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Dear Justin

The Ribbon, Wheat Road, Sydney
Development Application - Fire Engineering

This letter concerns the fire safety design of The Ribbon development on Wheat Road in Sydney, and specifically those aspects of the fire safety design that impact upon planning and hence are Development Approval related issues for the building.

A fire engineering review of the conceptual design has been undertaken by Arup based on drawings (dated 30 November 2015) provided by HASSELL, pmdl and Russell & George architects. The internal layout of the building above podium levels has altered significantly since the previous DA submission (dated 5 December 2012), which was primarily office.

The proposed building will primarily be for hotel and serviced apartments, consisting of:

- Levels 00 (ground floor) to 04 – a mix of retail, function space, restaurant, car parking, cinema, gym, serviced apartment storage and hotel lobby;
- Levels 05 to 21 – hotel rooms on the eastern side of the building (hotel gym in the middle of the building on Level 06);
- Levels 06 to 16 – serviced apartments on the western side of the building;
- Level 18 – swimming pools accessible via the serviced apartments lifts, serviced apartments internal stair on Level 16 or hotel on Level 18;
- Level 22 – hotel swimming pool and lounge/bar;
- Level 23 – restaurant;
- Level 24 – plant rooms.

The building will have an effective height of approximately 80m.

The fire safety design of the building will generally satisfy the Performance Requirements of the Building Code of Australia (BCA) by complying with the Deemed-to-Satisfy (DTS) Provisions. However, there are some aspects of the design that are to be developed using performance based, fire engineered Alternative Solutions to achieve compliance with the Performance Requirements of the BCA. The most significant of these issues are discussed in more detail below.

Interconnection of multiple storeys (serviced apartment and hotel levels)
Whilst the DTS Provisions allow for two stories to be open and interconnected with no additional fire safety measures, for this building Levels 7 and above are proposed to be interconnected by an atrium. The fire strategy for the atrium will need to be resolved during the design phases of this project. Whilst the design has not yet been resolved, there are several feasible options including:

- Separating the atrium from the floor levels (other than the lowest one or two levels) by smoke proof construction with sufficient smoke venting at high level to prevent failure of the glazed construction above the fire floor;
- Separating some of the highest levels from the atrium and leaving others, providing more smoke exhaust than the fully separated option. The smoke exhaust would be designed to maintain tenable conditions on the open floor levels. One of the technical challenges with this option is providing sufficient inlet air, given the constraints on inlet air paths due to the location of the atrium;
- Providing horizontal fire curtains (or similar) so that in fire mode only 2 occupied levels will be interconnected, as per the DTS provisions of the BCA.

Interconnection of multiple storeys (ground floor and Levels 1-4)
The DTS Provisions allow up to 3 storeys to be interconnected if the building is sprinklered and at least one of the storeys has direct egress to a road or open space. However, the north-eastern side of the building is proposed to be connected via an open circulation stair from Level 0 (Ground Floor) through to Level 4 (i.e. connecting 5 storeys). A fire engineering approach will be used to provide necessary compartmentation and/or smoke exhaust to minimise the risk of smoke spread and to maintain tenability for occupants.

Travel distances
The plans show extended travel distances from the serviced apartments on the western side of the building and from the hotel rooms on the eastern side of the building. The travel distances vary in length with some parts having 30m travel to a point of choice in lieu of 6m permitted by the DTS Provisions. Fire engineering options for addressing these travel distances include the following and for some areas a combination of measures would most likely be required:

- Providing horizontal egress between the serviced apartment corridors and hotel corridors and vice versa. This can overcome the issues with the extended travel distances in some areas;
- Sub-dividing the dead end corridors to minimise the travel distances and also provide an alternative egress path for occupants;
- Enhancing the detection systems in the corridor areas and the serviced apartment / hotel rooms (e.g. AS1670.1-2004 in the corridors and heat detectors in the rooms) and providing smoke seals to the doors to the rooms from the corridors;
- Using smoke control systems within the corridors to maintain tenable conditions.

Computational Fluid Dynamics (CFD) modelling would be required to test some of the design options, particularly for dead end corridors greater than 15m in length.

Hotel/serviced apartment corridors more than 40m long
The hotel/serviced apartment portions of the building contain public corridors that are longer than the 40m limit prescribed by the DTS Provisions. This can be justified on the basis of additional fire safety measures such as smoke seals to be fitted to all apartment / hotel entrance doors, enhanced smoke detection or well ventilated corridors provided with a smoke exhaust system.

Mechanical Services Void
The building will be provided with an air intake void on the east and the west sides of the building effectively connecting all hotel/serviced apartment levels. A fire engineering approach will be used to provide fire separation, as necessary, to minimise the risk of fire spread within the building, to an equivalent level as DTS provisions.

Rationalised egress width from Function Space
The total width of exits from the function space on Podium Level 4 will be less than that prescribed by the DTS Provisions. This can be justified by appropriate separation of the function space from the rest of the floor and provision of sprinklers and smoke exhaust to the function space to demonstrate that safe egress of occupants can be achieved before the onset of untenable conditions, hence meeting the Performance Requirements of the BCA.

Cinema strategy
For acoustic purposes, a performance based strategy is proposed for the cinema auditorium to minimise smoke exhaust requirements. Sprinkler protection and a robust escape strategy will be developed to meet the Performance Requirements of the BCA.

Car stacker
A fully automated car stacker is proposed at Ground, Level 1 and Level 2. The fire strategy for this innovative facility will address the risk of fire and smoke spread to meet the BCA's Performance Requirements with respect to compartmentation and fire-fighting intervention. It may also address occupant safety during egress, although the facility should not normally be occupied.

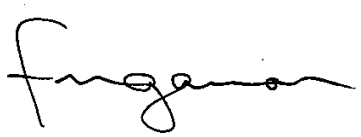
Fire Brigade Access
Due to the overhang of the building on the east side, the Fire Brigade booster assembly may need to be provided in an appropriate location accessed from Harbour Street, such that the Fire Brigade will not have pass under the overhang of the building to reach it. A fire engineering approach will be used to show that the location and protection to the surroundings of the boosters and fire brigade access routes will meet the Performance Requirements of the BCA. This will be discussed and agreed with Fire & Rescue NSW as the project progresses.

Conclusion

Based on our review of the project documentation, it is considered that a performance based approach can be used to demonstrate compliance with Performance Requirements of the BCA relating to fire safety without major changes to the current design.

It is anticipated that other non-compliances with the DTS Provisions of the BCA will be identified as the design further develops. However, it is considered that there are no significant issues that would affect the building layout arising from fire safety and hence no impediments to the issuing of a Development Approval for the project.

Yours sincerely



Felix Gamon
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