

Fire Safety Engineering Design Review for DA Submission



5 Skyline Crescent, Horningsea Park NSW 2171 (Lot 1, DP 1266533)

Date: 6 April 2022
Document ref: 297222
Issue No: 2.0
Author: Parkan Behayeddin

Sydney
Melbourne
Hong Kong
Kuala Lumpur

creating intelligent fire
safety solutions

1. General

Scientific Fire Services (SFS) has undertaken a preliminary review and high-level assessment of the architectural drawings and concepts proposed for the warehouse and associated office development 5 Skyline Crescent, Horningsea Park. The following provides a summary of the fire safety risk engineering aspects and 'in-principle' support for the proposed design.

2. The Project

The subject site is located at 5 Skyline Crescent, Horningsea Park NSW whereby it is proposed to design and construct a Class 7b storage warehouse facility and associated Class 5 office/administration portions. The building is proposed can be further described as follows:

- Warehouse: 4,470m²
- Office: 1,000m²

The building having a rise in storeys of two (2) (by virtue of the office portions) shall be treated as a *Large Isolated Building* and furthermore, shall be provided with automatic sprinkler protection throughout.

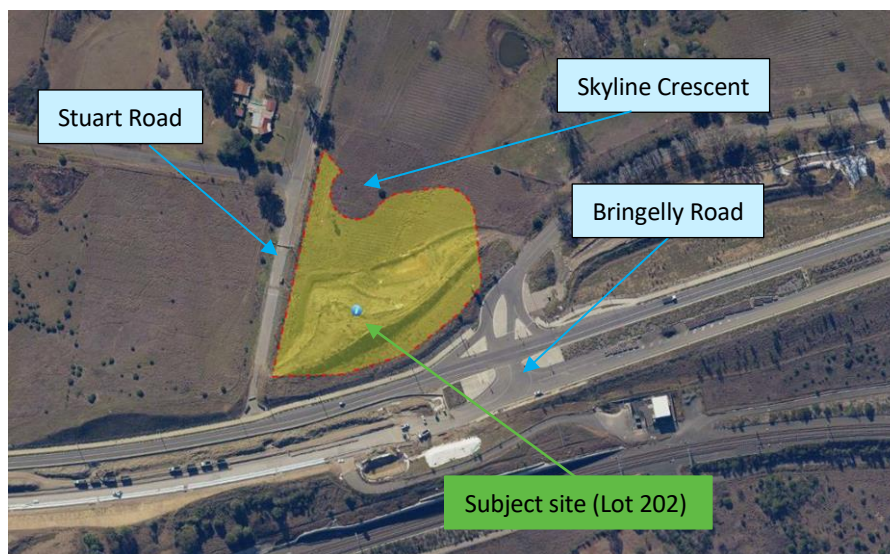


Figure 2.1: Locality

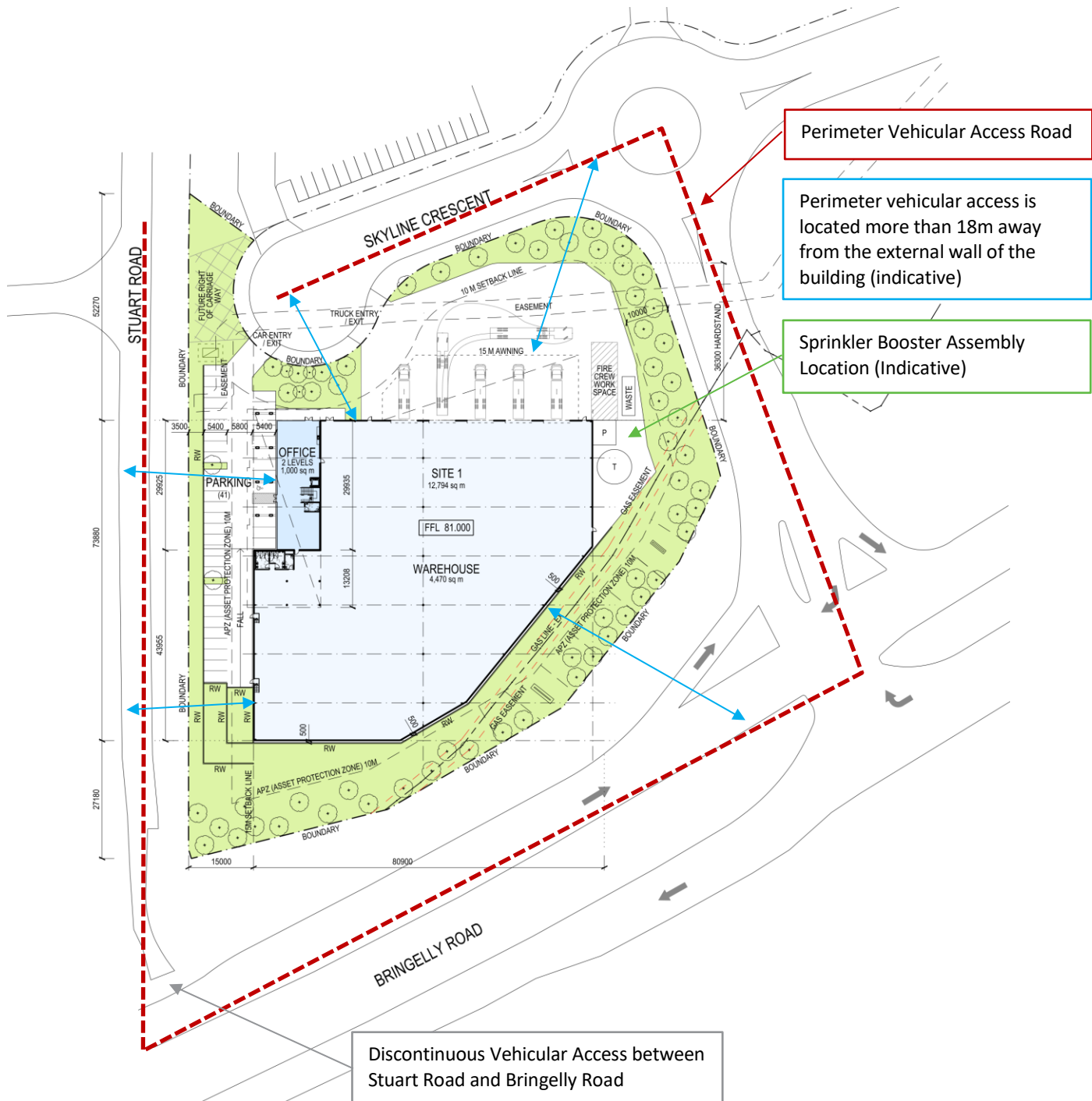


Figure 2.2: Site Plan

Overall, the building shall comprise a rise in storeys of two (2) with an effective height of less than 12m. As the volume of the proposed building exceeds the maximum volume limitation as permitted in Table C2.2 of Volume One of the NCC, the building has been classified as a *Large Isolated Building*. The building is required by Clause C1.1 of the NCC to be constructed in accordance with Type C fire-resisting construction and shall be provided with an automatic sprinkler system incorporating storage sprinkler system in accordance with Clause E1.5 of Volume One of the NCC and AS2118.1:2017. Furthermore, the building is required to be provided with perimeter vehicular access provisions.

The building description based on the BCA classification system is provided in Table 2.1.

Table 2.1: BCA Description of the building(s)

Summary of Building/Tenancy	
Building Classification(s):	Class 5 (Office), Class 7b (Warehouse)
Number of Storeys Contained:	Two (2)
Rise in Storeys:	Two (2)
Effective Height:	Less than 12m
Required Type of Construction:	Type C (Large Isolated Building)

3. Purpose

The preliminary fire safety engineering review has been undertaken to determine 'in-principle' whether the design will achieve meet the relevant *Performance Requirements* of the Building Code of Australia (BCA) (ABCB, 2019 Amendment 1). The design review relates to the fire-resisting construction, egress provisions and fire protection and equipment services proposed for the entire development.

The design issues specific to the subject building will be formally assessed through the application of the fire safety risk engineering process in accordance with the Australian Fire Engineering Guidelines (IFEG) (ABCB, 2021). It is the expectation that a suitable performance solution will be developed and supported through robust fire engineering methodologies of the current design proposal.

In the context of fire resisting construction, the fire resistance level for the broader part of the building is not proposed to deviate from the prescriptive provisions of the BCA, achieving the minimum fire rating for building elements commensurate with Type C fire resisting construction (i.e., in accordance with Part C from Volume one of the Building Code 2019 Amendment 1).

From a perimeter vehicular access perspective, it is proposed to review and rationalise the requirement for open provisions and perimeter vehicular access around the *Large Isolated Building* for attending fire brigade personnel. This has been further outlined in Section 3.1 of this statement.

In the context of occupant egress for the warehouse portions, egress distances (and the distance between alternative exits) have been identified to exceed the maximum prescribed distances. More specifically, exit travel distances to an exit (where 2 exits in separate directions is available) is measured to exceed 40m whilst the distance between alternative exits exceeds 60m (considering a future racking arrangement within the speculative warehouse). In order to reduce the impact of the identified egress related design issues, measures including the presence of storage sprinklers (initiating a building wide alarm) will assist in controlling and/or suppressing a potential fire and provide safe conditions during occupant egress and fire brigade intervention. With respect to the office portions, it has been identified that the egress travel distances to a single exit (on the first-floor levels) exceeds the maximum distance of 20m. To compensate for the extended travel distances within the office portions, a smoke detection and alarm system shall be proposed throughout the office portions. This has been detailed in Section 3.2.

In the context of fire services and equipment, the building shall be served by the standard suite of fire safety measures which are commensurate with a building of this size and nature. This shall generally include sprinkler protection, fire hydrant system, fire hose reel system, emergency lighting and exit signage and portable fire extinguishers. The location of the sprinkler booster assembly is also proposed to be permitted which is technically not at the site boundary, not at the principal entry and not within direct line of sight of the main building entry. All of this has been further outlined in Section 3.3.

3.1 Fire Resistance, Perimeter Vehicular Access and Open Space Provisions

Scientific Fire Services understand that deviations have been identified from the prescriptive provisions of the BCA with respect to the fire resistance/perimeter vehicular access/open space provisions. The design issues relating to fire resistance, open space and perimeter vehicular access provisions shall be addressed through a qualitative methodology with consideration given towards the effectiveness and efficacy surrounding the following:

- Operational firefighting ability and any potential impacts on operational functions undertaken during firefighting operations;
- Potential firefighter impacts as a direct result of the function and use of the building, likely fire load, potential fire intensity and hazard in association with the active and passive fire mitigation systems;

- Fire appliance and other emergency vehicle access around the entire site including the ability to ensure emergency vehicles do not obstruct appliance manoeuvrability and access around the site.

The holistic assessment methodology relative to firefighting operations shall consider the Standard Operational Guideline's (SOG's) of firefighting personnel which is expected to be obtained following direct consultation with the FRNSW specific to access being greater than 18m and the provision of a gates within the perimeter vehicular access roadway. These shall be supported through the typical fire brigade operations, and the provision of additional measures which include signage/mud-maps. The preliminary assessment conducted by Scientific Fire Services indicates that the vehicular and open space provisions can readily satisfy the relevant *Performance Requirements*, namely CP9 from the BCA.

3.2 Occupant Egress Provisions

Preliminary review of the project information highlights a number of egress related design issues which include the distance of travel within the warehouse portions exceeding the maximum prescribed distances of 40m and the distance between alternative exits exceeding 60m.

The design issues associated with the occupant egress throughout the warehouse portions will be evaluated by way of an overall holistic assessment that will be developed with consideration of all occupants from the warehouse portions. The design issues will be addressed through a deterministic and absolute approach demonstrating occupant and fire brigade life safety for acceptable durations of time. The exit travel distance and distance between alternative exits will be addressed with consideration to the fire safety systems installed within the building to ensure tenability limits are not breached during the evacuation process or firefighting operations.

The identified design shall be supported through computational modelling (i.e., CFD modelling and Pathfinder Evacuation Modelling) which shall suitably assess credible fire scenarios, the overall evacuation times of occupants and also the impact on attending fire brigade personnel upon arrival on site. The assessment will ensure that occupants would have adequate times to evacuate and also attending personnel to commence water application activities before being exposed to untenable conditions. The preliminary assessment conducted by Scientific Fire Services indicates that the proposed design solution relative to occupant egress from the warehouse portions shall meet the relevant *Performance Requirements*, namely DP4 and EP2.2 from the BCA.

With respect to the office portions, it has been identified that the egress travel distances to a single exit (on the first-floor levels) exceeds the maximum distance of 20m. To compensate for the extended travel distances, a smoke detection and alarm system shall be proposed throughout the office portions. The preliminary assessment to be conducted by Scientific Fire Services will conclude that the proposed design solution relative to occupant egress from the warehouse portions shall meet the relevant *Performance Requirements*, namely DP4 and EP2.2 from the BCA.

3.3 Fire Services & Equipment Provisions

Scientific Fire Services understand that the deviations from the prescriptive provisions of the BCA identified with respect to fire services & equipment for the proposed building design shall generally be designed to achieve compliance with the relevant DtS provisions unless otherwise noted herein. From a compliance perspective, the proposed design shall achieve compliance with the relevant *Performance Requirements* of the BCA.

3.3.1 Sprinkler Booster Assembly Location

The preliminary review of the design has identified that the proposed location of the sprinkler booster assembly is technically not at the site boundary, not at the principal entry location and not within direct line of sight of the main entrance to the building. The methodology to be adopted to address the design issue relative to the location of the sprinkler booster assembly shall be based upon a qualitative evaluation. The evaluation shall give consideration to the potential risks associated with the proposed sprinkler booster assembly location and the proposed fire safety measures which shall assist attending Fire Brigade personnel in locating the respective booster assemblies. The identified measures shall include block plans, additional signage denoting the sprinkler booster location on site, the adoption of a red strobe light to clear denote to attending fire brigade personnel the location of the sprinkler booster and also to ensure that the booster is accessible to accommodate fire brigade operations. The preliminary assessment undertaken by Scientific Fire Services suggests that the identified design issue for the sprinkler booster can satisfy the relevant *Performance Requirements*, namely EP1.4 of the BCA.

4. Statement of Endorsement

The fire and life safety related design issues will be addressed through the performance-based path of compliance. Scientific Fire Services can confirm that the proposed design will achieve fire safety design compliance to the Performance Requirements of CP9, DP4, EP1.4 and EP2.2 of the BCA (ABCB, 2019 Amendment 1).

The formulation of the Performance Based Design Brief (formerly referred to as the Fire Engineering Brief) represents the next step in the approvals process. Scientific Fire Services shall commence the process of developing this document and will provide a formal comprehensive FEB submission. As part of the process, a Fire Engineering Brief Questionnaire (FEBQ) document shall be prepared in accordance with the Fire and Rescue NSW proforma and formally submitted as part of the referrals process.

Finally, and in order to ensure that the client can obtain a Construction Certificate for the proposed building works, Scientific Fire Services will prepare a Fire Safety Engineering Report (FSER) incorporating stakeholder conditions, comments and advice to the satisfaction of the Principle Certifying Authority (PCA).

On the basis of the review of the proposed design issues identified herein, Scientific Fire Services can confirm that the documentation in relation to the subject development will achieve fire safety design compliance to the relevant Performance Requirements of the National Construction Code Series – Volume 1 – Amendment 1, Building Code of Australia (BCA).

I trust the above is satisfactory for your current purposes. Should you have any queries, please do not hesitate to contact me on (02) 9221-3658 or email to parkan.behayeddin@scifire.com.au



Parkan Behayeddin
Scientific Fire Services
BDC: 0756 - Accredited Certifier – Fire Safety

Appendix A. Preliminary List of Design Issues

Design Issue to be Addressed	NCC DtS Provision	Performance Requirement
<p>The following design issues have been identified with respect to the proposed perimeter vehicular access serving the building:</p> <ul style="list-style-type: none"> The perimeter vehicular access (being the public roads) is located more than 18m away from the external wall of the building; and Furthermore, the perimeter vehicular is discontinuous between Stuart Road and Skyline Crescent. 	Clause C2.3 inter alia Clause C2.4	CP9
<p>It has been identified that the exit travel distance to one of the alternative exits and distance between alternative exits within the <u>warehouse portion</u> exceeds the maximum prescribed exit travel distances. More specifically:</p> <ul style="list-style-type: none"> To permit the distance of travel to designated exits to exceed 40m (up to 60m); and To permit the distance of travel between alternative exits to exceed 60m (up to 120m). 	Clause D1.4 Clause D1.5	DP4 & EP2.2
<p>It has been identified that the exit travel distance to an exit within the <u>office portion</u> exceeds the maximum prescribed exit travel distances. More specifically:</p> <ul style="list-style-type: none"> To permit the distance of travel to a single exit (on the first-floor level) to exceed 20m (up to 30m). 	Clause D1.4	DP4 & EP2.2
<p>It is proposed to permit the sprinkler booster assembly is not to be located adjacent to the principal vehicular entry, not at the site boundary and not within direct line of sight of the main entry to the building.</p>	Clause E1.5 inter alia AS2118.1-2017	EP1.4

Appendix B. Architectural Drawings

Drawing No.	Title	Date / Revision
DA 03	Site Plan	05/04/2022 / P6