

File Ref. No: FRN14/2830
TRIM Doc. No: D15/65399
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24 August 2015

The Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

**EIS Exhibition
Barangaroo South
Crown Sydney Hotel Resort (SSD 6957)**

Introduction

FRNSW understanding of the Crown Casino development at the Barangaroo site includes, but is not limited to:

- Barangaroo is identified as a State Significant Site in Schedule 2 of the *State Environmental Planning Policy (State and Regional Development) 2011*.
- The NSW Government introduced and passed the *Casino Control Amendment (Barangaroo Restricted Gaming Facility) Bill 2013 (Proof)* which among other things exempts the Barangaroo Restricted Gaming Facility from the Smoke Free Environment Act 2000.
- The intention of the design is to create an architecturally iconic development that will complement Sydney icons like the Harbour Bridge and the Opera House.
- The structural twisting design from Wilkinson Eyre draws inspiration from three twisting petals.
- The development will be Sydney's first six-star luxury hotel that seeks to draw many of its visitors from China and other Asian countries.
- The building will have a maximum building height of approximately 271 metres.
- The building will be a performance based design incorporating numerous alternative solutions.



The Casino Control Amendment Bill

With the passing of the Casino Control Amendment Bill, the Barangaroo Restricted Gaming Facility will be exempt from the provisions of the Smoke Free Environment Act. As such smoking will be permitted within the development. A review of fire statistics indicates that smoking is responsible for 38% of civilian fatalities in Hotels and Apartment buildings [source RAWFIRE Fire Engineering Brief] and a significant cause of fires in buildings. It is not considered unreasonable then to state that there will be an increased risk of a fire starting within the building.

The Building Codes of Australia and Performance Based Building Design

If FRNSW were asked to make comment on the built environment it would be that building regulators and supporting regulatory documents seldom keep up with the ever increasing pace of change within the built environment. Additionally the Deemed-to-Satisfy (D-t-S) provisions of Building Code of Australia (BCA) when first drafted were not developed with Crown Tower in mind. To emphasize these points the following comments are offered—

- The BCA considers that the life risk associated with multilevel buildings can be effectively dealt with through the categorisation of buildings above and below an effective height of 25 m. If this assumption of life risk is correct a building having an effective height of 30 metres is considered to have a similar life safety risk to that of a building with an effective height of 100 metres or a building with an effective height of 270 metres. FRNSW think otherwise and that increasing building height incrementally increases the level of risk building occupants are exposed too. From a FRNSW operational perspective increasing building height slows fire brigade intervention time and increases the complexity of FRNSW operations.
- New construction techniques and materials are now regularly introduced into the market place without a comprehensive understanding of their impact and response to real fire. The recent fire in the docklands area of Melbourne could be considered to be one such example.
- Referenced Australian Standards of the BCA are often more than a decade old. For example AS 2118.1 *Automatic Fire Sprinklers* was published in 1999.
- The concept of vertical fire spread up the façade of a building is not considered or specifically catered for by the wet fire standards (i.e. fire hydrant and fire sprinkler) currently referenced by the BCA. For example under the provisions of AS 2118.1 an apartment building is required to be protected by a light hazard system capable of operating six heads at the required design flows irrespective of whether the façade offers the potential for vertical fire spread up 10 storeys or 80 storeys.

AS 2419.1 Fire Hydrant Systems and NFPA 14 – Installation of Standpipe and Hose Systems

In the United States of America a land of tall buildings (Wikipedia indicates that there a 100 buildings over 224 metres in height) Clause 7.9.3 of NFPA 14 *Standard for the Installation of Standpipe and Hose Systems* 2013 Edition states—

For systems with two or more zones in which any portion of the higher zones cannot be supplied by means of fire department pumpers through a fire department connection, an auxiliary means of supply in the form of high-level water storage with additional pumping equipment or other means acceptable to the AHJ shall be provided.

Note: Clause 7.9.4 of NFPA 14 *Standard for the Installation of Standpipe and Hose Systems* 2007 Edition detailed the same requirement.

In Australia, a land of increasing building height (of which Crown Tower will form part) AS 2419.1 *Fire Hydrant Installations* has no such similar provision. The implications of this difference in statutory requirements is explored below in terms of redundancy to system design—

- Where a multilevel building has an effective height of less than 25 m under the provisions of AS2419.1 a single fixed on-site pump will typically be provided to facilitate fire brigade intervention. Should this pump fail or the FRNSW Incident Controller determine to stop the on-site pump a fire brigade pumping appliance will be used to take its place. And if that fire brigade pumping appliance failed another will be able to take its place. In essence the ability of the fire brigade pumping appliance to boost to 25 m ensures the fire hydrant system is provided with many levels of redundancy.
- Where a multilevel building has an effective height of more than 25 m but not more than 135 m, a similar level of redundancy is capable of being provided by FRNSW pumping appliances should the required on-site pumps fail. However due to the increasing building height the FRNSW pumping appliance effectiveness decreases incrementally after an effective height of 50 m due to its inability to provide appropriate pressures and flows to upper storeys. At 135 m its performance is essentially exhausted.
- Where a building has a storey located above 135 m, fire brigade operations and the life safety of the building occupants now becomes solely dependent on the fixed on-site pumps building pumps (typically located on lower levels). In essence the height of the building has ensured that FRNSW pumping appliances are no longer able to offer a level of redundancy to the fire hydrant system. In this regard neither the BCA nor AS2419.1 currently provides an alternative to this loss of redundancy, unlike NFPA 14. Table 1 below provides a pictorial representation of this issue.

AS2419.1—2005 GENERAL FIXED ON-SITE PUMP REQUIREMENTS			
BCA Effective Height	Number of fixed on-site pumps	Number of fixed on-site relay pumps	Redundancy in design FRNSW pumping appliances
Less than 25 m	●	None required	FRNSW pumping appliances ...
More than 25 m less than 50 m	● ●	None required	FRNSW pumping appliances ...
More than 50 m less than 135 m	● ●	●	FRNSW pumping appliances ...
More than 135 m	● ●	●	FRNSW pumping appliances no longer able to provide redundancy to the fire hydrant system design

A landmark development, an international design competition and the world's best fire safety protection?

Information taken from the Environmental Impact Statement (EIS) indicates that an international design competition was undertaken to identify an architect with an iconic design capable of creating a landmark development within the precinct of Barangaroo. If it is considered acceptable to search the globe for the most appropriate design solution to complement Sydney icons like the Harbour Bridge and the Opera House FRNSW are of the opinion that it is not unreasonable to search the globe and take the most appropriate fire safety provisions to protect this landmark development and the people who will visit. The NFPA 14 requirement to provide *'high-level water storage with additional pumping equipment or other means acceptable to the AHJ'* is considered to be one such example of adopting world's best practice.

RECOMMENDATIONS

1. With consideration to the information detailed above, FRNSW recommend that in considering the submitted EIS the fire safety strategy for the building should not be limited by the Deemed to Satisfy provisions of the BCA. In this regard FRNSW would be hoping that any future conditions placed on the development enable FRNSW to advocate for the adoption of world's best fire safety practices such as Clause 7.9.4 of NFPA 14.
2. That FRNSW also be listed as a stakeholder and be consulted during the design and construction of the building, as well as any relevant stages post construction.

For further information please contact the Fire Safety Policy Unit, referencing FRNSW file number D15/65399. Please ensure that all correspondence in relation to this matter is submitted electronically to bfs@fire.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J Vistnes'.

Jamie Vistnes
Manager
Fire Safety Policy Unit