INDEPENDENT REVIEW OF BUSHFIRE IMPACT

PLANNING PROPOSAL

TO

REZONE LAND AT 95 – 97 STANHOPE ROAD,

KILLARA

Australian Bushfire Protection Planners Pty Limited

Bushfire Mitigation Consultants
ACN 083 085 474
32 Old Dog Trap Road
SOMERSBY 2250 NSW
Phone: (02) 43622112 Fax: (02) 43622204
Email: abpp@bigpond.net.au

ABPP
Australian Bushfire
Protection Planners Pty Ltd
ABN 48 935534 462
Bushfire Mitigation Consultants

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Report Number	Document	Preparation Date	Issue Date	Directors Approval
B183160-2	Final	06.04.2018	14.05.2018	*G.L.Swain*

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Email. abpp@bigpond.net.au

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1.0 Background.

Ku-ring-gai Council has received a Planning Proposal from Architectus Group Pty Ltd on behalf of Stockland Aevum Ltd, to rezone land at 95 Stanhope Rd, Killara.

The site currently operates as a retirement village (Lourdes Retirement Village) comprising 2-3 storey buildings. The uses include independent dwelling units, community uses, and a Residential Aged Care Facility (RACF).

The land was developed for senior's housing in the early 1980s and has had subsequent additions. The most recent development adding to the number of dwellings on the site was in 2011, completed under the SEPP (Housing for Seniors or people with a Disability) 2004.

The site currently houses:

- Independent living units;
- Serviced apartments;
- Hostel apartments;
- Residential Aged Care Facility (RACF);
- Admin centre, café, community centre, pool facilities;
- Croquet lawn, BBQ facilities; and
- Prayer chapel.

The Planning Proposal seeks to retain and intensify these uses on the site.

The site is currently zoned R2 Low Density Residential under the Ku-ring-gai Local Environmental Plan 2015 (KLEP 2015).

The Planning Proposal seeks to:

- Rezone the land from R2 (Low Density Residential) to R3 (Medium Density Residential);

- Amend the Floor Space Ratio from 0.3:1 to 0.8:1;

- Amend the Maximum Height from 9.5m (2 storey) to 9.5m-24m (2 storey - 7/8 storey).

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The proposed Master Plan includes:

- The existing entrance is t be retained with an improved landscape setting, with the Chapel to also be retained with new community facilities;
- A new village 'main street';
- A new 'Village Green';
- A new Residential Aged Care Facility [RACF];
- 282 new Independent Living Units [ILUs] and Serviced Apartments; and
- An upgrade to the existing road network including the two-way entry, a secondary entry off Stanhope Road (east), one-way loops roads and a dedicated service road for the RACF.

The proposed development includes the following:

- Increase from 83 to 133 beds within the new RACF;
- Increase from 49 to 59 Serviced Apartments;
- Increase from 106 to 223 Independent Living Units.

The proposed amendments to the KLEP 2015 are to enable Stockland to lodge a future Development Application for demolition and rebuild to a greater density at the north and west of the site (towards Stanhope Road).

Whilst the existing accommodation to the south and east of the site (adjacent to the bushland) are retained as is, the total site area has been incorporated to enable greater density on the central area proposed for redevelopment.

The site is located within an established low density residential area (single dwellings on large lots) to the north and west of the site, and established bushland to the south and east (Seven Little Australians Park forming part of Garigal National Park).

The site is identified as a "buffer" on the Ku-ring-gai Council Bush Fire Prone Land Map (2017).

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The Planning Proposal includes a bushfire assessment (by EcoLogical Australia) which finds that the subject site is appropriate for the suggested land uses and increase in the number of dwellings provided for senior's housing, subject to the implementation of various strategies.

2.0 The Brief.

Australian Bushfire Protection Planners Pty Limited has been commissioned by *Ku-ring-gai Council* to undertake an independent review of the bushfire impact of the Planning Proposal to rezone land at No. 95 – 97 Stanhope Road, Killara.

The scope of works includes:

- Undertake a review of the Bushfire Protection Assessment prepared by EcoLogical Australia to determine whether the report adequately addresses Section 117(2) Direction 4.4 – Planning for Bush Fire Protection and *Planning for Bush Fire Protection 2006*;

- Identify any further areas of assessment or investigation that should be included in the study;

- Identify the adequacy and accuracy of the methodology and analysis used in the assessment;

- Advise on the accuracy of the findings and conclusions of the assessment, particularly:

  - On whether the site is capable of accommodating the proposed future development and associated land uses;

  - The adequacy of the proposed bush fire risk mitigation measures.

3.0 Site Inspection.

An inspection of the site was undertaken by Graham Swain, Managing Director, *Australian Bushfire Protection Planners Pty Limited* on the 26th March 2018.

4.0 Documents Reviewed.

The following documents were examined in the preparation of this review:

- *Planning for Bushfire Protection 2006 – NSW Rural Fire Service*;

- Part 9.1 of the EP&A Act;

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- Urban Design Study – Lourdes Retirement Village 95 Stanhope Road, Killara prepared by Architectus;

- Bushfire Protection Assessment Report prepared by Ecological Australia – dated 19th June 2017;

- Ecological Assessment prepared by ACS Environmental Pty Ltd – dated February 2017;

- Practice Note 2/12 Planning Instruments and Policies – NSW Rural Fire Service;

- Ku-ring-gai Council Bushfire Prone Land Map;

- Contour Plan(s) supplied by Ku-ring-gai Council;

- Slope Assessment Plan supplied by Ku-ring-gai Council;

- Aerial Photograph (SixMaps).

5.0 Planning for Bushfire Protection 2006.

Planning for Bushfire Protection 2006 – NSW Rural Fire Service identifies the existing and proposed landuse on the site as a *'Special Fire Protection Purpose Development'* with planning controls for this type of development contained in Section 4.2.

Section 4.2.3 details the following specific objectives for Special Fire Protection Purpose Developments:

1. Provide for the special characteristics and needs of occupants as they are more likely to be adversely affected by smoke or heat while being evacuated;

2. Provide for safe emergency evacuation procedures;

3. In all cases the intent and performance criteria of each Bushfire Protection Measure [BPM] must be satisfied as per the Performance Tables within Section 4.2.7. Exceptional circumstances must be demonstrated for reductions in Asset Protection Zone (widths) required by Appendix 2.

Section 4.2.5 details the requirements for infill *SFPP* developments and states:

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"In circumstances where alterations or additions to existing SFPP's facilities are proposed, the RFS requires an appropriate combination of bushfire protection measures and compliance with the intent and performance criteria of each measure within Section 4.3.5.

However, it is also acknowledged that existing circumstances may make the preferred standards difficult to achieve. In such cases, the specific objectives of Section 4.2.3 are to be followed.

Alterations and additions to existing SFPP's which may involve an increase in size and footprint of the building or redevelopment of an existing building are considered to be infill development.

This type of development should also seek to achieve a better bushfire risk outcome (such as improved construction standards) than if the development did not proceed. The new building work should comply with A.S. 3959 – 2009 or be no closer to the hazard than the existing building".

Section 4.2.7 of *Planning for Bushfire Protection 2006* details the standards for bushfire protection measures for SFPP developments and states:

Asset Protection Zones:

"Intent of measures: to provide sufficient space for fire-fighters and other emergency services personnel, ensuring radiant heat levels permit operations under critical conditions of radiant heat, smoke and embers, while supporting or evacuating occupants.

Radiant heat levels of >10kW/m^2 must not be experienced by emergency services workers aiding residents within a special fire protection purpose development".

The table below provides the performance criteria and acceptable solutions for SFPP's located in a bushfire prone area.

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Performance Criteria	Acceptable solutions
The intent may be achieved where:	
• radiant heat levels of greater than 10kW/m² will not be experienced by occupants or emergency services workers entering or exiting a building.	• an APZ is provided in accordance with the relevant tables and figures in Appendix 2 of this document. • exits are located away from the hazard side of the building. • the APZ is wholly within the boundaries of the development site. Exceptional circumstances may apply (see section 3.3)
• applicants demonstrate that issues relating to slope are addressed: maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	• mechanisms are in place to provide for the maintenance of the APZ over the life of the development. • the APZ is not located on lands with a slope exceeding 18 degrees.
• APZs are managed and maintained to prevent the spread of a fire towards the building.	• in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005). *Note - a Monitoring and Fuel Management Program should be required as a condition of development consent.*
• vegetation is managed to prevent flame contact and reduce radiant heat to buildings, minimise the potential for wind driven embers to cause ignition and reduce the effect of smoke on residents and fire-fighters.	• compliance with Appendix 5.

6.0 Review of Bushfire Protection Assessment Report prepared by Ecological Australia.

Sections 1.1 & 1.2 of the report details the description of the proposal, location and description of the development site and includes a comment that the *"locality has not had a widespread wildfire and is never likely to experience this as the vegetation is confined to relatively narrow pathways in directions that are not exposed to widespread and major bushfires".*

Comment:

Figure 1 on Page 10 of this report provides a graphical representation of the fire paths which are likely to present a hazard to the site and identifies that there is a 1.2 klms fire path from the northeast with a potential head width of more than 300 metres.

The fire path from the southeast has a length of more than 450 metres with a potential head width of more than 250 metres.

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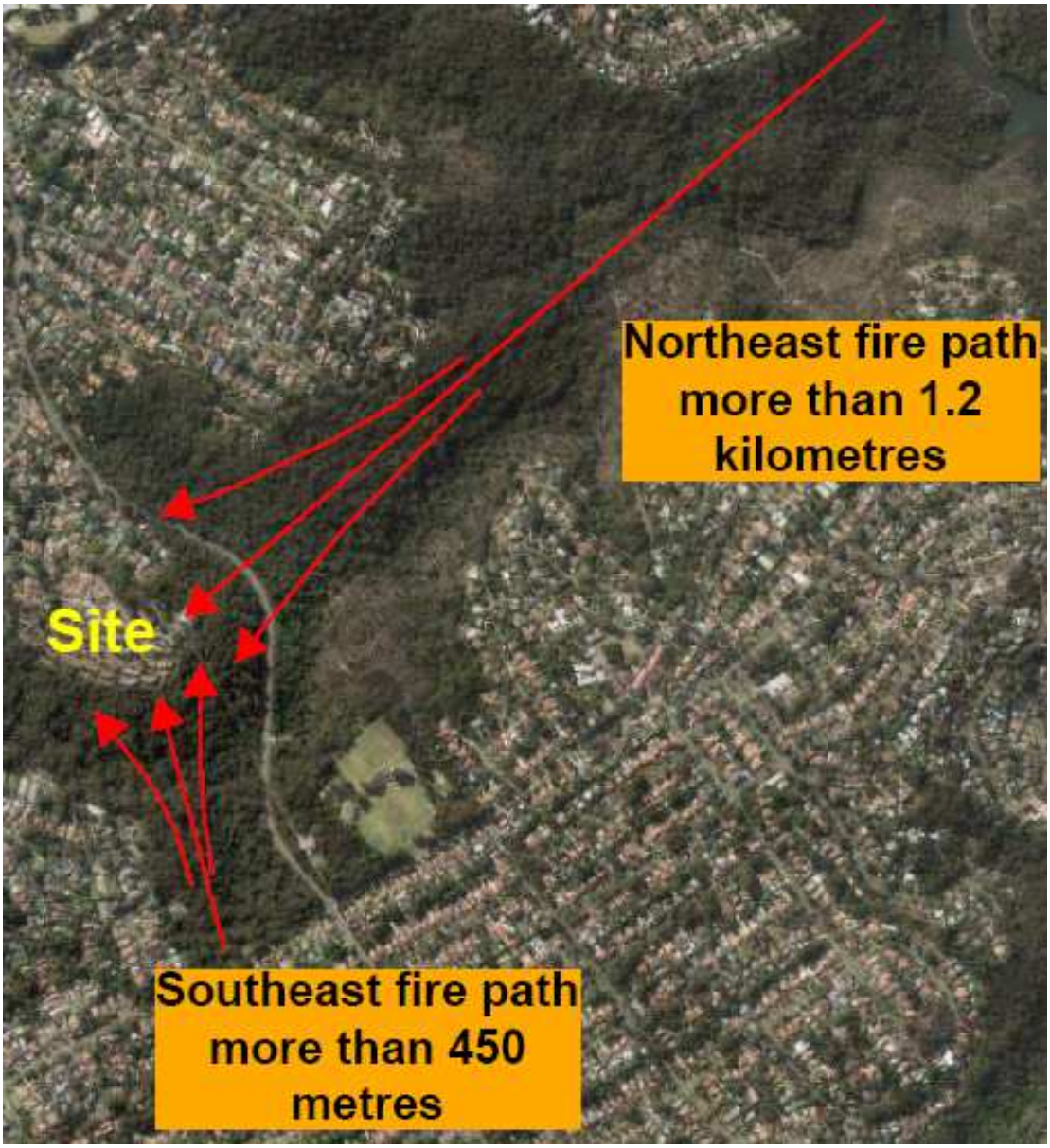
Figure 1 – Plan of Potential Fire Paths



Section 1.4 of the report identifies that the report relies on 'performance solutions' under *Planning for Bushfire Protection 2006* and the need for a 'Bushfire Engineering Brief (BEB)' to adequately engage stakeholders and to test and validate the performance solutions to an appropriate level'.

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Section 2 of the report undertakes a Bushfire Threat Assessment which includes the determination of the 'predominant vegetation class' for a distance of at least 140 metres out from the site and the slope class 'most significantly affecting fire behaviour' for a distance of at least 100 metres in all directions.

The report correctly classifies the 'predominant vegetation' to the north-east through to the south to southwest of the development as 'forest'. The report further states:

'The effective slope is characterised by a steep riparian corridor to the south and sandstone escarpments of varying heights that 'interrupt' the continuous slope grade and depending on the fire intensity its potential uphill spread'.

This comment does not take into account the likely crown fire spread upslope from the northeast, negating any benefit provided by the sandstone escarpments

Figure 2 – Effective Slope Diagram.

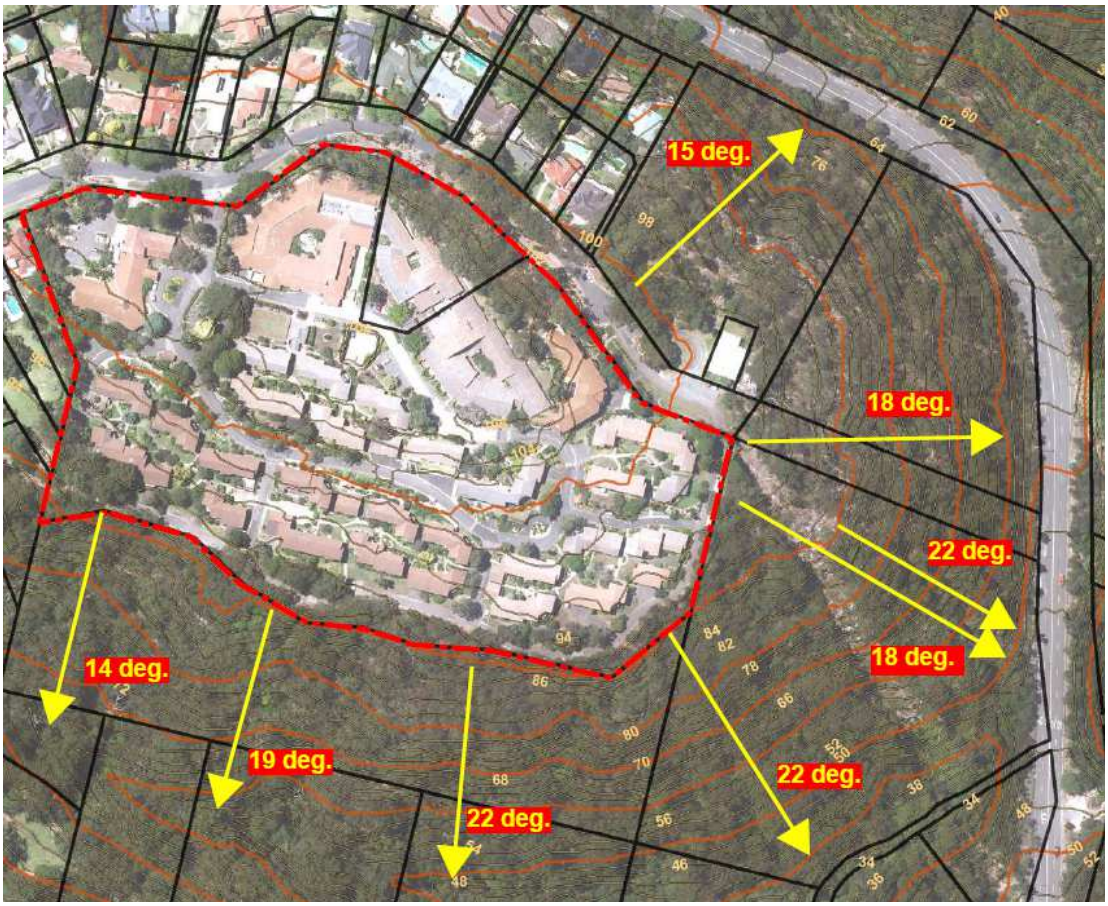

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Figure 2 on Page 11 of this report identifies some minor discrepancy in the effective slope identified on Figure 2 [Slope Assessment] in the ELA report.

Section 3 of the ELA report examines the Asset Protection Zones for the site and provides tables which identify the calculations of Asset Protection Zone width and level of building construction [Bushfire Attack Level - BAL] for each of the six defined effective slopes.

These calculations rely on the 'design fire modelling' provided in Appendix B: of the ELA report and are based on the assumption that the Fire Danger Index [FDI] for the location can be lowered to 55, from the accepted 100 as prescribed in *Planning for Bushfire Protection 2006,* for the Greater Sydney Region – refer to Table A2.3, Page 57 of *Planning for Bushfire Protection 2006*.

Correspondence from the NSW Rural Fire Service [see Attachment A] has confirmed that the Rural Fire Service will not accept lowering the Fire Danger Index for the site from 100 to 55, as proposed in the ELA report.

Therefore the assumptions, calculations and modelling in the ELA report are incorrect and will not be accepted by the NSW Rural Fire Service as the use of the correct level of Fire Danger Index [FDI 100] will increase the level of radiant heat on the exterior of the buildings, in the locations as shown in the Planning Proposal, to more than the mandatory 10kW/m^2.

As a result of the NSW Rural Fire Service not accepting the use of an FDI of 55, the default mechanism for determining complying Asset Protection Zones is Table A2.6 of *Planning for Bushfire Protection 2006.*

Table A2.6 *Planning for Bushfire Protection 2006* requires that for effective slopes of more than 10 degrees, having forest as the predominant vegetation type, the Asset Protection Zone is 100 metres in order to achieve a radiant heat rating on the exterior of the buildings of no greater than 10kW/m^2.

The Planning Proposal locates the new buildings closer to the hazard than the required 100 metre wide setback [Asset Protection Zone] and therefore does not address the mandatory NSW Rural Fire Service performance standard for *Special Fire Protection Purpose Development* as required by Section 4.2.7 of *Planning for Bushfire Protection 2006.*

Figure 3 on Page 13 of this report showing the 100 metre wide Asset Protection Zone setback line.

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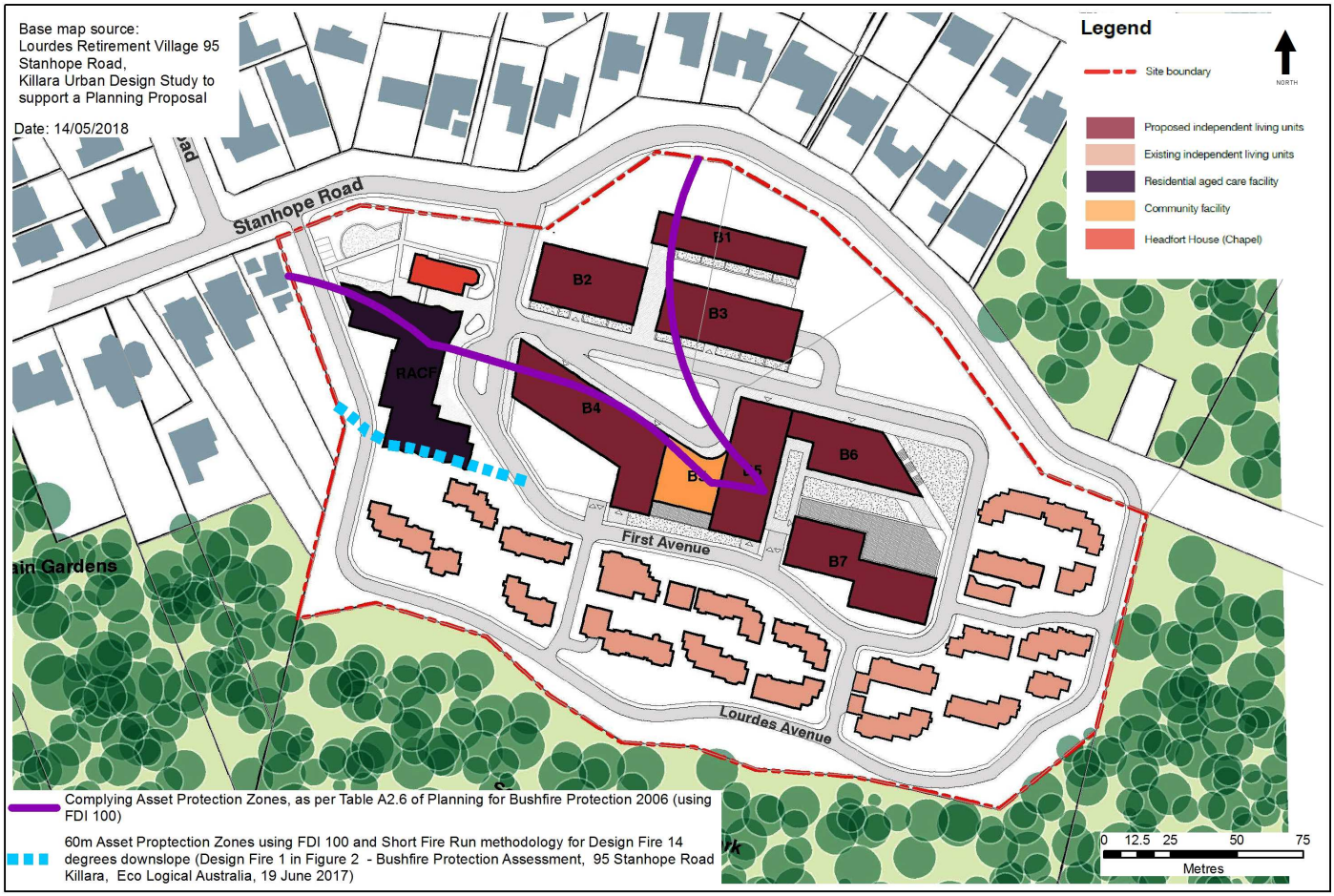
The ELA report utilises a Short Fire Run calculation to justify the Asset Protection Zone setback to the southwest. The maximum length of fire path [run] accepted by the Rural Fire Service in Short Fire Run calculations is 150 metres.

Except for the Design Fire 14 degree downslope fire path to the southwest, which has a fire run distance of 147 – 150 metres, all other fire paths exceed the 150 metre length and therefore preclude the use of the Short Fire Run Calculator. The Planning Proposal provides a setback of around 58m (but a required APZ of 55 metres) to the southwest of the new RACF building. Using the Short Fire Run methodology and FDI 100, a distance of 60m is required to provide radiant heat of less than 10kW/m2 to this aspect of the building, as mapped within Figure 3

Figure 3 – Plan showing 100 metre and 60 metre wide Asset Protection Zone setback line.



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Sections 4 & 5 of the ELA report examine the Bushfire Attack Level to the existing and proposed buildings.

The findings in this section of the report are based on calculations which use the reduced Fire Danger Index of 55 – not the Fire Danger Index of 100 confirmed by the NSW Rural Fire Service.

The assessment of BAL rating to the buildings determined in the ELA report is therefore not accurate and the use of the correct Fire Danger Index [FDI 100] will increase the radiant heat on the exterior of the proposed buildings [as shown in the Planning Proposal] to greater than 10kW/m^2.

This increase in radiant heat and construction standards to the proposed buildings do not comply with the *Special Fire Protection Purpose Development* performance requirements of *Planning for Bushfire Protection 2006.*

Sections 6 & 7 of the ELA report detail the general requirements for Water Supply, Gas and Electrical supplies in accordance with *Planning for Bushfire Protection 2006.*

Section 8 of the ELA report examines the existing and proposed access arrangements under the Planning Proposal with the proposal to provide a secondary access to Stanhope Road. This improves emergency egress from the site except that the existing perimeter access road linking to the secondary exit is not safe and will be subject to bushfire over-run.

The Planning Proposal establishes a loop perimeter internal road identified as 'First Avenue'. A review of the likely impact on this road has identified that with the use of the increased Fire Danger Rating for the site the north-eastern, eastern and south-eastern sections of the loop will be exposed to radiant heat levels greater than 10kW/m^2. This section of the loop road will therefore not provide safe access/egress for residents and an operational platform for fire-fighters assisting during bushfire. Refer to Figure 4 on Page 15 of this report.

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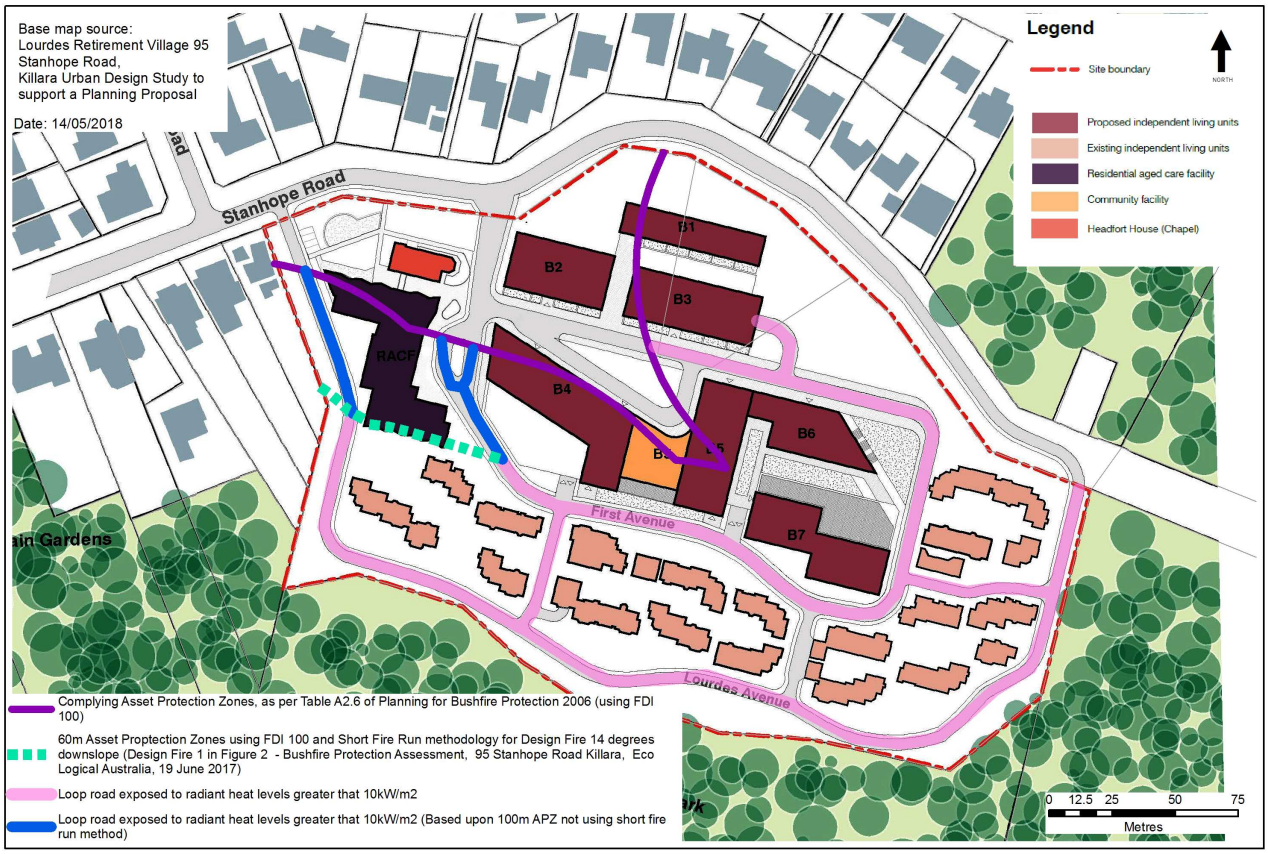
Figure 4 – Plan showing location of high risk access road.



Section 9 of the ELA report examines emergency response and evacuation.

Due to the inaccuracies in the determination of the Asset Protection Zones, the assessment of the safety of the occupants is also incorrect and evacuation will therefore be required. The author does not respond to the risk to the existing ILUs retained in the Asset Protection Zone setback to the new buildings.

An additional issue is the proposal to increase the occupation density within the facility.

This will result in the need for a higher level of response by the Emergency Services to assist in the relocation of the residents to a safer neighbourhood place. This assistance may not be available.

Section 10 – Conclusion, relies on the bushfire protection measures determined by modelling using the incorrect Fire Danger Index, which the NSW Rural Fire Service will not be accepted – refer to Attachment A.

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In addition, the report is essentially 'silent' on the issue of the safety of the residents occupying the existing Independent Living Units to be retained on the periphery of the existing village.

7.0 Identify any further areas of assessment or investigation that should be included in the study.

This review has identified inaccuracies in the preparation of the ELA Bushfire Protection Assessment Report.

A new assessment of the Planning Proposal is required to be undertaken, in consultation with the NSW Rural Fire Service and Council, to examine whether there is any potential to redevelop the site.

The NSW Rural Fire Service may, under the provisions of 'infill development' permit a reduction in the width of the Asset Protection Zones to permit the new buildings to be located behind the 29 kW/m^2 setback distance.

Previous advice from the NSW Rural Fire Service [on similar projects] has confirmed that the Service is unlikely to accept an increase in the occupancy of the facility due to the need to evacuate an increased number of vulnerable people from the site, placing additional demand on road infrastructure and the emergency services.

The Planning Proposal includes the construction of multi-level buildings exceeding three storeys in height. Such buildings have higher densities and increased external façade surface areas potentially exposed to bushfire attack.

The increased height can result in exposure to convective heat and is exacerbated on this site by the steep slopes across which bushfire will travel.

The NSW Rural Fire Service recommends that multi-storey buildings should not be located along ridges [such as this site] or slopes with significant fire runs.

8.0 Identify the adequacy and accuracy of the methodology and analysis used in the assessment.

Refer to findings within Section 6.

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9.0 Advice on the accuracy of the findings and conclusions of the assessment, particularly:

- On whether the site is capable of accommodating the proposed future development and associated landuses.

Comment:
The site is not capable of accommodating the development as detailed in the proposed Master Plan as the setbacks proposed do not comply with the requirement that the exterior of the buildings have a radiant heat exposure of not more than 10 kW/m^2.

In order to justify redevelopment on the site discussions should be held with the NSW Rural Fire Service to confirm whether the Service is prepared to consider reducing the width of Asset Protection Zones and is also prepared to accept an increase in the level of radiant heat exposure on the exterior of the new buildings to BAL 29.

If the Service confirms support for a reduction in the width of the Asset Protection Zones and an increase in the level of radiant heat above 10kW/m^2 the Master Plan should be redesigned achieve the required standards.

The occupancy numbers shall also be reduced to lower the number of persons requiring evacuation from the buildings located in the 29 kW/m^2 setback distance. This will depend on the NSW Rural Fire Service's acceptance of an increase in the radiant heat level from 10kW/m^2 to 29k/Wm^2.

The existing ILUs proposed to be retained on the periphery of the site shall be removed and the area managed as an Asset Protection Zone. The existing perimeter road shall be retained for fire-fighting and maintenance access and the internal road redesigned to provide access to the buildings and a second connection to Stanhope Road, located inside the 10kW/m^2 setback – refer to Figure 5 on Page 18 of this report.

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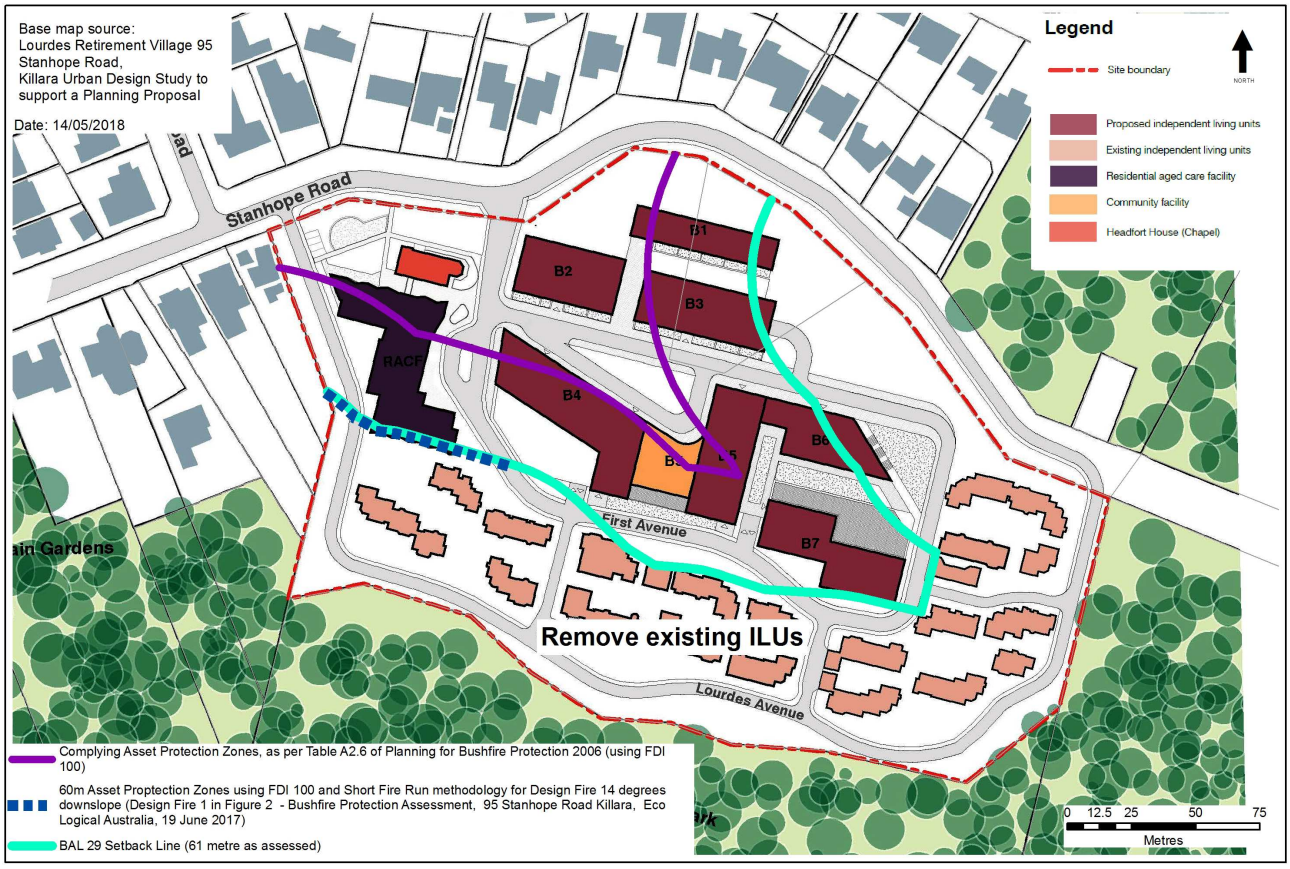
Figure 5 – Plan showing 100 metre wide Asset Protection Zone setback and 29kW/m^2 (61m) setback line.



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- The adequacy of the proposed bushfire risk mitigation measures.

Comment:
The proposed bushfire risk mitigation measures are not adequate as the proposal does not address the core requirement of reducing the radiant heat on the exterior of the buildings to not more than 10kW/m^2 and the provision of safe access for residents and emergency service personnel has not been addressed.

In addition, the proposed increase in the numbers of residents makes egress from the buildings challenging and will place an increased demand on road infrastructure and safety of adjoining residents and emergency services during evacuation. The proposal to include multi storey buildings will also increase the potential for entrapment.

Graham Swain,
Managing Director,

Australian Bushfire Protection Planners Pty Limited
14.05.2018

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Attachment A – Correspondence from NSW Rural Fire Service

From: Craig Casey [Craig.Casey@rfs.nsw.gov.au]
Sent: Wednesday, 28 March 2018 3:15 PM
To: abpp@bigpond.net.au
Cc: Nika Fomin; Kalpana Varghese
Subject: Proposed redevelopment of Lourdes Retirement Village, 95 Stanhope Road Killara, Modification of FDI levels.

Dear Graham

I've spoken to both Nika Fomin (Manager Planning and Environment Services) and Kalpana Varghese (Acting Team Leader Development Assessment and Planning) regarding you enquiry, concerning the possible modifications to the Fire Danger Indices (FDI) used here in determining the proposed radiant heat levels as experienced by a SFPP development as part of either a direct performance or alternate solution and its compliance with PBP-2006.

Due to the many factors that contribute the determination of a (FDI) and many variables involved such as wind speed, temperature, humidity and fuel conditions and topographic features, and combined with the level of vulnerability of the proposed developments inhabitants and the difficulties with any scientific verification, we would not support the use of a modified FDI due to the inherent high level of risk to the residents and fire fighters.

Kind regards

Craig

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