Fire Safety Engineering Design Review for DA Submission

146 Arthur Street, North Sydney

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1. General

Scientific Fire Services (SFS) has undertaken a preliminary review and high-level assessment of the architectural drawings, concepts and BCA report outlining the DtS departures from the BCA for the proposed mixed use residential development located at 146 Arthur Street, North Sydney NSW.

It is noted that Scientific Fire Services provided informal and preliminary Fire Engineering input to the applicant prior to DA Submission to ensure that the overall strategy and the DA plans were prepared to anticipate requirements at the Construction Certificate stage and avoid modification applications. It is generally premature to prepare an PBDB document at the DA stage and common practice if request by Council for fire engineering input is to prepare a Fire Safety Engineering Design Review.

As concluded in this Design Review, based on 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 – BCA 2022, Building Code of Australia (BCA).

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 146 Arthur Street, North Sydney whereby it is proposed to construct a new mixed-use residential, retail and community development. The site shall be bounded by Arthur Street to the east and Little Walker Street to the west. The overview of the subject site is shown in Figure 2.1.

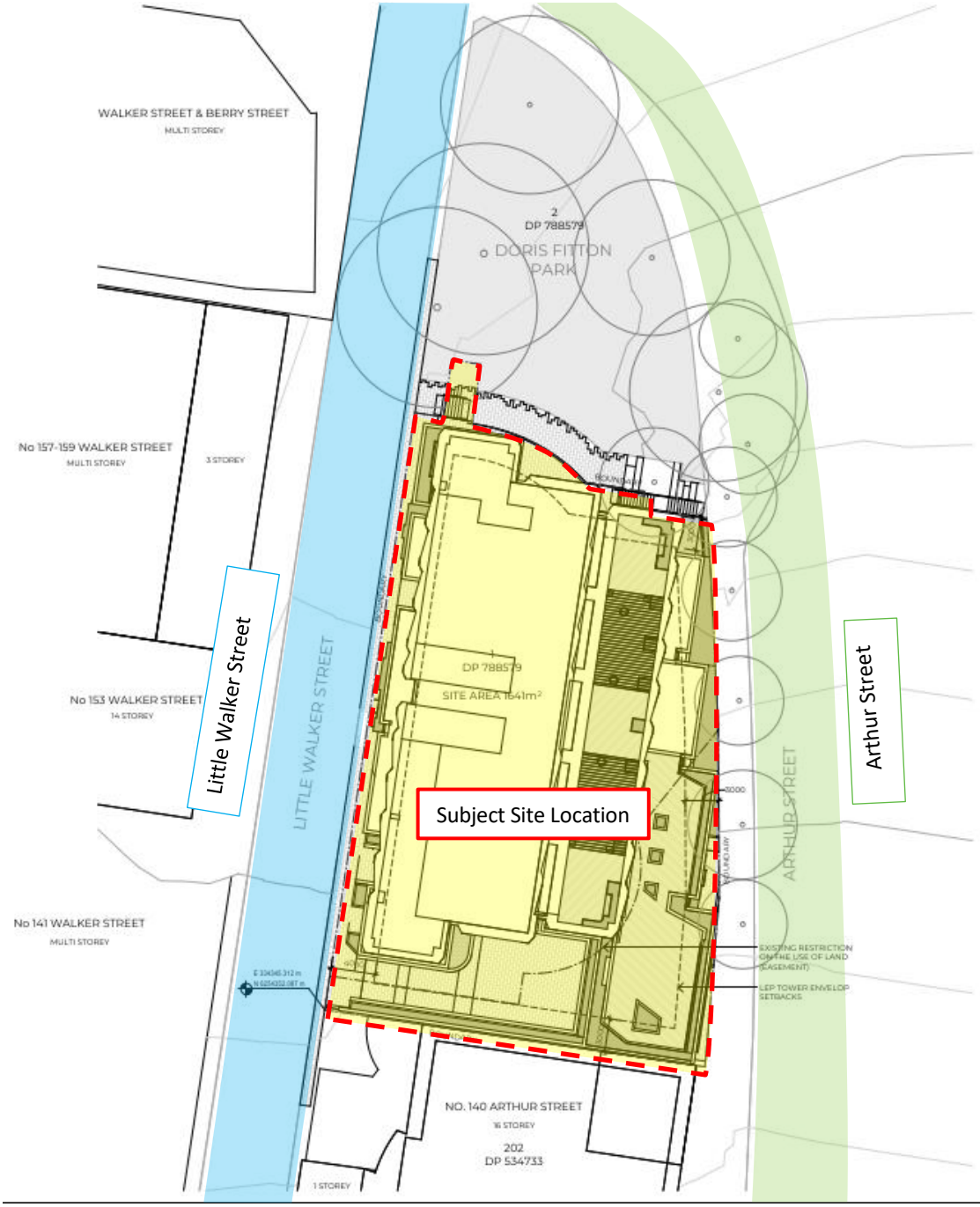

Figure 2.1: Proposed Site Plan

The entire site shall contain up to three hundred and ninety (390) residential apartments dispersed through forty-three(43) levels (L2-L44), four (4) levels of retail and amenities (LG-L1, Rooftop) and four (4) levels of associated basement parking facilities (B1-B4). Occupant egress provisions for the tower levels shall be achieved through two (2) centrally located fire-isolated stairs and five (5) lifts to which discharge the occupants directly to road/open space on the GF. Table 2.1 provides a summary of the building characteristics.

Table 2.1: Overview of building characteristics

Occupancy Use / Levels	Key Building Characteristics
Carpark Facility (B4-B1)	• Basement Levels B4-B2 comprises of storage areas, car and motorcycle parking spaces arranged as follows: – Total: 66 car parks and 9 motorcycle parks – Basement 2: 22 car parks and 3 motorcycle parks – Basement 3: 22 car parks and 3 motorcycle parks – Basement 4: 22 car parks and 3 motorcycle parks – Storage areas are provided around the perimeter and near the lifts of each basement level • Basement 1 forms part of the buildings general back of house areas. This consist of ancillary/services rooms including waste rooms, chute discharge, grease arrestor, plant rooms, rainwater tank and bicycle parking/storage. • Occupant access to these areas is afforded through the lifts and two (2) fire stairs. • Carpark entrance along Arthur Street in the Basement 1 floorplan, with access to lower-level parking to be provided via carpark ramp. • Access to the Fire Control Room located on Basement 1, is provided directly from road/open space via the passageways on Arthur Street
Retail/Communal /Lobbies (LG-L1)	• Ground floor (G) provides access to the lobby in addition to the retail tenancy. Access provided via Little Walker and Arthur Street. • The following levels shall be provided with shared amenity spaces consisting of: – Lower Ground (LG): Cinema room, games room, kids play, gym, residents lounge, sauna, pool, wc and change room – Ground floor (G): Residents lounge, library, mail room, office, public amenities, retail space – café and restaurant – Level 1 (L1): flexible communal space, residents terrace, coworking and bookable rooms • Fire pump room located on lower ground accessible via the fire stairs • Everyday access to these levels/areas is afforded through the five (5) central lifts and two (2) fire stairs are available for egress, an additional stairway provides access to residential community spaces on LG-L1. • Fire stairs discharge to Little Walker Street on Ground floor
Residential (L2-L44)	• L2-L44 has been allocated for residential function and use. A total of 390 apartments shall comprise of 8 or 10 apartments per level, containing of a mixture of one (1) – three (3) bedroom apartment configurations. • The following levels shall be provided with a shared amenity space: – L8-L10 – L17-L19 – L26-L28 – L35-L37 • Everyday access to these levels/areas is afforded through the five (5) central lifts and two (2) fire stairs are available for egress.
Rooftop (Rooftop Amenity, Rooftop upper)	• Rooftop Amenity consists of communal amenities including residents terrace containing assorted seating, residents lounges, storage, WC areas and bookable rooms that contains kitchens. • Everyday access to the Rooftop Amenity is afforded through the five (5) central lifts and two (2) fire stairs are available for egress • Rooftop Upper has been allocated for fire pump room and ancillary amenities including fans, antennas and plant areas. • The Rooftop upper is accessible by two (2) fire stairs

The general overview of the subject development layout has been illustrated in Figure 2.2 to Figure 2.10.

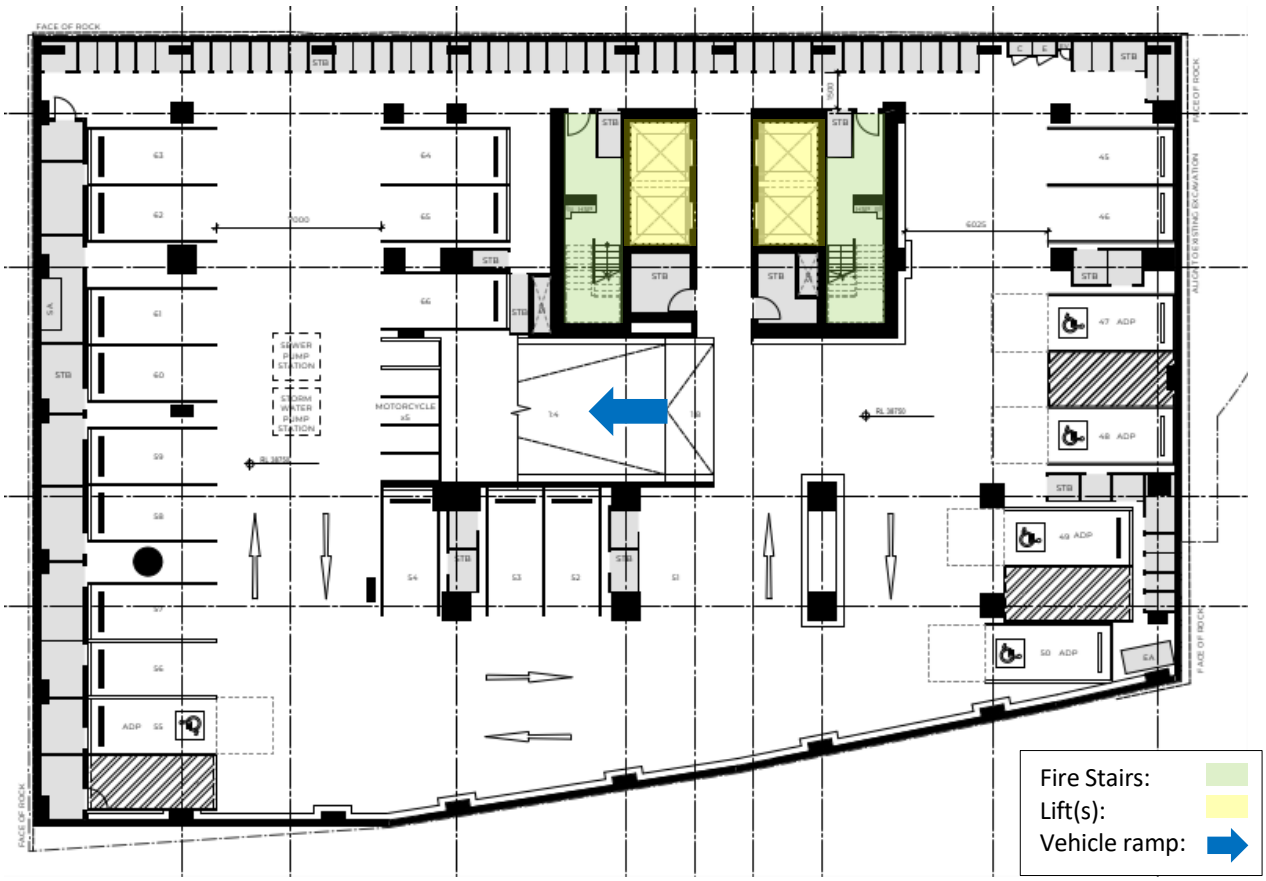

Figure 2.2: Basement level 4 layout (B4) (B2-B3 similar)

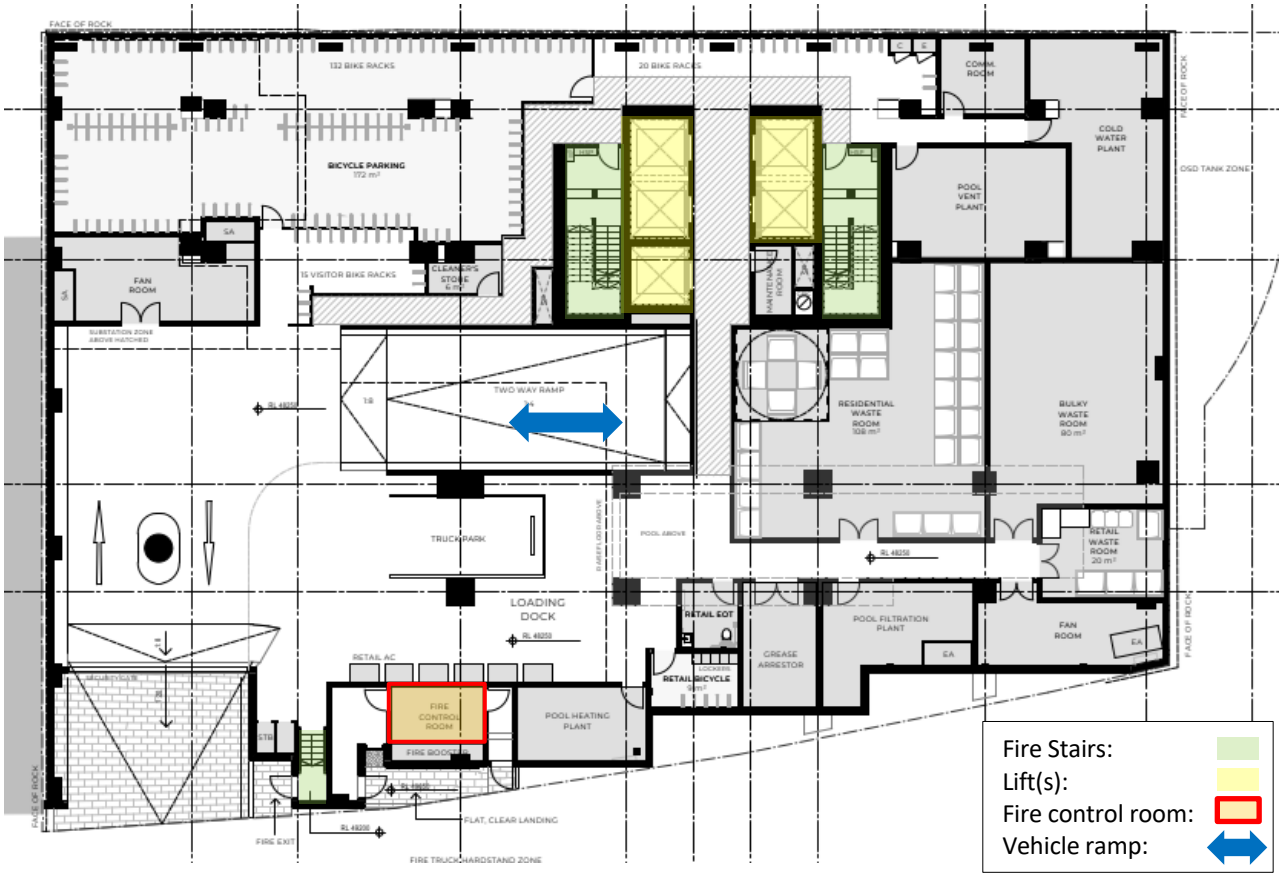

Figure 2.3: Basement level 1 layout (B1)

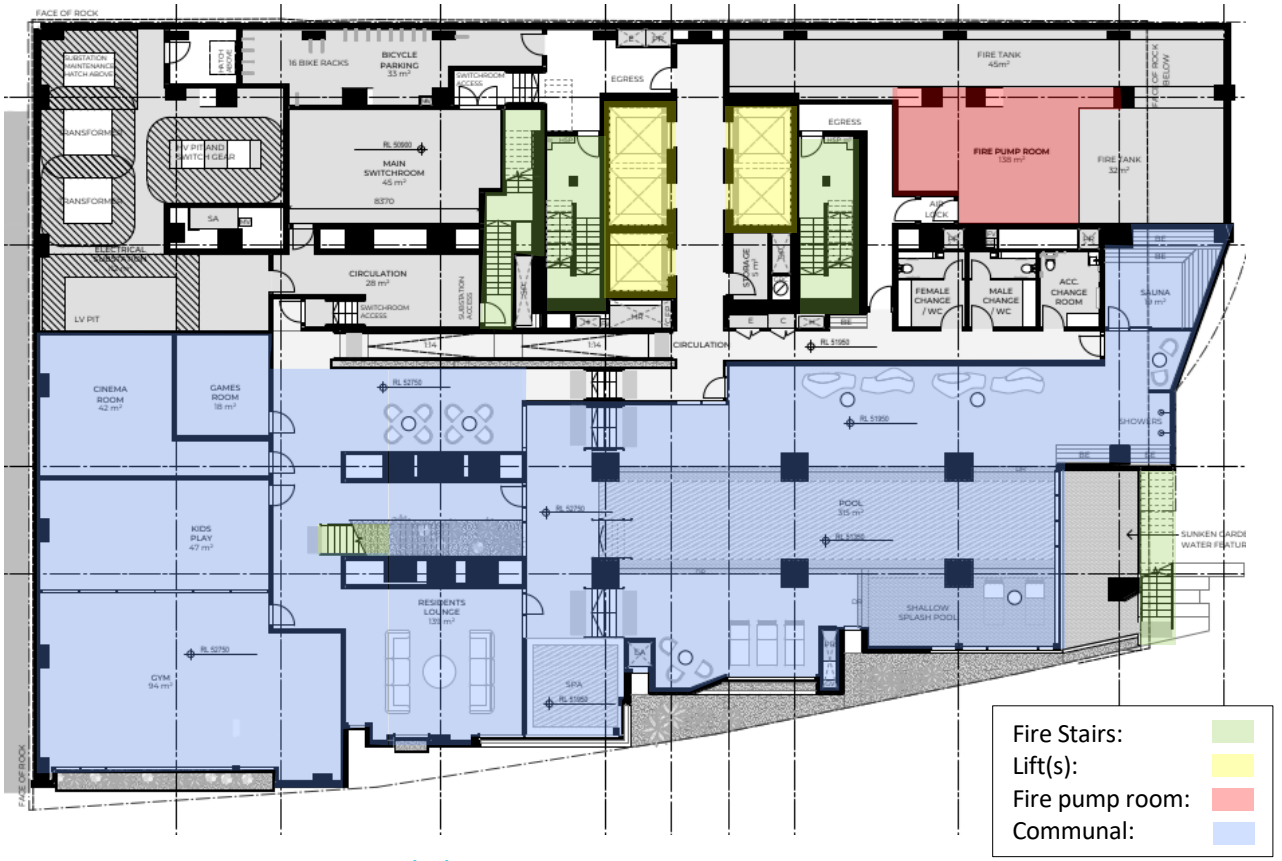

Figure 2.4: Lower Ground Floor layout (LG)

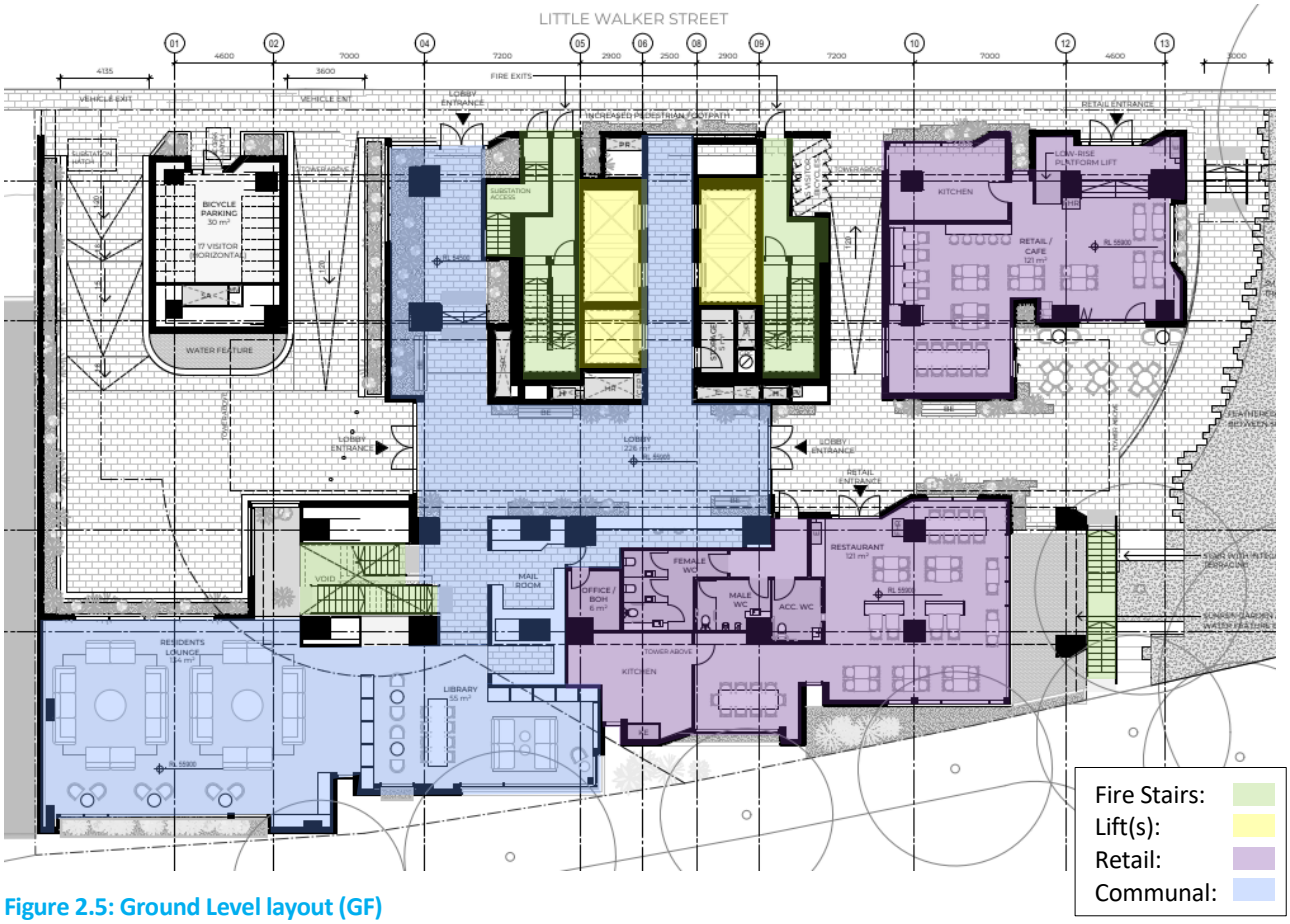

Figure 2.5: Ground Level layout (GF)

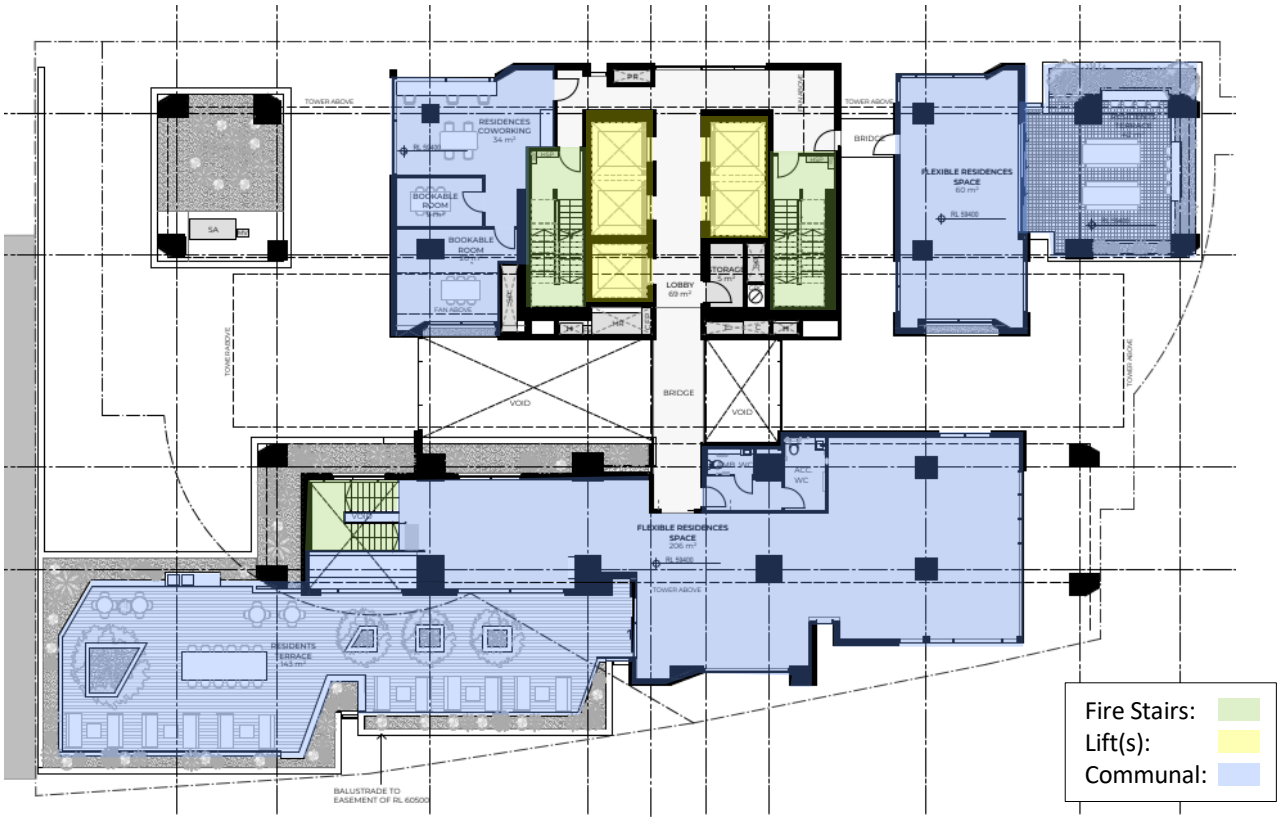

Figure 2.6: Level 1 layout (L1)

Figure 2.7: Residential Typical layout (L2-L44 similar)

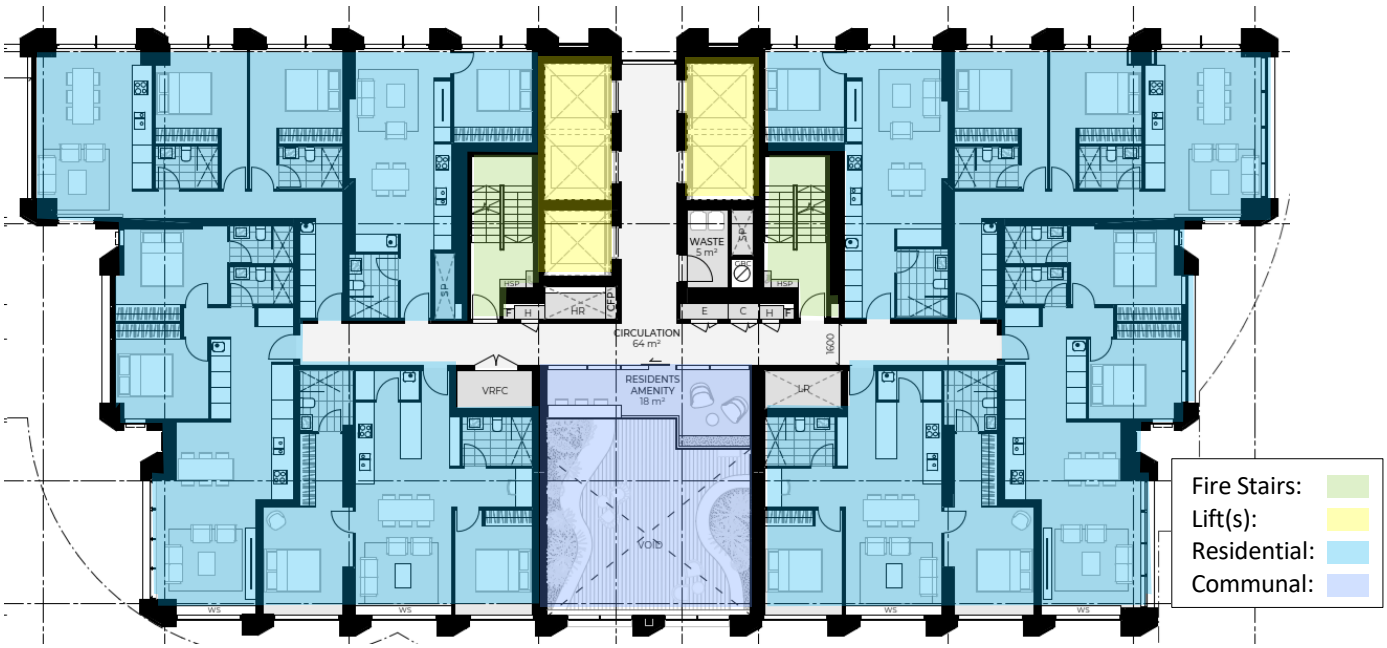

Figure 2.8: Residential Typical Amenity Layout

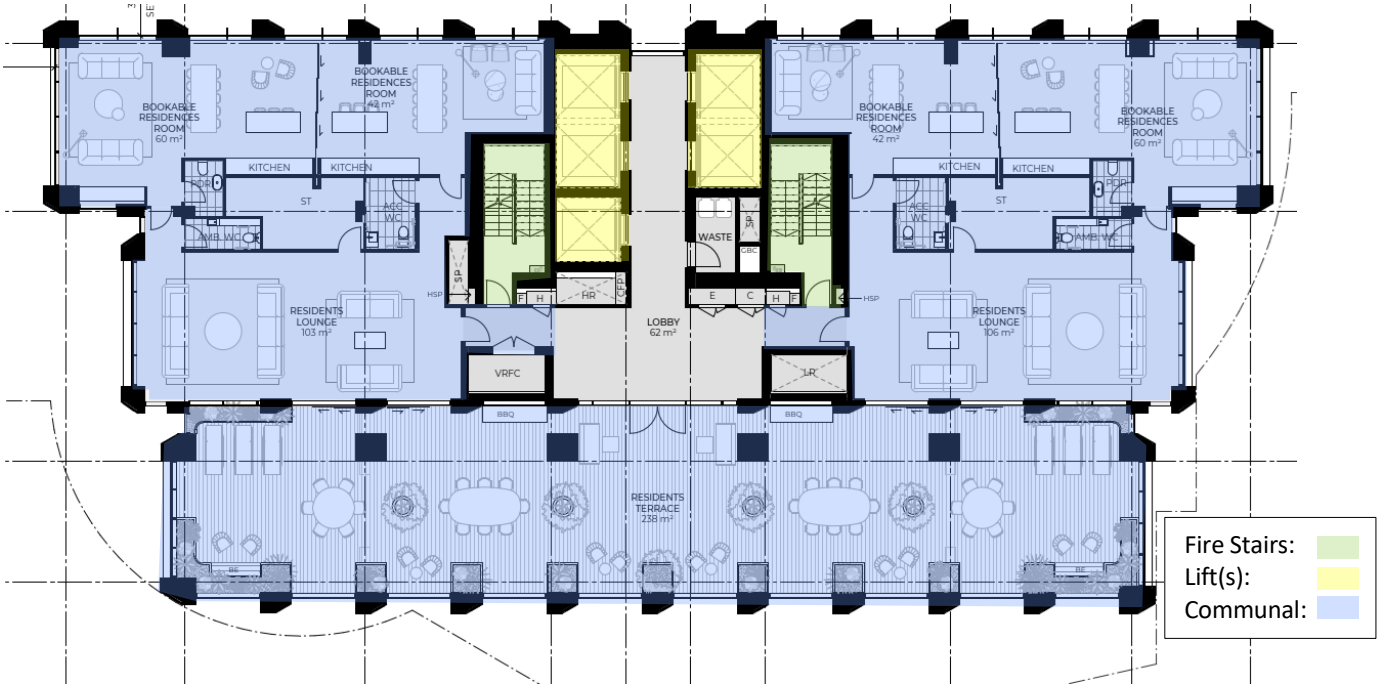

Figure 2.9: Rooftop Amenity layout (L45)

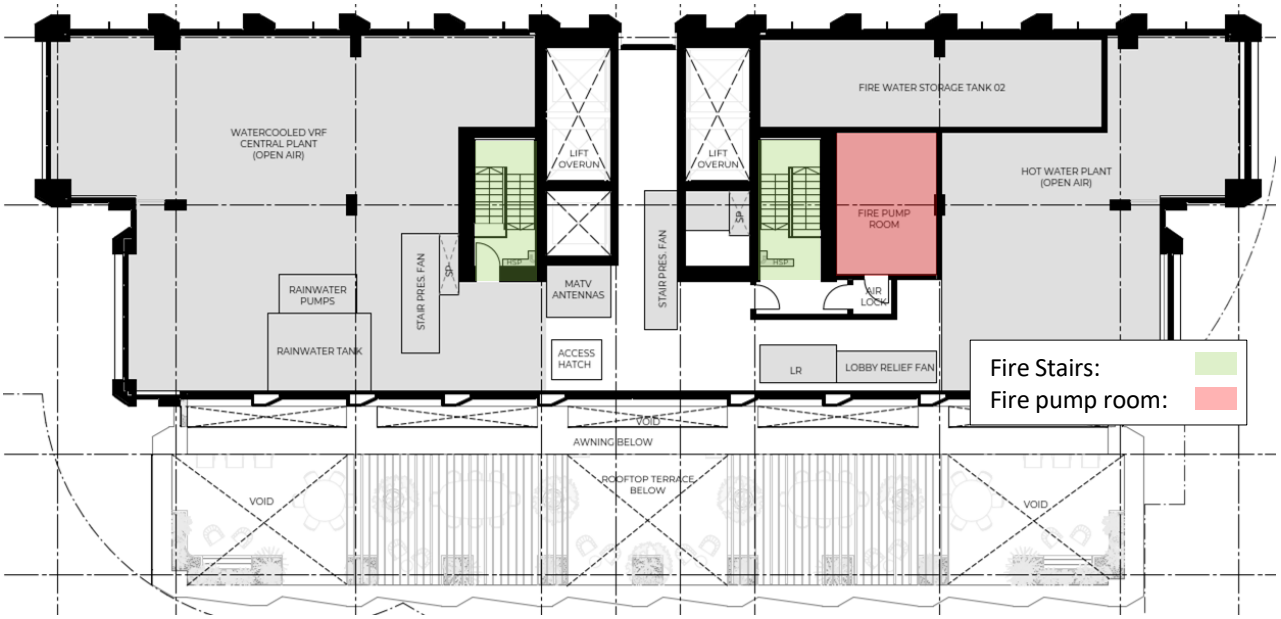

Figure 2.10: Rooftop Upper layout (L46)

Outlined below is a BCA summary of the overall building detail.

Table 2.2: BCA description of building

Building Summary	Classification and Use
Building Classification	B4-B1: Class 7a (Carpark) & Class 7b (Storage) LG: Class 2 (Residential/Communal) GF: Class 2 (Residential) & Class 6 (Retail) L1-L2: Class 5 (Office) L2-L47: Class 2 (Residential/Communal)
Number of Storeys Contained	Fifty-Three (53)
Rise in Storeys	Fifty-One (51)

Building Summary	Classification and Use
Type of Construction Required	Type A construction
Effective Height	158.60m

3. Purpose

The preliminary fire safety engineering review was undertaken to determine 'in-principle' whether the design will achieve compliance with the Performance Requirements of the Building Code of Australia (BCA) (ABCB, 2022). The design review relates to the fire-resisting construction, egress provisions and fire protection services proposed for the entire development.

The design issues specific to the subject building (refer to Table 4.1) will be formally assessed through the application of the fire safety risk engineering process in accordance with the Australian Fire Engineering Guidelines (AFEG) (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.

4. Compliance Expectation

The relevant Performance Requirements against which the Performance Solution is assessed must be established in accordance with the BCA. From Clause A2G2, a number of 'Performance Solutions' may be used to show that a Building Solution complies with the Performance Requirements. The following table provides a summary of the fire safety risk engineering aspects of the design that will be the subject of the project Performance Solution.

Table 4.1: BCA departures – Fire safety engineering scope of works

No.	Performance Solution Design Issues Addressed	BCA DtS Provision	Performance Requirement(s)
1.	As the fire rated garbage chute shafts are not provided with fire rated bases due to the operational need of such chutes (to allow the garbage to descend into the collection bins) below rooms.	Specification S5C8	C1P2 & C1P8
2.	It is proposed to provide a reduction in DTS FRL's from Class 6 FRL'S 180/180/180 to 120/120/120, fire separation does not extend along the lot boundary from the car-parking area located on the basement 01 and non-compliant fire separation is not provided between the Class 2 residents lounge and lobby and the ground floor. If storage in the basements is greater than 10% of the total floor area of the storey then it will be proposed to provide a FRL 120/120/120 in lieu of FRL 240/240/240.	Specification S5C11	C1P2 & C1P2
3.	Fire separation of classifications on the same storey and in different storeys should be provided in accordance with BCA Clauses C3D9 and C3D10 and the floor between the adjoining parts must have an FRL of not less than that prescribed in Specification 5 for the classification of the lower storey. The Class 2 public lobbies are not suitably separated with bounding construction on the LG, Ground and Level 01.	C3D9 & C3D10	C1P2 & E2P2
4.	BCA Clause C3D15 requires public corridor in Class 2 buildings, if more than 40 m in length, must be divided at intervals of not more than 40 m with smoke-proof walls complying with S11C2. On the ground floor the Class 2 public corridor length is approx. 52m and therefore greater than 40m.	C3D15 & S11C2	D1P4 & E2P2
5.	BCA Clause C4D12 requires bounding construction between the Class 2 residential parts and the residential corridors. The sky garden & residential amenities areas on what levels. are not proposed to be fire separated from the residential public corridor with compliant fire separation.	C4D12	C1P2
6.	In accordance with BCA Clause C4D3 compliance relating to protection of openings in external walls is required. Openings in the external walls of the building are to be protected in accordance with C4D5, being fire rated windows, external sprinklers or the like, if they are:	C4D3 & C4D5	C1P2

No.	Performance Solution Design Issues Addressed	BCA DtS Provision	Performance Requirement(s)
	Less than 3m to side or rear boundary, Less than 6m from the far boundary of a road or lane, Less than 6m from another building on the same allotment. The following external opening are located less than 3m from the boundary. • Lower ground Gym. • Openings in the flexible community space on level 01. • Openings on GL 12-13 typical residential, typical levels, Level 12 mid plant, residential typical amenity, residential typical upper, rooftop amenity, rooftop plant		
7.	Separation of external walls and associated openings in different fire compartments are required to comply with the requirements of BCA Clause C4D4. External walls and associated openings in different fire compartments between the ground floor Class 2 lobby and the Class 6 restaurant does not achieve compliance.	C4D4	C1P2
8.	In accordance with BCA Clause D2D3 as all buildings have an effective of greater than 25m two (2) exits are required from all levels. The basements are to be provided with a minimum of two exits. An AS1657 ladder hatch is used for egress on the lower ground in the electrical substation (RL 50.900) which discharges at the ground floor (RL 54.500). It has been assumed by this office that the ladder will comply with D2D3 and AS1657, however the discharge of the ladder on the ground floor affects the egress in the bicycle parking on the ground floor in accordance with BCA Clause D2D15. This non-compliance is proposed to be addressed	D2D3, D2D15 & AS1657	D1P4 & E2P2
9.	The following areas have travel distances which exceed allowable deemed-to-satisfy (DTS) in accordance with BCA Clause D2D5. Travel distance to a point of choice are exceeded in the following locations. • Basement 01 – Up to 29m in lieu of 20m. • Lower Ground – Up to 26m in lieu of 20m. • L1 30m to a POC from residents' terrace • Typical residential levels – Up to 7m in lieu of 6m. • Rooftop residents terrace – Up to 24m in lieu 20m and the bookable rooms of Up to 26m in lieu of 20m. • Rooftop plant – Up to 25m in lieu of 20m. Travel distance to an exit are exceeded in the following locations. • Basement 04-02 – Up to 48m in lieu of 40m.	D2D5	D1P4 & E2P2
10.	The following areas have travel distances between alternative exits which are deemed-to-satisfy (DTS) in accordance with BCA Clause D2D6. • Basement 04-02 – Up to 72m in lieu of 60m. • Multiple required exits on the ground floor between GL 04-10 are located less than 9m apart.	D2D6	D1P4 & E2P2
11.	In accordance with BCA Clause D2D8 the unobstructed width of each required exit must not be less than 1000mm. The unobstructed width of path of travel to an exit is less than 1000mm in the Basement 04-02 approx. 950mm.	D2D8	D1P6
12.	The fire-isolated stairways which discharges on the ground floor does provide independent egress (converge) from each storey served and discharge directly, or by way of its own fire-isolated passageway.	D2D12	D1P5 & E2P2
13.	The non-fire isolated stairway (GL 02-04) connecting 3x storeys in discharges greater than 20m (21m) from a doorway providing egress to a road or open space on the ground floor.	D2D14	D1P5 & E2P2
14.	Separation of rising and descending stair flights in fire isolated stairs is required to comply with BCA Clause D3D5 and there must be no direct connection between a flight rising from a storey below the lowest level of	D3D5	D1P5

No.	Performance Solution Design Issues Addressed	BCA DtS Provision	Performance Requirement(s)
	access to a road or open space and a flight descending from a storey above that level. The drawings show that separation is provided between stair flights in the fire isolated stairs. The open stair (required non-fire isolated exit) on LG, GL and L1 has rising and descending without suitable separation.		
15.	The building is required to be served by a fire hydrant system in accordance with clause E1D2 and AS2419. The fire hydrant booster assembly is not located within sight of the main principal entrance.	E1D2 & AS2419	E1P3
16.	The fire control room located on Basement 01 does not provide access via the front entrance of the building or via a fire isolated stair and the required doors do not open into the room in accordance with Specification 19C9.	19C9	E1P6
17.	The sky gardens on Levels 17, 26, 35 connect three (3) storeys and do not have direct egress to a road or open space in accordance with BCA G3D1.	G3D1	C1P2, C1P8, C1P9, D1P4, D1P6 & E2P2

5. 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 the Building Code of Australia (BCA), (ABCB, 2022) Volume 1.

The formulation of the Performance Based Design Brief (PBDB) 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 PBDB submission. As part of the process, a Fire Engineering Brief Questionnaire (FEBQ) document shall be prepared in accordance with the Fire and Rescue NSW pro forma 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, Building Code of Australia (BCA), 2022 Volume 1.

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 derya.horasan@scifire.com.au

Derya Horasan
Director

Scientific Fire Services

BDC:2272 – Certifier – Fire Safety

Appendix A. Architectural Drawings

Table A.1: Architectural drawings relied upon

Drawing No.	Title	Date	Revision
DA - 1110	Existing Site Plan	22/03/24	A
DA - 1200	Demolition Plan	22/03/24	A
DA - 1220	Proposed Site plan	22/03/24	A
DA - 1300	Overall Elevations	22/03/24	A
DA - 1320	Overall Sections	22/03/24	A
DA - 2204	Basement 04 - Car Park	22/03/24	A
DA - 2205	Basement 03 - Car Park	22/03/24	A
DA - 2206	Basement 02 - Car Park	22/03/24	A
DA - 2207	Basement 01 - Car Park / Loading Dock	22/03/24	A
DA - 2210	Lower Ground	22/03/24	A
DA - 2220	Ground	22/03/24	A
DA - 2221	Level 01	22/03/24	A
DA - 2230	Residential Typical Lower	22/03/24	A
DA - 2231	Level 12 - Mid Plant	22/03/24	A
DA - 2232	Residential Typical Amenity	22/03/24	A
DA - 2233	Residential Typical Amenity - Balcony	22/03/24	A
DA - 2235	Residential Typical Upper	22/03/24	A
DA - 2240	Rooftop Amenity	22/03/24	A
DA - 2241	Rooftop Plant	22/03/24	A
DA - 2245	Roof Plan	22/03/24	A
DA - 3201	Podium Elevations	22/03/24	A
DA - 3202	Podium Elevations	22/03/24	A
DA - 3240	Sections - Podium East West	22/03/24	A
DA - 3242	Sections - Podium North South 01	22/03/24	A
DA - 3243	Sections - Podium North South 02	22/03/24	A
DA - 3245	Sections - Tower North South	22/03/24	A