Our Ref: 18LIG07BF
Council Ref: DA2020/0484
NSW RFS Ref: DA20200520001778-Original-1

7 October 2020

Lighthouse Project Group
PO Box 920
MILSONS POINT NSW 1565

**Attention**: Mr A Bloch-Jorgensen

Dear Alex

**Re: Peer Review - Proposed Commercial Building Development Review of Approved Bushfire Protection Measures**
**Lot 7335 DP 1152473, Frenchs Forest Bushland Cemetery**

*Travers bushfire & ecology* has been engaged to undertake a peer review of the 'Proposed Commercial Building Development Review of Approved Bushfire Protection Measures (project Ref: 100B-330-4) prepared by *Sydney Bushfire Consultants (SBC)* at the above address (dated: 7 October 2020).

The objective of the *SBC* report was to prepare a revised bushfire assessment, based on the recommended conditions listed in the NSW Rural Fire Service letter dated 3 June 2020 (ref: DA20200520001778_Original-1) due to the environmental impact to the Coastal Upland Swamp (endangered ecological community) and associated buffer zone.

In particular *Northern Beach Council* issued their Natural Environmental Referral Response – Biodiversity, dated 18/9/2020 (following their review of the RFS conditions) which states that the proposal is unsupported based on the following:

> ***The bushfire report (Sydney Bushfire Consultants, 19 March 2020) states that the proposal does not meet the definition of either Residential or Special Fire Protection Purposes (SFPP) development and does not identify any required bushfire APZs. However, the RFS referral response received 3 June 2020 seeks to apply bushfire protection standards consistent with that of a SFPP development, including a condition requiring establishment of an Inner Protection Area (IPA) for a distance of 67m from the function centre and proposed chapel.***
>
> ***Implementation of a 67m IPA from the development site would impact approximately 0.5ha of native vegetation, including a large proportion of the Coastal Upland Swamp and riparian vegetation along the creek line. It is noted that this may also potentially trigger entry into the Biodiversity Offset Scheme (BOS) by way of the area clearing threshold, which is 0.5ha for the subject site. It is therefore considered that the submitted information does not adequately reflect potential impacts of the proposal (taking into account RFS conditions), which are likely to result in a significant impact to Coastal Upland Swamp and riparian vegetation.***

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This peer review has been undertaken to review the revised bushfire assessment by SBC and in particular their assessment against the following:

- *Planning for Bushfire Protection 2019* (PBP) (and in particular the provisions outlined in Section 8.3.11 – Public assembly buildings).
- Alternative solution (Method 2 – AS3959 (2018)) to determine BAL ratings and minimum APZ requirements for the Chapel and Function Centre.

***Section 8.3.11 Public assembly buildings***

PBP 2019 acknowledges the variation in bushfire risk associated with occupants of assembly buildings, and in particular the evacuation challenges presented by large numbers of occupants. As a result PBP provides the following two options:

1. Buildings used for public assembly with a floor space area of greater than 500m$^2$. These developments are to be treated technically as SFPP and must not experience radiant heat levels of greater than 10kW/m$^2$ on any part of the building.
2. Buildings used for public assembly with a floor space less than 500m$^2$.

Whilst PBP is generally silent on the requirements for buildings <500m$^2$ in size, the NSW Rural Fire Service have confirmed that they consider these smaller buildings as *'other' development*' (i.e. need to consider the aims and objectives of PBP).

The report by SBC outlines the proposal's adherence to a floor space of less than 500m$^2$ (excluding areas used for back of house – such as kitchen, storage rooms etc.). In summary the report states the following applicable floor size with plans provided in its Appendix 3 from *Hector Abrahams Architects* providing support for these calculations;

**Table 1** – Floor space

| Chapel | Function Centre | Total Floor space |
|---|---|---|
| 270m$^2$ (plus 71m$^2$ outdoor public area (deck) | 72m$^2$ (plus 78m$^2$ outdoor public area) | 491m$^2$ |

Whilst PBP 2019 does not stipulate the number of people expected to occupy a building with a size of 500m$^2$ the SBC report does reference advice from MBC Group whom have confirmed that BCA Clause D1.13 defines that a church and a function centre requires the allocation of 1m$^2$ per person (i.e. an expected occupancy of 500 people).

The capacity of the assembly buildings has been confirmed as follows:

- Chapel – seating capacity of 130 persons
- Function centre – capacity of 130 persons

*Travers bushfire & ecology* agree that the calculated 260 persons is well below the allowable 500 persons allowed for within a 500m$^2$ building.

As a result *Travers bushfire & ecology* concur with the SBC report. Based on the size and capacity of the combined Chapel and Function Centre the proposal should not be considered as if it is an SFPP development and the requirement to comply with 10kW/m$^2$ on any part of the building should not apply.

The development should be considered as 'other' development and a suitable package of bushfire protection measures have been proposed commensurate with the assessed level of risk to the development. As outlined in the report by SBC due consideration has already been given and it is not proposed to amend the recommended RFS conditions in relation to building upgrades, access, services (water, gas & electricity) or emergency planning (i.e. Conditions 3 – 5 as outlined in the NSW RFS approval letter).

**Asset Protection Zones & BAL rating**

The APZs recommended by *SBC* are based on a site specific engineering (Method 2 calculations) as allowable within PBP to satisfy the performance criteria.

The performance criteria states '*APZs are provided commensurate with the construction of the building and a defendable space is provided'*.

The size of the APZ is assessed in terms of the bushfire hazard – vegetation, topography and fire danger index. These inputs are described in detail below.

***Vegetation formation (PBP 2019)***

*SBC* identified the following vegetation formations / communities within the study area:

- Coastal Upland Swamp
- North Coast Wet Sclerophyll Forest
- Sydney Coastal Dry Sclerophyll Forest
- Remnant vegetation (equivalent to 'rainforest' in terms of A1.11.1 of PBP)

The report also acknowledged a portion of the remnant vegetation (south-west of Chapel) as an exclusion due its narrow width and current status as a managed ornamental garden.

*Travers bushfire & ecology* concur with the assessment above. These formations are supported by the detailed vegetation survey of the development site that has been undertaken by *Travers bushfire & ecology* as detailed within the Biodiversity Development Assessment Report, April 2020 and as summarised below.

**Table 2** – Vegetation classification

| Aspect / Fire Run | Vegetation community (source: TBE, 2020) | Vegetation formation | Vegetation class | Comprehensive fuel loads (t/ha) | Acceptable solution fuel loads (t/ha) *(PBP 2019)* |
|---|---|---|---|---|---|
| North of Chapel / Fire Run 1 & 2 & east of Function Centre / Fire Run 6 (refer Note 1) | Smooth-barked Apple – Turpentine Blackbutt tall open forest on enriched sandstone slopes and gullies of the Sydney Region (PCT 1841) | North Coast Wet Sclerophyll Forest | Wet Sclerophyll Forest | 22 / 35.98 | 22/36.1 |
| North of Function Centre / Fire Run 3 | Red Bloodwood – Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast (PCT 1783) | Dry Sclerophyll Forest (shrubby) | Sydney Coastal Dry Sclerophyll Forest | 21.3/27.3 | 22/36.1 |

| Aspect / Fire Run | Vegetation community (source: TBE, 2020) | Vegetation formation | Vegetation class | Comprehensive fuel loads (t/ha) | Acceptable solution fuel loads (t/ha) *(PBP 2019)* |
|---|---|---|---|---|---|
| | Red Bloodwood – Silvertop Ash – Stringybark open forest on ironstone in the Sydney region (Duffys Forest) (PCT 1786) | | | | |
| North - Refer Note 2 | Needlebush – Banksia wet heath swamps on coastal sandstone plateaus of the Sydney Basin (PCT 1804) | Freshwater wetland | Coastal Heath Swamp | 15/15 | 15/15 |
| South-east & North-west of Chapel / Fire Run 4 & 5 & South-east of Function Centre / Fire Run 7 | Remnant Forest / Rainforest (based on narrow width – clause A1.11.1 of PBP) | Rainforest | Rainforest | 10/13.2 | 10/13.2 |

**Note 1:** In addition to the fire run scenarios identified by SBC, *Travers bushfire & ecology* have included an additional Fire Run 6 (east of Function Centre) and Fire Run 7 (south-east of Function Centre) – refer Schedule 1 attached for location. Noting that these additional runs support the APZ and BAL applied by SBC for the proposed new building construction.

**Note 2**: SBC in their assessment have used the comprehensive fuel loads as identified in column 5. This assessment has excluded the coastal heath swamp (15/15t/ha) fuel load as the predominant vegetation was determined as North Coast Wet Sclerophyll Forest.

***Slope assessment***

*Travers bushfire & ecology* concur with the slope assessment provided within the SBC report as detailed in Table 3 & 4.

***Bushfire attack assessment***

The following assessment has utilised an alternative solution approach in compliance with *AS3959* Appendix B Method 2, using the effective slope and comprehensive fuel loads to determine the minimum required APZ to comply with the performance criteria outlined in PBP as follows:

'*APZs are provided commensurate with the construction of the building and a defendable space is provided*'.

Table 3 & 4 provides a summary of the bushfire attack assessment for the Function Centre and the Chapel. These APZ's / fire runs are depicted in Schedule 1 attached. Fire Runs 1 – 5 represent the assessment undertake by SBC, with Fire Runs 6 & 7 provided as an additional assessment to the east and south-east of the Function Centre.

**Table 3** – Bushfire attack assessment (Chapel)

| Aspect / Fire Run | Vegetation formation within 140m of development | Reduced flame width | Effective slope of land | APZ provided | Bushfire attack level / radiant heat |
|---|---|---|---|---|---|
| North-east / Fire run 1 | North Coast Wet Sclerophyll Forest (22 / 35.98 t/ha) | 55m | 4° U | 20m | BAL 29 / 26.07kW/m$^2$ |
| North / Fire run 2 | North Coast Wet Sclerophyll Forest (22 / 35.98 t/ha) | 55m | Level | 24m | BAL 29 / 25.85 kW/m$^2$ |
| South-west & south-east / Fire Run 4 & 5 | Remnant forest (10/13.2t/ha) | N/A | Level | 12m | BAL 29 / 25.57 kW/m$^2$ |
| West | Excluded vegetation | N/A | Level | 8m | 8m provides sufficient defendable space in compliance with the performance criteria of PBP |

**Table 4** – Bushfire attack assessment (Function Centre)

| Aspect / Fire Run | Vegetation formation within 140m of development | Reduced flame width | Effective slope of land | APZ provided | Bushfire attack level / radiant heat |
|---|---|---|---|---|---|
| North-east / Fire run 3 | Sydney Coastal Dry Sclerophyll Forest (21.3/27.3 t/ha) | 20m | 4° U | 19m | BAL 19 / 17.84kW/m$^2$ |
| East / Fire run 6 (refer Note 1) | North Coast Wet Sclerophyll Forest (22 / 35.98 t/ha) | 55m | 5° U | 24m | BAL 19 / 18.15 kW/m$^2$ |
| South-east / Fire Run 7 (refer Note 1) | Remnant forest (10/13.2t/ha) | N/A | Level | 16m (to existing building)<br>40m (to new build) | BAL 19 / 18.71 kW/m$^2$ |

***Note 1:*** A performance-based assessment using Appendix B of *AS3959* was undertaken to determine the required APZ and BAL levels for the south-eastern and eastern aspect of the Function Centre. The results of the assessment are provided below and were prepared using the bushfire attack level calculator developed by *Flamesol.*

Calculated October 7, 2020, 3:34 pm (BALc v.4.8)

**Fire Run 6**

| Bushfire Attack Level calculator - AS3959-2018 (Method 2) | | | |
|---|---|---|---|
| Inputs | | Outputs | |
| Fire Danger Index | 100 | Rate of spread | 1.86 km/h |
| Vegetation classification | Forest | Flame length | 16.47 m |
| Surface fuel load | 22 t/ha | Flame angle | 66 ° |
| Overall fuel load | 35.98 t/ha | Panel height | 15.04 m |
| Vegetation height | n/a | Elevation of receiver | 7.52 m |
| Effective slope | -5 ° | Fire intensity | 34,757 kW/m |
| Site slope | 0 ° | Transmissivity | 0.826 |
| Distance to vegetation | 25 m | Viewfactor | 0.2889 |
| Flame width | 55 m | Radiant heat flux | 18.15 kW/m² |
| Windspeed | n/a | Bushfire Attack Level | BAL-19 |
| Heat of combustion | 18,600 kJ/kg | | |
| Flame temperature | 1,090 K | | |

Calculated October 8, 2020, 8:28 am (BALc v.4.8)

**Fire Run 7**

| Bushfire Attack Level calculator - AS3959-2018 (Method 2) | | | |
|---|---|---|---|
| Inputs | | Outputs | |
| Fire Danger Index | 100 | Rate of spread | 1.2 km/h |
| Vegetation classification | Rainforest | Flame length | 9.380000000000001 m |
| Surface fuel load | 10 t/ha | Flame angle | 72 ° |
| Overall fuel load | 13.2 t/ha | Panel height | 8.92 m |
| Vegetation height | n/a | Elevation of receiver | 4.46 m |
| Effective slope | 0 ° | Fire intensity | 8,184 kW/m |
| Site slope | 0 ° | Transmissivity | 0.848 |
| Distance to vegetation | 16 m | Viewfactor | 0.2903 |
| Flame width | 100 m | Radiant heat flux | 18.71 kW/m² |
| Windspeed | n/a | Bushfire Attack Level | BAL-19 |
| Heat of combustion | 18,600 kJ/kg | | |
| Flame temperature | 1,090 K | | |

***Conclusion***

*Travers bushfire & ecology* has undertaken a review of the 'Proposed Commercial Building Development Review of Approved Bushfire Protection Measures (project Ref: 100B-330-4) prepared by *Sydney Bushfire Consultants (SBC).*

We concur with the assessment of the development against the provisions outlined in Section 8.3.11 (public assembly buildings <500m$^2$) which is further supported by the expected low occupancy rates of 260 people.

We concur with the alternative solution approach in determining minimum APZ's and BAL ratings to satisfy the intent of the performance criteria outlined in PBP. In addition we have provided an additional two (2) fire run scenarios in support of the 8 – 24m APZ applied to the Chapel (BAL 29) and the 16 – 25m APZ applied to the Function Centre (BAL 19 for new additions).

With the provision of APZ's, BAL construction standards as identified above and the recommended conditions 3 - 5 listed in the NSW RFS letter (ref: DA20200520001778-Original-1) the proposed development is capable of achieving compliance with the aims and objectives of *Planning For Bush Fire Protection 2019*.

If you require any further information please do not hesitate to contact the undersigned on (02) 4340 5331 or at info@traversecology.com.au

Yours faithfully

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

Nicole van Dorst
*BA Sc.* BPAD-Level 3-23610 (FPA)
Manager Bushfire Services – ***Travers bushfire & ecology***


**Legend**

- Study area
- Proposed new works
- Asset Protection Zone (APZ) (466m2 impact on riparian zone)

**Watercourse Classification**

- Drainage line
- First order
- Second order
- Top of bank
- Riparian Zone (0.187ha)

**Vegetation Class**

- Coastal Upland Swamp (TEC) (PCT 1804)
- North Coast Wet Sclerophyll Forest (PCT 1841)
- Sydney Coastal Dry Sclerophll Forest (PCT 1783)

Travers bushfire & ecology
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| PROJECT & MXD REFERENCE | DATE & ISSUE NUMBER | SCALE & COORDINATE SYSTEM |
|---|---|---|
| 1 Hakea Ave, Frenchs Forest<br>18LIG07_BF001 | 7/10/2020<br>Issue 1<br>EB | 1:800 @ A3<br>GDA 1994 MGA Zone 56 |

0 20 40 m

TITLE

# Schedule 1 - Bushfire Protection Meaures

Document Path: N:\GIS STORAGE\N Drive\18LIG07_HakeaAve_FrenchsForest\MXDs\18LIG07_BF001.mxd

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.