protection Zone setbacks to the various land-uses, both within the Hospital Precinct and generally across the Estate.

Table 1 summarises the extent to which the Concept Plan conforms to the deemed-to-satisfy specifications of *Planning for Bushfire Protection 2006*.

Table 2 summarises the extent to which the Concept Plan conforms to the additional requirements of the Director Generals Requirements.

Table 1. Compliance with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006*.


Bushfire Protection Measure	Compliance with deemed-to-satisfy provisions of <i>Planning for Bushfire Protection 2006</i>.
Asset Protection Zone setbacks	YES – widths of Asset Protection Zones comply with Table A2.4 [Residential] and Table A2.6 [Special Fire Protection Purpose Development of <i>Planning for Bushfire Protection 2006</i> .
The siting and adequacy of water supplies for fire fighting	YES – Hydrant supply to be installed in accordance with AS 2419.2 – additional static fire-fighting water supply recommended for the Hospital and Aged Care development precincts
Design of Public Roads	YES – Existing Public Roads and proposed internal access roads shall comply with the specifications of Section 4.1.3(1) and Section 4.2.7 of <i>Planning for Bushfire Protection 2006</i> .
Design of Fire Trail network	No fire trail network required
Adequacy of emergency response access and egress	YES – Existing and proposed road network provide two-way access that provide safe access/egress for emergency service vehicles.
Adequacy of bushfire maintenance plans and fire emergency procedures	<p>YES – The existing Estate Fire Management Plan should be progressively updated to address the provision of Asset Protection Zones to the existing and future development on the site and the fuel management of residual vegetation. A copy of the Estate Fire Management Plan shall be provided to the Hornsby District Office of the NSW Rural Fire Service and the NSW Fire Brigade.</p> <p>A sub-committee shall be established from the members of the Emergency Liaison Committee to over-see the implementations of the recommendations of the Estate Fire Management Plan with the Chair Person of the sub-committee responsible for liaison with the Hornsby Ku-ring-gai Bushfire Management Committee and attendance at Bushfire Management Committee meetings.</p>
Building construction standards	<p>YES – Maximum Level 3 construction standards shall apply to all non-special fire protection development on the Estate [except for “infill development”].</p> <p>Special Fire Protection Purpose Development shall not be exposed to radiant heat levels greater than 10kWm².</p>
Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	Not applicable
Emergency Management	<p>Upon approval of the Concept Plan, an Emergency Liaison Committee shall be established by the Australian Conference Association [ACA].</p> <p>The Chair Person of the Committee shall also attend the Local Emergency Management Committee meetings and bring to those meetings and the Emergency Service Combat Agencies / support Welfare Agencies the emergency planning protocols and issues related to the various land uses within the Estate.</p> <p>The Committee/Chair Person shall also be responsible for implementing annual inspections of the facilities on the Estate by the Emergency Service Combat Agencies.</p>

Table 2. Compliance with the additional Director Generals Requirements [DGRs].

Requirement	Compliance with the additional DGRs
Ensuring Special Fire Protection purpose developments are located away from the bushland interface	YES – width of the Asset Protection Zones to the Special Fire Protection purpose developments within the Hospital Precinct complies with Table A2.6 [Special Fire Protection Purpose Development of <i>Planning for Bushfire Protection 2006</i> [Minimum 100m to Coups Creek corridor].
Identify vegetation types, ownership and ongoing management of any proposed Asset Protection Zone	YES – The type of vegetation within the Asset Protection Zones will be either landscaped gardens or where they extend into the existing bushland vegetation this bushland will be modified to provide crown separation and a managed, discontinuous understorey. Within the Estate, the ownership and management of the Asset Protection Zones and residual vegetation shall be the responsibility of the Australian Conference Association. On land that is not retained by the ACA, management shall rest with the owners of that land under the provisions of an 88B Easement.

REFERENCES:

- N.S.W Rural Fire Service – *Planning for Bushfire Protection 2006*;
- *Environmental Planning & Assessment Act – 1979*;
- *Rural Fires Act – 1997*;
- *Rural Fires Regulation 2002*;
- NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping 2002*;
- *Bushfire Environmental Assessment Code 2003*;
- Building Code of Australia;
- Australian Standard A.S 3959-1999 “*Construction of Buildings in Bushfire Prone Areas*”.
- *Ku-ring-gai Bushfire Prone Land Map*



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