Our Reference B06331
3.6.2010

Bates Smart
243 Liverpool Street,
Sydney
NSW 2010

Australian Bushfire Protection Planners Pty Ltd
ACN 083085474
Bushfire Mitigation Consultants

Attention: Albert Gregori

Re: Bushfire Protection Assessment Report for the proposed rezoning of Lot 1 in DP 532353, No. 126 Greville Street & Lot 1 in DP 408490 Millwood Avenue, Chatswood

Dear Albert,
Further to your request I have reviewed the Bushfire Protection Assessment Report undertaken for the proposed rezoning of Lot 1 in DP 532353, No. 126 Greville Street & Lot 1 in DP 408490 Millwood Avenue, Chatswood and can confirm that the report was prepared in accordance with the requirements of *Planning for Bushfire Protection 2006* – which remains the current bushfire planning document for NSW.

Furthermore, discussions and liaison with the NSW Rural Fire Service were based on achieving compliance with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* in regard to the provision of Asset Protection Zones to the future building/s; access and water supplies for fire-fighting operations.

The report also used *Planning for Bushfire Protection 2006* to establish the building construction requirements, however, on the 1st May 2010, NSW adopted the updated Australian Standard AS3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.* This updated Standard changes the way bushfire attack levels are determined and may change the level of construction from that determined in the report dated 21.5.2007.

Under the provisions of 79BA of the *Environmental Planning & Assessment Act 1979,* the final determination of the construction standards must be undertaken as part of the Development Application for construction of the future buildings on the site – therefore I see no need to update the report as this matter will be addressed more appropriately at that time.

Other than the above reference to construction standards, the recommendations of the report dated 21.5.2007 remains relevant at this time.

If you require any further information please contact the undersigned.
Yours faithfully,

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

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BUSHFIRE PROTECTION ASSESSMENT

FOR THE

PROPOSED REZONING

OF

LOT 1 in DP 532353,

No. 126 GREVILLE STREET

&

LOT 1 in DP 408490

MILLWOOD AVENUE

CHATSWOOD

FOR THE

BARANA GROUP.

Australian Bushfire Protection Planners Pty Limited
ACN 083 085 474

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FOR THE

BARANA GROUP.

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B06331 - 3	Final	26.4.2007	21.5.2007	*G.L.Swain*

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EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited, at the request of the Barana Group, has prepared an amended Bushfire Protection Assessment to accompany a rezoning of the land within Lot 1 in DP 532353, No. 126 Greville Street and Lot 1 in DP 408490 Millwood Avenue, Chatswood.

The development site, which forms the land within the rezoning application, is located on the north-western side of Greville Street, to the northeast of Millwood Avenue and contains the existing structures of the Commonwealth Acoustics Laboratories and Ultrasound Institute.

The entire site is presently zoned 5(a) Special Use Acoustic Laboratory. The applicant seeks to rezone the site to permit Medium Density Residential Development. The land within Lot 1 in DP 408490 and Lot 138 in DP 14799, No. 25 Millwood Avenue, which is owned by the applicant, will be used to accommodate an emergency pedestrian egress from the proposed medium density development on Lot 1 in DP 532352, No. 126 Greville Street.

The site [Lot 1 in DP 532353, No 126 Greville Street] is adjoined to the southwest, south, southeast and east by existing residential development. Residential development also adjoins the northern boundary of the eastern portion of the site with vacant State Government land adjoining the splayed north-eastern boundary of the western portion of the site. Lane Cove National Park adjoins the north-western boundary. Both the State Government land, the land to the north east of the western portion of the site and the Lane Cove National Park contain vegetation which has been mapped, by Willoughby Council, as Category 1 Bushfire Prone Vegetation.

The northern portion of the site also contains a triangular area of Category 1 Bushfire Prone Vegetation that forms the riparian corridor to the creekline which flows to the north along the north-eastern boundary of the western portion of the site.

The site is therefore impacted by the bushfire prone vegetation on the site and within the adjoining National Park and State Government lands. This vegetation is defined, under the provisions of Section 146 of the *Environmental Planning & Assessment Act – 1979,* as Category 1 Vegetation on the Willoughby Council Certified Bushfire Prone Land Map.

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A review of the fire history for the site revealed that during the 1994 bushfire season, the Lane Cove River corridor fire shed embers into the vegetation on the University of Technology Sydney Ku-ring-gai Campus, located on the ridgeline to the northwest of the site. The fire within the University Campus extended downslope, under the prevailing northwest winds, into the Blue Gum Creek corridor [Lane Cove National Park] before running upslope towards Millwood Avenue and the north – western boundary of the site. No physical damage occurred within the developed areas of the site.

Pursuant to Ministerial Direction No. 19 – Planning for Bushfire Protection [under Section 117 of the *Environmental Planning & Assessment Act – 1979],* the Council is required, prior to the preparation of a draft LEP that effects, or is in proximity to land mapped as bushfire prone land, to consult with the NSW Rural Fire Service amongst other things], under Section 62 of that Act and take into account any comments so made.

A former schematic layout for the modification of the existing buildings to accommodate medium density units and construction of new medium density units on the site and subsequent Bushfire Protection Assessment for the rezoning of the site was prepared following advice received from the NSW Rural Fire Service. The application was rejected by the NSW Rural Fire Service on the grounds that the matter was a rezoning proposal and therefore, had to comply with the Asset Protection Zone setbacks required by *Planning for Bushfire Protection 2001.*

Subsequent to the non-acceptance of the rezoning proposal based on the re-use and modification of the existing buildings and the release of *Planning for Bushfire Protection 2006,* a further meeting was held with Mr Lew Short, Manager of Development Control, NSW Rural Fire Service [and other members of the Development Control Division of the Rural Fire Service] to determine the permissibility of the rezoning of the land to permit medium density development using the setbacks required under *Planning for Bushfire Protection 2006.*

Other matters such as emergency access and egress, effective slopes and vegetation communities/riparian corridors were also discussed. Further to these discussions, additional site surveys were undertaken by Denny Linker & Co., Registered Surveyors, to determine effective slopes of the land within the National Park estate to the northwest of the site and within the narrow riparian corridor in the northern portion of the site.

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This was done so as to permit accurate determination of the requisite widths of Asset Protection Zones required to future medium density development on the site. [Refer to Appendix A – Plan showing effective slope of land].

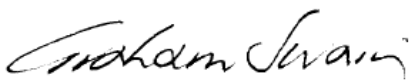
The schematic medium density development plan for the site, prepared by BatesSmart Architects, provides setbacks from the unmanaged vegetation within the Lane Cove National Park and the riparian corridor within the site, which comply with the deemed-to-satisfy specifications for the provision of Asset Protection Zones for the effective slopes and vegetation formations found within these bushfire prone areas.

Emergency access provisions have also been addressed in the provision of an alternate vehicular egress from the underground carpark to the medium density development within the western portion of the site, to Range Street and emergency pedestrian egress available from the underground carpark to Millwood Avenue, via an existing residential property [25 Millwood Avenue] to the south of the site.

Due to the site being impacted by the Willoughby Council's Bushfire Prone Land Map, future medium density development on the site, which includes the construction of new buildings within the eastern and north-western portions of the site, falls within the requirements of Section 91(1) [Integrated Development] of the *Environmental Planning & Assessment Act - 1979.*

Future medium density residential development on the site therefore falls under the provisions of Section 100B of the *Rural Fires Act* and will require the issue of a Bushfire Safety Authority from the Commissioner of the NSW Rural Fire Service.

This report assesses the provisions of Section 46(1) (g) of the *Rural Fires Regulation,* necessary to provide compliance with Section 100B of the *Rural Fires Act 1997* and provides recommendations on the provision of Asset Protection Zones, access, water supplies for fire-fighting operations and building construction standards to the future medium density residential buildings on the site, to satisfy the requirements of a *Bushfire Safety Authority* issued by the Commissioner of the NSW Rural Fire Service under *Section 100B (4)* of the *Rural Fires Act - 1997*.



Graham Swain,
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SECTION 1

INTRODUCTION

1.1 Rezoning Proposal.

This Bushfire Protection Assessment has been prepared, at the request of the *Barana Group*, to accompany a submission for the rezoning of the land within Lot 1 in DP 532353, No. 126 Greville Street & Lot 1 in DP 408490 Millwood Avenue, Chatswood.

The rezoning proposal seeks to modify the current 5(a) Special Use Acoustic Laboratory zoning to permit Medium Density Residential Development.

A schematic development plan has been prepared by BatesSmart, Architects, for the construction of a number of apartment buildings within the area of the existing Acoustic Laboratory Carpark [fronting Greville Street] and the construction of other apartment buildings located in the western portion of the Acoustic Laboratory site.

1.2 Aims of this Assessment.

The aims of this assessment are as follows:

- Determine the formation of the vegetation on and adjoining the development site, in accordance with the vegetation classification system contained in *Planning for Bushfire Protection 2006*;

- Undertake an assessment to determine the effective slope of the land on and adjoining the development site;

- Determine the Fire Danger Index [FDI] for the site;

- Undertake an assessment to determine bushfire protection measures to the future medium density development, that address the following matters:

  (i) The provision of building setbacks (Asset Protection Zones) from vegetated areas and the siting of buildings to minimize the impact of radiant heat and direct flame contact;

  (ii) Fire fighting water supplies;

  (iii) Access requirements for emergency service vehicles;

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(iv) Construction standards to be used for the future buildings within the proposed development to minimize the vulnerability of buildings to ignition from radiation and ember attack;

(v) Land management responsibilities; and

(vi) Evacuation management.

1.3 Statutory Requirements.

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

1.3.1 Legislation.

***(a) Environmental Planning and Assessment Act - 1979* (EPA Act)**

Planning and development within NSW is regulated by the *Environmental Planning & Assessment Act, 1979* (EPA Act).

In relation to the rezoning of land for the future construction of residential buildings and the protection against the impacts of bushfires, Ministerial Direction No. 19 – Planning for Bushfire Protection [under Section 117 of the *Environmental Planning & Assessment Act – 1979*] applies.

Pursuant to Ministerial Direction No. 19 – Planning for Bushfire Protection, the Council is required, prior to the preparation of a draft LEP that effects, or is in proximity to land mapped as bushfire prone land, to:

(1) Consult with the NSW Rural Fire Service amongst other things], under Section 62 of that Act and take into account any comments so made;

(2) Have regard to Planning for Bushfire Protection 2001 [now 2006];

(3) Introduce controls that avoid placing inappropriate developments in hazardous areas, and;

(4) Ensure that bushfire hazard reduction is not prohibited within the APZ.

A draft LEP shall, where development is proposed, comply with the following provisions, as appropriate:

(a) Provide an Asset Protection Zone [APZ] incorporating at a minimum:

- An Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for

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development and has a building line consistent with the incorporation of an APZ, within the property, and

- An Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road.

(b) For infill development [that is development within an already subdivided area], where an appropriate APZ cannot be achieved, provide for an appropriate performance standard in consultation with the NSW Rural Fire Service. If the provisions of the draft LEP permit Special Fire Protection Purposes [as defined under Section 100B of the *Rural Fires Act 199],* the APZ provisions shall be complied with;

(c) Contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks;

(d) Contain provisions for adequate water supply for fire fighting purposes;

(e) Minimise the perimeter of the area of land interfacing the hazard;

(f) Introduce controls on the placement of combustible materials in the Inner Protection Area, and;

(5) If the draft local plan does not comply with the provisions listed in paragraphs 2 & 3, the Council must obtain written advice from the Commissioner of the NSW Rural Fire Service, to the effect that, notwithstanding the non-compliance, the NSW Rural Fire Service does not object to the progression of the draft LEP.

In relation to bushfire protection planning for new residential, rural residential and special fire protection developments in bushfire prone areas in NSW, the following sections of the EPA Act apply:

- Section 79C(1) states *"In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development, the subject of the development application:*

  - *The likely impacts of the development (e.g. natural hazards such as bushfire threat)*
  - *The suitability of a site for development (e.g. bushfires)*

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- Section 91(1) defines the subdivision of Bushfire Prone Land for residential and rural residential subdivision and the construction of Special Protection Developments that are located in a Bushfire Prone Area as integrated development, which requires authorization under Section 100B of the *Rural Fires Act 1997.*

In relation to a future Development Application submitted for the construction of residential buildings on bushfire prone land Section 79BA of the *Environmental Planning & Assessment Act* states that:

"development consent cannot be granted for any purpose (other than a subdivision of land that could lawfully be used for residential or rural residential purposes or development for a special fire protection purpose) on bushfire prone land unless the consent authority:

- *Is satisfied that the development conforms to the specifications of Planning for Bushfire Protection 2001[2006] or;*

- *The consent authority has consulted with the Commissioner of the NSW Rural Fire Service concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bushfire".*

(b) Rural Fires Act 1997

The objectives of the *Rural Fires Act* are to provide:
- The prevention, mitigation and suppression of fires;
- Coordination of bushfire fighting and prevention
- Protection of people and property from fires; and
- Protection of the environment.

The *Rural Fires Act* was amended in August 2002 by the *Rural Fires & Environmental Assessment Legislation Amendment Act, 2002.* In relation to bushfire protection planning for new residential; rural residential and Special Fire Protection developments in bushfire prone areas in NSW, the following section of the *Rural Fires Act* applies:

- Section 100B provides for the issue, by the Commissioner of the NSW Rural Fire Service, of a Bushfire Safety Authority for development which creates the subdivision of bushfire prone land for residential and rural residential development and construction of Special Fire Protection developments located within a Bushfire Prone Area.

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Application for a Bushfire Safety Authority must be lodged as part of the development application process and must demonstrate compliance with *Planning for Bushfire Protection 2006* and other matters which are considered necessary, by the Commissioner, to protect persons, property and the environment from the impact of bushfire.

In relation to the management of bushfire fuels on public and private lands within NSW, the following section of the Act applies:

- Sections 63(1) and 63(2) require public authorities and owners / occupiers of land to take all practicable steps to prevent the occurrence of bushfires on, and to minimize the danger of, the spread of bushfires.

(c) Rural Fires Regulation 2002.

The *Rural Fires Regulation 2002*, August 2002, repeals the *Rural Fires Regulation 1997* and restates with some modifications the provisions of the old Regulation and contains new provisions relating to bushfire prone land and bushfire hazard reduction. The following section relates to planning for new residential, rural residential and special fire protection developments in bushfire prone areas in NSW:

- Section 46(g) of the *Rural Fires Regulation* provides details of the matters that are required to be addressed for the issue of a *Bushfire Safety Authority* under Section 100B of the *Rural Fires Act.*

(d) Threatened Species Conservation Act 1995 (TSC Act).

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities as listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development or an activity (such as the implementation of hazard reduction and asset protection) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

(e) Native Vegetation Act - 2003 (NV Act).

The *Native Vegetation Act - 2003* states indigenous vegetation within 20 metres of the bed or bank of a river or lake, or on slopes over 18 degrees, requires clearing consent under the *NV Act,* unless during an emergency fire event as authorized under the *Rural Fires Act 1997.*

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1.3.2 Planning Policies.

***(a) 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 residential subdivision and Special Protection Developments in bushfire prone areas.

The document does not give total guidance on matters dealing with the subdivision of bushfire prone land for residential or rural residential development or development of a Special Protection Purpose as the Commissioner may determine, under Section 100B of the *Rural Fires Act,* additional measures that are considered necessary to protect the development against the impact of bushfire.

1.4 Documentation reviewed in this Assessment.

- Plan showing Detail & Levels at No. 126 Greville Street, Chatswood prepared by Denny Linker & Co. Ref. 051010; Dated 14.11.2005;
- Plan showing effective slopes of the land within the vegetated land to the northwest, north and northeast of the proposed development footprint, prepared by Denny Linker & Co;
- Identification Survey No. 126 Greville Street Chatswood prepared by Whelans Land Information Consultants. Ref. B512 Dwg. B512-006 dated 18.3.2003;
- Plan Showing Existing Drainage Patterns & Easements prepared by Whelans Land Information Consultants. Ref. B512 Dwg. B512 – 001A;
- Schematic Plan of Proposed Development prepared by BatesSmart Architects. Project No. S10496, Drawing No. SK01-140307 – dated 14.3.2007;
- Landscape Plan prepared by EDAW/AECOM, Drawing No. SK01H;
- Circulation Diagram prepared by EDAW/AECOM, Drawing No. SKO2E;
- Sections prepared by EDAW/AECOM, Drawing Nos. SKO3G, SKO4F and SKO5E;
- Images & Plant Schedule prepared by EDAW/AECOM, Drawing No. SK06D;
- Plan of existing & proposed vegetation prepared by EDAW/AECOM, Drawing No. SKO7G;
- Plan of Key Environmental Constraints prepared by EDAW/AECOM. Drawing No. SK08O;
- Plan of Vegetated Areas – Identification of existing trees likely to the retained/removed prepared by EDAW/AECOM. Drawing No. SK09C;
- Aerial Photograph of the site;
- Willoughby Council Bushfire Prone Land Map;

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- *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service/Planning N.S.W.
- Australian Standard AS3959 *Construction of Buildings in Bushfire Prone Areas*;
- *Rural Fires Regulation 2002.*

1.5 Site Inspection and Meetings.

Graham Swain of Australian Bushfire Protection Planners Pty Limited inspected the site on the 25th May 2006 to assess the topography, slopes and vegetation classification within and adjoining the site and to review the existing development's compliance with the requisite Asset Protection Zones and access provisions.

Adjoining properties were also inspected to determine the surrounding land use / land management.

Site inspections were held with Mr John Delaney [7th June 2006] and Mr Lew Short of the NSW Rural Fire Service [24th October 2006]. A further meeting was held with the Department of Natural Resources to determine the riparian corridor requirements under the Rivers and Foreshores Improvement Act - 1948.

Meetings have occurred between the Applicant, Consultant Team and the NSW Rural Fire Service [21st March 2007 & 29th March 2007 with Lew Short].

Two meetings have occurred between the Applicant, Consultant Team and staff members of Willoughby Council.

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SECTION 2

PROPERTY DESCRIPTION

2.1 Location & Description.

The site that is the subject of the Rezoning Application is known as Lot 1 in DP 532353, No. 126 Greville Street Chatswood and Lot 1 in DP 408490 being part of No. 25 Millwood Avenue.

The site [Lot 1 in DP 532353] has an area of 3.435 hectares in an irregular shape with a frontage of 71.41 metres to western side of Greville Street and contains the existing buildings within the Commonwealth Acoustics Laboratories and Ultrasound Institute.

The site contains the upper tributary of Blue Gum Creek and slopes to the nor-nor-west along the path of the creek. Extensive landscaping occupies the grounds surrounding the existing Acoustics Laboratories and Ultrasound Institute building footprints.

The improvements within the site include a three & four storey concrete office building, located in the western portion of the site and a two level concrete carpark located in the eastern portion of the site. Access to these structures is gained from Greville Street via a bitumen driveway that enters the site within the south-eastern corner of the site.

2.2 Existing Land Use.

The site was cleared, excavated and developed in C. 1984 by the Commonwealth Government to house the Commonwealth Acoustics Laboratories and Ultrasound Institute. This remains the present day land use of the site with the land being Zoned 5(a) Special Uses – Acoustics Laboratory.

2.3 Surrounding Land Use.

(a) North

The northern boundary of the site runs to the west, perpendicular to Greville Street, turning to the northwest to junction with the rear or north-western boundary. The land immediately adjoining the eastern section of the northern boundary [Lot 1 in DP 959445] is vacant land owned by the State Government. The land beyond Lot 1 consists of existing residential development on No. 138, 138A, 138B, & 138C Greville Street.

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The splayed western portion of the north-eastern boundary adjoins Lot 1 in DP 539362. This land is vacant land owned by the State Government.

(b) East

The land adjoining the eastern boundary of the site forms the Greville Street carriageway beyond which is existing residential development.

(c) Southwest, South & Southeast

The south-western, southern and south-eastern boundary of the site adjoins existing residential development that is accessed either from Greville Street, Range Street or Millwood Avenue. The western portion of the south-western boundary of the site adjoins Lot 149 in DP 14799 which is a small parcel of vacant land owned by Willoughby Municipality Council.

(d) West

The land adjoining the north-western boundary of the site forms part of the Lane Cove National Park estate.

2.4 Topography.

Appendix 2 of *Planning for Bushfire Protection 2006* states that slopes should be assessed, over a distance of at least 100m from a development site and that the gradient of the land should be determined which will most significantly influence the fire behaviour to the site. The land within the riparian corridor and the adjoining National Park estate to the northwest of the site have been surveyed to accurately determine the effective slope of the land containing the bushfire prone vegetation to the north and northwest of the site.

a) Within the Site.

The topography of the land within the site is dominated by the Blue Gum Creek corridor which enters the south-eastern corner of the site via pipes beneath Greville Street, flowing via pipes under the existing driveway. The creekline continues to flow from the pipe head, in a nor-nor-westerly direction, running generally parallel to the north-eastern boundary.

Whilst the existing building footprints have been excavated into the slope of the site, the eastern portion of the site falls to the southwest into the creekline. The remainder of the site falls to the northeast into the creekline and falls generally to the northwest along the creekline.

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The area of vegetated land within the northern corner of the site falls to the north at < 15 degrees across the narrow riparian corridor into the creekline. The effective slope of the land along the riparian corridor [i.e. upslope from the northwest] is 2 degrees 35 minutes.

b) Beyond the Site.

- ***North – Eastern Portion.***

  The topography to the north of the eastern portion of the site follows the contours to the north whilst falling to the west into the creek corridor. The effective slope of the land within the adjoining Lot 1 in DP 539362 [State Government land] is < 10 degrees downslope to the northwest of the existing carpark structure.

- ***North – Western Portion***

  The effective slope of the land containing the bushfire prone vegetation to the north of the corner of the cleared land on the site ranges from 6 degrees 27 minutes to 9 degrees 14 minutes.

- ***Northeast – Western Portion.***

  The topography of the land to the northeast of the north-eastern boundary [western portion] rises above the creek corridor and site boundary at > 5 degrees.

- ***East & Southeast of Greville Street.***

  The topography of the residential land to the east & southeast of Greville Street rises at > 5 degrees above the site.

- ***Southwest, South & Southeast.***

  The topography of the residential land to the southwest, south & southeast and the Council Reserve to the southwest of the site rises above to site at < 5 degrees toward the south.

- ***Northwest.***

  The topography of the land within the adjoining Lane Cove National Park falls to the northwest with an effective slope of 6 degrees 30 minutes. [Refer to Attachment A, Plan of Effective Slopes].

2.4 Vegetation within the Site.

Appendix A2.3 of *Planning for Bushfire Protection 2006* provides a methodology for determining the predominant bushfire prone vegetation for at least 140 metres in all directions from the future development on the site.

Vegetation is classified using Table A2.1 of *Planning for Bushfire Protection 2006,* which classifies vegetation types into the following groups:

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(a) Forests [wet & dry sclerophyll forests];
(b) Woodlands;
(c) Plantations – being pine plantations not native plantations;
(d) Forested Wetlands;
(e) Tall Heaths;
(f) Freshwater Heaths;
(g) Short Heaths;
(h) Alpine Complex;
(i) Semi – arid Woodlands;
(j) Arid Woodlands; and
(k) Rainforests.

The vegetation within the site predominantly consists of maintained lawns and landscaped gardens. The vegetated northern portion of the site and the riparian corridor below Waterfall 3 contains Sydney Sandstone Gully Forest [Category 1, Group 1 Bushfire Prone Vegetation] as confirmed by Cumberland Ecology.

Advice has been sought from DNR on the status of the vegetation within the creek corridors. This advice has confirmed that the creek corridor to the north of Waterfall 3 is classified as a Category 2 stream requiring a 20 metre wide fully structured riparian corridor to each side of the creek bank. The existing Sydney Sandstone Gully Forest in this corridor will be retained with 10 metres of the outer edge of the existing vegetation managed as an Outer Protection Zone, forming part of the Asset Protection Zone to the future buildings.

The creek corridor above Waterfall 3 has been classified as a Category 3 stream with the requirement for the provision of an average 10 metre wide [minimum 5 metres] fully structured corridor to each side of the creek bank. The up stream portion of the stream will be re-vegetated to an average width of 20 metres, up to the edge of the existing access driveway [Refer to Key Environmental Constraints Drawing SK08L prepared by EDAW].

This re-vegetation will necessitate the provision of Asset Protection Zones to the new buildings adjoining the riparian corridor and the provision of an alternate means of emergency exit from the future development onto Range Street.

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2.6 Vegetation within 140 metres of the Site.

(a) North of eastern portion of the site.

The adjoining residential development contains maintained landscaped gardens.

(b) Northeast of western portion of the site.

The State Government land adjoining the north-eastern boundary of the western portion of the site contains an area of dense weed infestation within the area to the west of the existing residential development and weed infested Low Open Forest further to the west, within the creek corridor to the northeast of the site boundary.

(c) East.

The vegetation within the adjoining residential development to the east of Greville Street consists of maintained landscaped gardens.

(d) Southwest, South & Southeast.

The land to the southwest, south & southeast, within the existing residential development, consists of maintained landscaped gardens. The narrow strip of Council land between the south-western boundary of the site and Millwood Avenue contains Dense Shrub Woodland to a width of 12 – 15 metres.

(e) Northwest.

The land to the northwest of the site, within the adjoining Lane Cove National Park, contains Sydney Sandstone Gully Forest community. The vegetation within 100 metres of the north-western boundary of the site consists of a dense scrub layer up to 2.5 – 3 metres with scattered trees that have a crown density of < 30%, which, rather than an Open Forest structure of > 30% crown density, represents a Woodland structure of < 30% crown density. [The widths of the Asset Protection Zone to the north-western aspect of the future medium density development have been determined using a “Forest” vegetation formation, thus providing additional setback distance than that required for Woodland vegetation.

2.7 Significant Environmental Features within the Site.

The development site does not contain significant environmental features such as SEPP 44 Koala Habitat, SEPP 14 Wetlands; SEPP 26 Littoral Rainforests; Areas of Geological interest; Steep Lands [>18 degrees]; Land slip areas or National Parks Estate.

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The riparian corridor to the tributary of Blue Gum Creek occupies the northern portion of the site and extends along the north-eastern boundary, extending generally to the south between the proposed north-eastern and western development precincts on the site.

The proposed development layout maintains and protects the riparian corridor to this creekline with enhancement of the vegetation as recommended by DNR.

2.8 Known Threatened Species, Population or Ecological Community within the site.

There are no known threatened species, population or ecological community within the site [Refer to the Ecological report prepared by Cumberland Ecology].

2.9 Details and location of Aboriginal Relics or Aboriginal Place.

There are no known Aboriginal relics within the site [Refer to Archeological Report].

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SECTION 3

FIRE MANAGEMENT RESPONSIBILITIES

Fire management within the development site is the responsibility of:

3.1 Willoughby Council.

The Willoughby Council has responsibility, under Section 66 of the *Rural Fires Act*, for the issue of a notice in writing requiring an owner / occupier of any land within the LGA to carry out bushfire hazard reduction works on that land. Section 100E of the *Rural Fires Act* requires Council 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.

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 its area of operation and through Mutual Aid Agreements, provide assistance to the NSW Rural Fire Service, particularly for structural fire operations within the NSW Rural Fire Brigade Districts. Hazmat management within New South Wales is the responsibility of the NSW Fire Brigade.

The proposed development falls under the NSW Fire Brigade jurisdiction for fire fighting operations.

3.4 Bush Fire Coordinating Committee.

The Bush Fire Coordinating Committee has the responsibility for planning for co-ordinated fire fighting activities / hazard management activities within the State. It is not an operational organization, a fire fighting organization or a funding source for fire management activities.

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

- ***Section 50*** *of the Act requires the Bush Fire Co-ordinating Committee to constitute a Bush Fire Management Committee for the whole of the area of any local Council area for which a rural fire district is constituted.*

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- ***Section 51 (1A)*** *requires a Bush Fire Management Committee to report to the Bush Fire Co-ordinating Committee on the implementation of the requirements of the Bushfire Risk Management Plan.*

- ***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 Private Land Owners / Occupiers.

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

- ***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'.*

In this section; '*notified steps*' means:

(a) any steps that a bush fire risk management plan (or the Co-ordinating Committee) advises a person to take;

(b) that are included in a bush fire risk management plan applying to the land.

- ***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*).

Management of the residual vegetation and the Asset Protection Zones to the future assets will be undertaken by the landowners in accordance with a Bushfire Management Plan prepared for the future development. The Bushfire Management Plan shall be administered under the provisions of Section 88B of the Conveyancing Act of 1919 and form part of the Community Management Statement.

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SECTION 4

PRECINCT LEVEL ASSESSMENT

4.1 Introduction.

Planning for Bushfire Protection 2006 provides the following procedure for assessing a development at a defined precinct level in order to determine whether the development is bushfire prone and if so, the need to provide appropriate setbacks [Asset Protection Zones]:

(a) Determine vegetation distance, type and class as follows:
Identify all vegetation in each direction from the site for a distance of at least 140 metres, and then consult Table A2.1 to determine the vegetation formation which predominates;

(b) Determine the average slope of the land between the predominant vegetation class and the development.

Table 1 summarises the information provided in Section 2 of this report and undertakes a precinct level assessment to determine those aspects of the development that require provision of Asset Protection Zones.

Table 1. Assessment of Bushfire Prone Vegetation

Aspect	Existing Land Use	Predominant Vegetation within 140 m of Development	Predominant vegetation class from Table A2.1 of *PfBFP*	Effective Slope of land.	Comments
North of eastern portion of the site	Residential development/ Playing fields	Managed Curtilage Landscaped Gardens	Nil	Level to the north; < 10 degrees down slope to N.W.	The adjoining vegetation is not bushfire prone.
Northeast of western portion of the site	Vacant State Government land	Weeds – Low Open Forest	Wet/Dry Sclerophyll Forest	> 5 degrees upslope.	The adjoining vegetation is bushfire prone.
East of Greville Street	Residential Development	Managed Curtilage Landscaped Gardens	Nil.	> 5 degrees upslope.	The adjoining vegetation is not bushfire prone.
Southwest, south & southeast	Residential Development	Managed Curtilage Landscaped Gardens	Nil	< 5 degrees upslope	The adjoining vegetation is not bushfire prone.
Southwest	Council Land	12 – 15m wide strip of Dense Shrub Woodland	Classified as Rainforest vegetation	< 5 degrees upslope	The adjoining vegetation is bushfire prone
Northwest	National Park	Dense Shrub /Woodland; Low Open Forest >100m to the northwest	Dry Sclerophyll Forest	6.5 degrees downslope to NW; 9 degrees 14 minutes to north	The adjoining vegetation is bushfire prone

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SECTION 5

BUSHFIRE PROTECTION ASSESSMENT

5.1 Introduction.

Section 46(1) (g) of the *Rural Fires Regulation 2002* requires that an application for a *Bushfire Safety Authority* must include a bushfire assessment for the proposed development (including the methodology used in the assessment) that addresses the extent to which the development provides:

- *asset protection zones,*
- *the siting and adequacy of water supplies for fire fighting operations,*
- *capacity of public roads to handle increased volumes of traffic during a bushfire emergency,*
- *whether or not public roads link with the fire trail network and have two way access,*
- *the adequacy of access and egress for the purposes of emergency response,*
- *the adequacy of bushfire maintenance plans and fire emergency procedures,*
- *the construction standards to be used for building elements.*
- the adequacy of fire protection systems incorporated into the development.

Planning for Bushfire Protection 2006 provides a methodology to determine the Asset Protection Zones and Bushfire Attack / Construction Standards required for habitable buildings in development for residential purposes that are designated as bushfire prone. Section 5.2 of this report uses this methodology to determine the Asset Protection Zone requirements to the future residential buildings within the site whilst Section 5.3 determines the potential levels of Bushfire Attack on the existing and future buildings on the site.

Planning for Bushfire Protection 2006 also provides specifications for the management of bushfire fuels, provision of access and water supplies for fire fighting operations. These matters are addressed in Sections 5.4 – 5.9 of this report.

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5.2 Determination of Asset Protection Zones.

Appendix 2 of *Planning for Bushfire Protection 2006* provides the following procedure for determining setback distances (Asset Protection Zones):

(a) Determine vegetation formations as follows:

- Identify all vegetation in all directions from the site 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 A2.5 and determine the appropriate setback [Asset Protection Zone] for the assessed land use, vegetation formation and slope range.

Table 2 provides a summary of the Asset Protection Zones required to new residential buildings within the site.

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Table 2. Bushfire Protection Assessment – Asset Protection Zones – Future Residential Buildings constructed on the Site. FDI – 100

Aspect	Vegetation within 140m of development	Predominant Vegetation Class (Table A2.1 of *PfBFP*)	Effective Slope of Land	Recommended Width of Asset Protection Zone [Table A2.4 of *PfBFP*] FDI – 100	Width of APZ provided	Compliance with RFS Deemed-to-satisfy requirement of *PfBFP*
Northwest of eastern unit precinct [Vegetation on State Government land – Lot 1 in DP539362]	Weeds & Low Open Forest	Potential Dry Sclerophyll Forest	< 10 degrees downslope	35 metres for 5 – 10 degrees downslope	> 35 metres [IPA] to new buildings from vegetation on adjoining State Government Land	Yes.
Riparian corridor to west of units in eastern portion of site [off Greville Street]	Revegetated Low Open Forest in riparian corridor	Rainforest - [narrow linear width of corridor – average width of 10 metres to each side of creekline]	< 5 deg downslope across creek corridor	20 metres	20 metres [IPA] provided by managed landscaped gardens.	Yes Refer to Note 1.
Northeast of western portion of site [Vegetation in riparian corridor & State Government Land – Lot 1 in DP539362	Sydney Sandstone Gully Forest within riparian corridor to creek and on land to the northeast of creek	Wet/Dry Sclerophyll Forest	Initially downslope < 15 deg. across riparian corridor to creek then upslope > 15 degrees	20 metres – narrow corridor of riparian vegetation along the south-western side of creek line	33.0 metres: 23.0 metre wide Inner Protection Area + 10 metre wide managed Outer Protection Area forming the outer edge of the riparian corridor	Yes. Refer to Note 2.
Northern corner of site	Sydney Sandstone Gully Forest within riparian corridor to creek and on land to the northeast of creek	Wet/Dry Sclerophyll Forest	6 degrees 27 minutes; 7 degrees 27 minutes; 9 degrees 14 minutes	35 metres for 5 - 10 degrees downslope	42 metres diagonally to the north; 33 metres to the northeast	Yes Refer to Note 3.
Southwest [Council Reserve]	Dense Shrub Woodland	Rainforest [15m wide linear width of corridor between site & Millwood Ave]	> 5 degrees upslope	10 metres	9.2 metres on north-western end – 7.4 on south-eastern end of setback from the Council Reserve	Yes & as agreed by the NSW Rural Fire Service. Refer Note 5
Northwest within Lane Cove National Park	Dense Shrub Woodland; Open Forest >100 metres to the N.W.	Dry Sclerophyll Forest	6 degrees 30 minutes downslope to the north west	35 metres to the northwest for 5 - 10 degrees downslope to the northwest	28 metres.	Yes. Refer to Note 4

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Assessment Results:

Note 1:

The vegetation within the riparian corridor to the southern portion of the tributary of Blue Gum Creek is being re-vegetated to comply with the DNR requirements. This corridor will link to the north into the existing riparian corridor to the north of Waterfall 3. The 20 metre wide Asset Protection Zone to the southwest of the future units in the eastern portion of the site and to the east of the future units on the south-western side of the corridor will mitigate the risk from the extension of fires through the riparian corridor towards the southern corner of the site.

Note 2:

The effective slope of the land within some parts of the riparian corridor to the southwest of the creekline increases to 15 degrees downslope to the creek within the slopes to the northeast of the creekline [within the State Government owned land] rising steeply to the northeast beyond the creek/property boundary. The slope to the creek, within the property, represents a short length of land with a perpendicular axis to the north-eastern aspect of the future unit blocks.

The fire run along the creek corridor, from the northwest [as occurred during the 1994 bushfires] will fan out as the fire progresses upslope from the northwest, along an effective upslope of 2 degrees 35 minutes in the creek corridor. During a fire event with north-westerly winds, the fire will not turn perpendicular to the direction of fire-run from the northwest, to burn upslope across the 15 degree riparian corridor to the creekline.

Instead, the fire will burn upslope diagonally towards the building from the north and therefore the effective slope which will produce the most significant fire behaviour in the vegetated corridor to the north-eastern aspect of the future buildings will be 9 degrees 14 Minutes.

Should a fire start in the vegetation on the State Government land to the northeast of the western portion of the site, the fire can only impact upon the future development under a north-easterly wind direction. This will result in a slow down slope burn with low/moderate fire intensity. It is not likely that such a fire event will have the potential to cross the damp riparian corridor/creek.

Therefore the 15 degree downslope aspect to the future development will not present a risk that warrants an increase in the width of the Asset Protection Zone provided. The 33.0 metre wide Asset Protection Zone provided complies with the deemed-to-satisfy Asset Protection Zone width required by Table A2.4 of *Planning for Bushfire Protection 2006* for the recognised fire path from the northwest.

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Note 3:
The effective slope of the land in a northerly direction from the line of the existing forest vegetation in the northern corner of the site has been surveyed and ranges from 6 degrees 27 minutes to 9 degrees 14 minutes. Using the NSW Rural Fire Service's Asset Protection Zone calculator, the required width of setback for a 6 degrees 27 minute downslope is 28 metres and 33 metres for the 9 degrees 14 minutes downslope.

The Asset Protection Zone width provided perpendicular to the north-eastern face of the future buildings is 33.0 metres and 42.0 metres measured diagonally to the north of the future buildings, or in the direction of the fire run up the riparian corridor to the creek [refer to EDAW Drawing SK08 – Key Environmental Constraints].

These setbacks exceed the setbacks required to address the potential levels of radiant heat on the future buildings for Level 3 construction standards.

Note 4:
The vegetation to the northwest of the site, for a distance exceeding 100 metres in the adjoining Lane Cove National Park, consists of Tall Shrub with scattered trees that represent a Woodland Formation. The effective slope of the land within the National Park is 6 degrees 27 minutes downslope to the northwest.

Utilising the Rural Fire Service Asset Protection Zone Calculator, the required width of Asset Protection Zone for Dry Sclerophyll Forest, not Woodland with a shrub understorey, is 28.0 metres. The schematic development proposal provides the requisite 28.0 metre wide Asset Protection Zone to the northwest for Level 3 construction standards to the buildings, therefore complying with the deemed-to-satisfy setbacks for [Dry Sclerophyll] Forest as determined by the Asset Protection Zone Calculator.

Note 5:
During the site inspections undertaken by John Delany and Lew Short [Development Control – NSW Rural Fire Service], the setback requirements to the narrow corridor of Dense Shrub Woodland vegetation within the Council Reserve was inspected and an agreement reached that this vegetation provided little hazard potential to the development due to the linear nature of the corridor.

The setback distances provided to the buildings in the schematic layout address the potential bushfire hazard to this aspect of the site.

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5.3 Determination of Bushfire Attack (Construction Standards).

Part 2.3.4 of the Building Code of Australia states that a Class 1 building that is 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 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. Therefore, the construction of the Class 1, 2 and Class 3 buildings within the development shall be constructed to comply with the specifications of this Standard.

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 in accordance with the following classifications:

- *Less than 20 metres*
- *From 20 metres but not greater than 30 metres*
- *Greater than 30 metres but not greater than 50 metres*
- *Greater than 50 metres but not greater than 80 metres*
- *Greater than 80 metres but not greater than 100 metres.*

(c) Determine the effective slope of the ground for each vegetation formation;

(d) Determine the relevant Fire Danger Index [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 no greater than 14.5 KWm² or is greater than 100 metres from all woody vegetation.

- Medium:

Significant ember attack with radiation heat greater than 14.5 KWm² and no greater than 16 KWm² (Level 1 Construction AS3959-1999).

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- High:
Significant ember attack and possible flame contact, radiation heat greater than 16 KWm² and no greater than 21 KWm² (Level 2 Construction AS3959-1999).
- Extreme:
Significant ember attack and possible flame contact, radiation heat greater than 21 KWm² and no greater than 31 KWm² (Level 3 Construction AS3959-1999).
- Flame Zone:
Within the Flame Zone and / or greater than 31 KWm² (Construction outside scope of AS3959-1999).

Table 3 provides a summary of Bushfire Attack and the resultant construction standards required for the new residential buildings within the site.

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Table 3 Bushfire Attack Assessment – Construction Standards to the future Residential Buildings within the site.

Aspect	Vegetation within 140m of development	Predominant Vegetation Class (Fig A2.2 and Table A2.1)	Effective Slope of Land	Width of Asset Protection Zone (Inner Protection Area) provided	Category of Bushfire Attack (Table A3.3)	Level of Construction required (AS 3959 – 1999)
Northwest of new residential buildings in eastern portion of the site	Weeds + Low Open Forest within State Government land/riparian corridor	Rainforest classification to Riparian Corridor to creekline; Dry Sclerophyll Forest within State Government Land	< 10 degrees downslope to the north	> 35 metres to Dry Sclerophyll Forest vegetation	Extreme	Level 3
Residential buildings adjoining upper section of Riparian Corridor	Narrow corridor [Average width of 20 metres] of Re-vegetated Low Open Forest	Rainforest due to narrow width of riparian corridor vegetation	< 5 degrees downslope	20 metres	Medium	Level 1 Refer to Note 1
Northeast of units in western portion of site [Vegetation within State Government Land – Lot 1 in DP539362	Managed Curtilage to buildings + Low Open Forest in creek corridor	Wet & Dry Sclerophyll Forest in riparian corridor to creek – Dry Sclerophyll Forest on land to the northeast of creekline	< 15 degrees downslope to creek; < 15 degrees upslope beyond creek	> 33.0 metres.	Extreme	Level 3
North of northern corner of the site	Managed Curtilage to buildings + Low Open Forest in creek corridor	Wet & Dry Sclerophyll Forest in riparian corridor to creek	6.5 degrees to 9.25 degrees downslope	Minimum 33.0 metres up to 42.00 metres on the diagonal	Extreme	Level 3
Northwest within Lane Cove National Park	Dense Shrub Woodland; Open Forest >100 metres to the northwest	Dry Sclerophyll Forest	6.5 degrees downslope to the north west	28 metres to the northwest	Extreme	Level 3
Southwest [Council Reserve]	Dense Shrub Woodland	Rainforest [due to vegetation width of 15 metres]	< 5 degrees upslope	9.2 metres on N.W end varying down to 7.4 metres on south-eastern end	Flame Zone	Beyond A.S 3959 – 1999 Refer to Note 2

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Assessment Results:

Note 1:

The future dwellings which adjoin the re-vegetated riparian corridor shall be constructed to comply with the specification of Level 3 of Australian Standard A.S. 3959-1999 *"Construction of Buildings in Bushfire Prone Areas"*.

Note 2:

The south-western aspect of the future building in the western corner of the site adjoins a narrow finger < 15metres wide] of Low Open Forest vegetation with a linear aspect to the building. Whilst the theoretical radiant heat on this elevation has been determined to be more than 29kWm2, the actual level of radiant heat will not be significant due to the linear nature of the vegetation. Level 3 construction to this elevation will address the actual levels of radiant heat given off by a fire burning along the corridor of vegetation between the site and Millwood Avenue.

5.4 Water Supplies for Firefighting Operations.

The existing buildings within the site are connected to a Hydrant Booster Valve system, including ring fire mains. This system shall be retained, including the provision of the ring main hydrant system, in any future development proposal for the site. Modification will be necessary to accommodate the future medium density residential development proposed to be constructed on the site.

5.5 Access for Fire Fighting Operations.

5.5.1 Adequacy of Public Roads.

The future road network within the site will utilize a new driveway entry off Greville Street. Greville Street is a municipal road which provides access to the adjoining residential development and provides adequate access for fire fighting operations.

5.5.2 Fire Trail Access to two-way Public Roads.

The schematic layout of the future medium density residential development within the site provides for the provision of a perimeter fire trail access to the northeast and northwest of the future buildings within the western portion of the site. This proposed fire trail will link to the internal two-way access road network thence to Greville Street.

5.5.3 Emergency Response Access / Egress.

The primary emergency response access is provided to the site via an access driveway off Greville Street. A perimeter fire trail also provides access to the northeast, north and northwest of the future buildings on the site.

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However, with the proposed re-vegetation of the riparian corridor to the north of the main access road, it is recommended that alternate emergency access/egress be provided from the northern end of Range Street to the road access to the basement carpark beneath the unit blocks within the western portion of the site. The units located in the eastern portion of the site will exit directly onto Greville Street and no alternate emergency access/egress route is required.

Locked gates/bollards shall be provided to prevent unauthorized use of the emergency access way onto Range Street.

Future internal access roads and the fire trail shall be constructed to comply with the deemed-to-comply specifications of Section 4.1.3 “Access” of *Planning for Bushfire Protection 2006.*

The minimum width for the internal access roads, including the emergency egress link to Range Street, shall be 6.5 metres with “No Parking” to one side with services [Hydrants etc.] located to that side of the road and be capable of carrying a fully laden fire appliance of 15 tonne GVM.

The fire trail shall be constructed to a minimum width of 4.0 metres and be capable of carrying a fully laden fire appliance of 15 tonne GVM. Internal corners to roads and fire trails shall have a radius of 6.0 metres and an outer radius of 12.0 metres.

5.6 Adequacy of Bushfire Maintenance Plans and Fire Emergency Procedures.

The Lane Cove National Park Bushfire Management Plan adequately addresses the maintenance of bushfire fuels within the park estate and fire emergency procedures for the management of the bushfires during fire events in the Lane Cove National Park.

There is no known fuel management plan for the adjoining State Government land [Lot 1 in DP 539362]. However a weed management plan is in place for the land that adjoins the north-western section of the north-eastern boundary of the site.

A Fire Management Plan and Landscape/Vegetation Management Plan shall be prepared as part of the future development of the site to address the maintenance of the vegetation within the site, including the riparian corridor. The Fire Management Plan and Landscape/Vegetation Management Plan shall be annexed to the Community Management Statement.

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5.7 Management of Asset Protection Zones.

The intention of bushfire hazard 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 and fire-fighters.

Careful attention shall be given to species selection of landscaping near the future buildings, their location relative to their flammability, avoidance of continuity of vegetation [separation horizontally and vertically] and ongoing maintenance to remove flammable fuels.

5.7.1 Fuel Management:

A diligent approach to the management of bushfire fuel levels is required to the land within the future development. Management of the vegetation within the Asset Protection Zones shall comply with the recommendations of Appendix A5.4 & Appendix A5.5 of *Planning for Bushfire Protection 2006* and the Rural Fire Service *"Standards for Asset Protection Zones"*. [Refer to Figure 1 *"Plan of Bushfire Protection Measures"* for details on widths/locations of Asset Protection Zones].

Management of the landscaped gardens shall comply with the following:

- Maintain a clear area of low cut lawn or pavement adjacent to the buildings;
- Keep areas under fences, fence posts, gates & trees raked and clear of combustible fuels;
- Utilise non-combustible fencing and retaining wall structures near buildings;
- Separate future tree canopy and shrub connectivity with defined landscaped garden beds;
- Maintain tree canopies and shrubs so that they are clear of the building by at least five metres;
- Utilise non-flammable materials such as Scoria, pebbles and recycled crushed bricks as ground cover to landscaped gardens in close proximity to buildings;
- Maintain minimal fine fuel loading at ground level within the Inner Protection Area and landscaped area (nominally 3 tonnes / hectare);
- Trees and shrubs are acceptable provided that they are spread out and do not form a continuous canopy, are not species that retain dead material and are located away from the buildings to minimize radiant heat and direct flame attack.

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- Landscape species selection shall be drawn from those that are considered to be species which are *"fire retardant"* and do not promulgate the spread of fire;

5.8 Evacuation.

Safe evacuation can occur from the site via the existing access driveway onto Greville Street, unless the riparian corridor to the upper tributary of Blue Gum Creek is ignited by burning embers. If this occurs, emergency access/egress can occur via the emergency link road to Range Street. Pedestrian egress can be achieved from the future unit buildings within the western portion of the site by occupants travelling to the basement carpark, via the internal lifts, thence proceeding, under cover to the emergency access stairs on the south-western aspect of the development. Egress can occur from that point onto Millwood Avenue thence east to Chatswood.

5.9 Adequacy of Sprinkler Systems & other Fire Protection Measures.

There are no sprinkler systems or other fire protection measures required or deemed necessary to address the potential level of bushfire impacts on the future medium density buildings. The provision of deemed-to-satisfy Asset Protection Zones and construction standards to the future buildings adequately address the potential bushfire risk to the future residential development on the site.

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SECTION 6

RECOMMENDATIONS

Recommendation 1:

Asset Protection Zones shall be provided, to the future medium density residential buildings within the site, to the widths as nominated in Table 4. (Refer to Figure 1 *"Plan of Bushfire Protection Measures"*).

Table 4. Asset Protection Zones – New Residential Buildings on the Site

Aspect	Vegetation within 140m of development	Predominant Vegetation Class (Fig A2.2 and Table A2.1)	Effective Slope of Land	Width of Asset Protection Zone Provided
Northwest of new buildings in eastern portion of the site	Low Open Forest within State Government Land	Dry Sclerophyll Forest	< 10 degrees downslope	> 35 metres [IPA] provided by managed landscaping
New buildings adjoining the upper section of the riparian corridor to Blue Gum Creek	Narrow band of Low Open Forest in the re-vegetated riparian corridor	Rainforest formation due to narrow width of corridor [< 20m]	< 5 degrees downslope to creek	> 20 metres [IPA] provided by managed landscaped gardens
Northeast of new buildings in the western portion of the site	Low Open Forest in the Blue Gum Creek corridor	Dry Sclerophyll Forest	< 15 degrees downslope across riparian corridor	33.0 metres provided to the northeast; [23.0m IPA + 10.0m OPA]
North of the buildings in the western portion of the site	Low Open Forest	Dry Sclerophyll Forest	6.5 – 9.25 degrees	42 metres to the north; 33.0 metres to the northeast. [23.0m IPA + 10.0m OPA]
Northwest of new buildings in western portion of the site [Vegetation within the National Park]	Tall Shrub & sparse trees for > 100 metres. Dry Sclerophyll Forest beyond	Dry Sclerophyll Forest	6.5 degrees downslope to northwest	28 metres to the northwest of the new buildings provided by the setback from the north-western boundary of the site
Southwest [Council Reserve]	Dense Shrub Woodland [scattered trees]	Rainforest formation due to < 15 metre wide corridor	< 5 degrees upslope	9.2 metres on north-western end; 7.2 metres on south-eastern end of setback

Recommendation 2:

The Asset Protection Zones and the landscaped areas of the site shall be maintained in accordance with Section 5.7.1 of this report and Appendix 5 of *Planning for Bushfire Protection 2006* and the NSW Rural Fire Service's *"Specifications for Asset Protection Zones"*.

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Recommendation 3:
A Fire Management Plan shall be prepared to address the maintenance of the bushfire fuels within the site, including the Asset Protection Zones and riparian corridors.

The Fire Management Plan shall form an annexure to the Community Management Statement.

Recommendation 4:
The minimum construction standard to the future medium density residential buildings on the site shall be in accordance with the Level 3 specifications of Australian Standard A.S. 3959-1999, *"Construction of Buildings in Bushfire Prone Areas".*

Recommendation 5:
The roof gutters and valleys to the future medium density residential buildings shall be fitted with a protection system which minimizes the accumulation of combustible materials. The protection device shall have a flammability index of less than 5, measured against the performance standards of AS1530.2.

Recommendation 6:
Future access roads within the development shall be constructed to comply with the specifications of Section 4.1.3 of *Planning for Bushfire Protection 2006.* The minimum road carriageway width shall be 6.5 metres, exclusive of carparking to one side of the road, with the capacity of the road surfaces sufficient to carry a fully laden fire appliance with a GVM of 15 tonnes.

Recommendation 7:
The proposed perimeter fire trail shall be constructed to comply with the specifications of Section 4.1.3 of *Planning for Bushfire Protection 2006.* The minimum formed width for the fire trail shall be 4 metres with an additional one (1) metre provided to each side, clear of all grasses and shrubs. The capacity of the surface of the trail shall be sufficient to carry a fully laden Category 1 Rural Fire Service Tanker with a GVM of 15 tonnes.

Recommendation 8:
An emergency access/egress link shall be provided from the internal access road onto Range Street. This access shall be constructed to a width of 6.5 metres and shall be provided with locked bollards or a gate on the southern boundary of the site.

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Recommendation 9:
The existing hydrant water supply and hydrant ring main to the perimeter of the western portion of the site shall be maintained within the development, in accordance with the specifications of Australian Standard A.S 2419.2.

Hydrants shall have a flow rate of 10 litres / second. Blue hydrant markers shall be provided to locate the positions of the hydrants. The markers shall be positioned on the hydrant side of the centreline of the road pavement.

Recommendation 10:
An Evacuation Plan shall be prepared, at the development application stage, for the future medium density residential development on the site. The Evacuation Plan shall address the timely relocation of residents in the event of a major bushfire event in the Lane Cove National Park and other emergencies that may impact the development/area.

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SECTION 7

CONCLUSION

It is proposed that land within Lot 1 in DP 532353, No. 126 Greville Street and Lot 1 in DP 408490, the triangular northern portion of No. 25 Millwood Avenue in Chatswood be rezoned from its present zoning of 5(a) Special Uses – Acoustic Laboratories to permit the erection of a medium density residential development.

The site is impacted by Bushfire Prone Vegetation; therefore any proposal to rezone the site for residential development triggers Ministerial Direction No. 19 – Planning for Bushfire Protection [under Section 117 of the *Environmental Planning & Assessment Act – 1979* which requires the Council to consult with the NSW Rural Fire Service [amongst other things], under Section 62 of that Act.

The schematic layout, which has been prepared for the redevelopment of the site, indicates that the existing buildings on the site will be demolished to permit the future construction of multi storey medium density units in the eastern and western portions of the site, on both sides of the riparian corridor that forms the upper reaches of Blue Gum Creek, which is required to be re-vegetated to an average width of 20 metres.

This necessitates the provision of Asset Protection Zones to this corridor and the provision of alternate emergency access/egress from the site via Range Street. The future buildings within the western portion of the site will be located to provide Asset Protection Zone setbacks to the retained riparian vegetation within the northern portion of the site and the vegetation within the adjoining Lane Cove National Park, to the northwest, and the Council Reserve to the southwest of the site.

These setbacks comply with the deemed-to-satisfy provisions of Appendix 2 of *Planning for Bushfire Protection 2006* or in the case of the setback from the Dense Shrub Woodland in the Council Reserve to the south-western aspect of the site, in accordance with the advice received from the NSW Rural Fire Service.

Similar deemed-to-satisfy provisions for access/water supply for fire fighting operations and construction standards to the future medium density residential development are met.

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The recommendations contained within this report address the requirements of the Rural Fire Service and of Section 46(1)(g) of the *Rural Fires Regulation 2002* as a prerequisite for the issue of a Bushfire Safety Authority under Section 100B (4) of the *Rural Fires Act* for a future medium density residential development constructed within the site.

The following table summarises the extent to which the schematic development proposal conforms to the requirements of Section 46(1) (g) of the *Rural Fires Regulation 2002* and the deemed-to-satisfy specifications of *Planning for Bushfire Protection 2006*

Table 6. Compliance with Section 46(1) (g) of the Rural Fires Act

Requirements of Section 46(g) of Rural Fires Regulation		**Compliance with deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006.***
(I)	Asset Protection Zone setbacks	YES
(II)	The siting and adequacy of water supplies for fire fighting	YES
(III)	Capacity of public roads to handle increased volumes of traffic in the event of a bushfire emergency	YES
(IV)	Public roads that link with the fire trail network have two - way access	YES
(V)	Adequacy of emergency response access and egress	YES
(VI)	Adequacy of bushfire maintenance plans and fire emergency procedures	YES
(VII)	Building construction standards	YES
(VIII)	Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development	Not applicable

The proposed development, as represented by the schematic layout prepared by Batesmart, complies with the “Deemed-to-Satisfy” specifications set out in Chapter 4 (Performance Based Control) and the aim and objectives of *Planning for Bushfire Protection 2006.*

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REFERENCES:

- N.S.W Rural Fire Service – *Planning for Bushfire Protection 2006*;
- *Environmental Planning & Assessment Act – 1979;*
- *Rural Fires Act – 1997;*
- *Rural Fires and Environmental Assessment Legislation Amendment Act 2002;*
- *Rural Fires Regulation 2002;*
- NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping 2002;*
- *Threatened Species Conservation Act 1995;*
- *Native Vegetation Act;*
- *Bushfire Environmental Assessment Code 2003;*
- Building Code of Australia;
- Australian Standard A.S 3959-1999 "*Construction of Buildings in Bushfire Prone Areas".*
- Willoughby Bushfire Prone Land Map

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SECTION 8

ATTACHMENT A – Issue C

Plan of Effective Slopes
[Prepared by EDAW]

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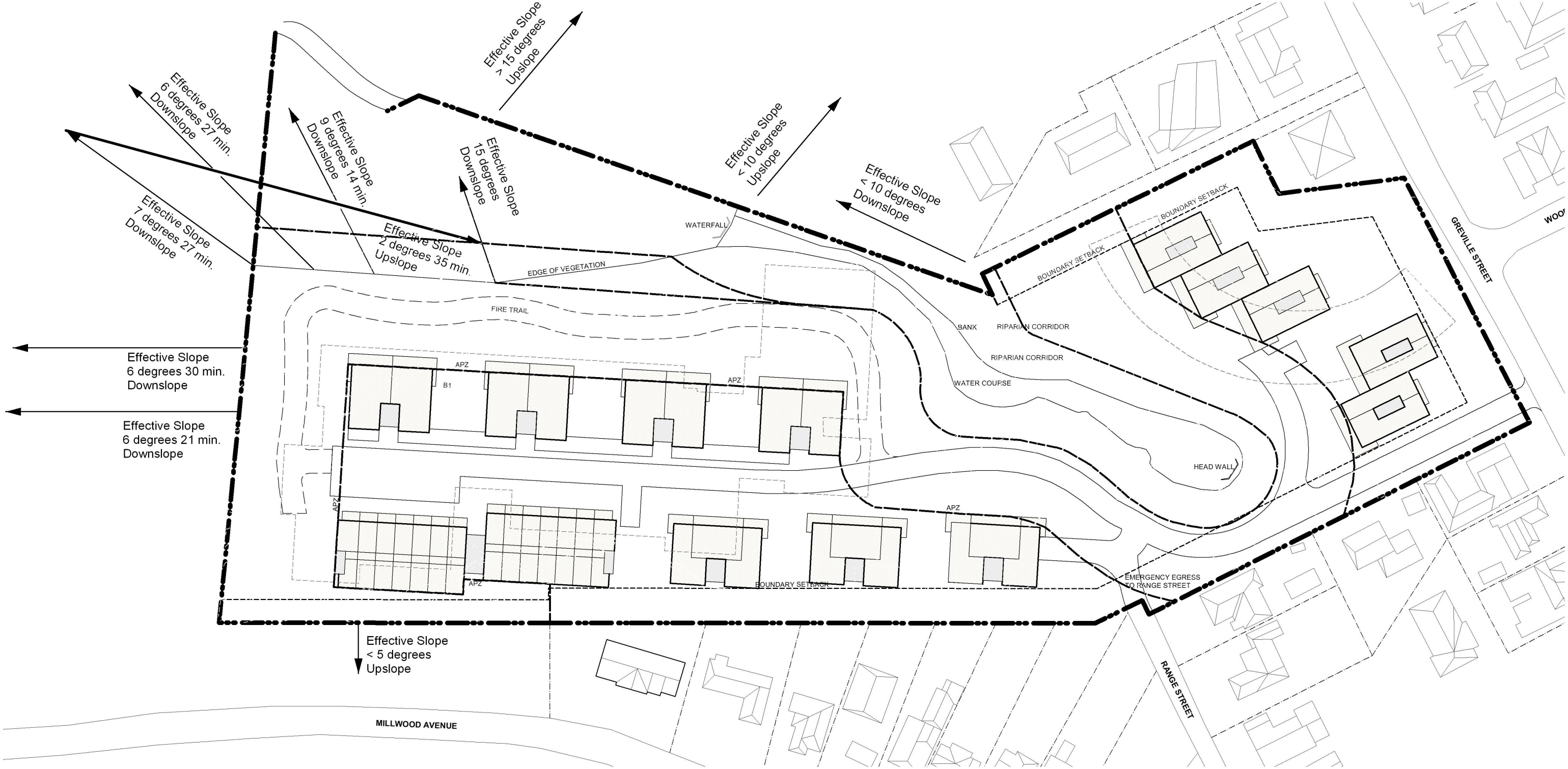

Attachment A - Plan of Effective Slopes

'*Woodlands*' Medium Density Residential Development

Barana Group

Project	126 Greville Street, West Chatswood
Client	Barana Group
Drawing	Plan of Effective Slopes

0 10 20 30 40 50 M

SYDNEY
BRISBANE
MELBOURNE
SUNSHINE COAST
ASIA
EUROPE
MIDDLE EAST
USA

EDAW | AECOM

2-14 MOUNTAIN STREET ULTIMO NSW 2007
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Scale	1:1000@A3
Project No.	06055B
Drawn	NM

Attachment A

A.B.N. 37 003 886 306

QA 2-12(1)N

SECTION 9

ATTACHMENT B

FIGURE 1C – Plan of Bushfire Protection Measures
[Prepared by EDAW]

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Lane Cove National Park - Sydney Sandstone Gully Forest

Sydney Sandstone Gully Forest - Outer Protection Area

Line of existing vegetation

State Government owned bushland- highly weed infested

Conserved Sydney Sandstone Gully Forest

Waterfall 03

Line of external balconies

Waterfall 01

Waterfall 02

BOUNDARY SETBACK

CRITICAL TREES

GREVILLE STREET

WOOD STREET

FIRE TRAIL

42m APZ

28m IPA

33m APZ

23m IPA

10m

20m IPA

12m

6m

35m IPA

20m IPA

B1 B2 B3 B4 B5

C1 C2 C3

D1 D2 D3 D4 D5

A1 A2

9.2m IPA

7.4m IPA

NOTE:
Pedestrian egress via lifts to basement for units B1-B5, A1+A2, C1-C3

Line of 20m APZ to Category 3 Watercourse Riparian Corridor

EMERGENCY EGRESS TO RANGE STREET

Emergency vehicular / pedestrian egress from basement

Emergency pedestrian egress from basement carpark to Millwood Avenue

Council Bushland Reserve

NOTE:
This development edge is based upon a 33.0m setback from the existing building line and comprises of 23.0m landscape development (Inner Protection Area) and a 10m Outer Protection Area to existing bushland edge.

MILLWOOD AVENUE

RANGE STREET

NOTES

1. All plant selection on project will be based on locally occuring species from the Sydney Sandstone Gully Forest community

LEGEND

- APZ (Inner Protection Area) landscape development - set against existing bushland to be managed as an Outer Protection Area (to the Category 2 Watercourse) and new bushland to be restored to the Category 3 Watercourse
- Existing building footprints
- Line of existing vegetation
- Fully structured riparian corridor average 10m wide (minimum 5m wide)
- Zone of fully structured vegetation - Remnant Sydney Sandstone Gully Forest
- Asset Protection Zone - Outer Protection Area of remnant Sydney Sandstone Gully Forest
- Landscape Area

Project	126 Greville Street, West Chatswood
Client	Barana Group
Drawing	Plan of Bushfire Protection Measures

Figure 1- Plan of Bushfire Protection Measures

'*Woodlands*' Medium Density Residential Development

Barana Group

0 10 20 30 40 50 M

SYDNEY BRISBANE MELBOURNE SUNSHINE COAST
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Drawn	NM

Fig.1 C

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