
Brunswick Street, Manchester

Concept Design (RIBA Stage 3)

Fire Safety Strategy

1 Executive Summary

Brunswick Living Limited have appointed Innov8 Construction Solutions who in turn have appointed Surety Fire Solutions Ltd. (Surety) to develop the concept fire strategy for the proposed development of sixteen residential flats over five floors (ground plus four upper residential storeys) and a roof terrace gardens (sixth floor), located on Brunswick Street in Manchester.

Fire Engineering Brief

Surety is developing the fire safety design in consultation with Innov8 Construction Solutions for compliance with Part B (Fire Safety) of The Building (Amendment) Regulations 2018¹

This strategy has been developed using Approved Document B² (ADB:2020) and BS9991:2015 as the basis for the assessment of compliance for Part B, volume 1 – Dwellings of the Building Regulations 2010.

The building amendment etc. (Amendment) (England) Regulations and associated guidance comes into force on 1 December 2022. The amendment regulations will extend Regulation 7 (2) to buildings (including Residential) with a storey over 11m. The external wall and associated materials will need to achieve A2,s1-d0 or A1.

The building amendment regulations also introduce:

- Secure Information Boxes,
- Evacuation Alert Systems, and
- A range of clarifications and corrections including roofing membranes.

Although there are some transitional arrangements including *'the regulations will not apply where a building notice or an initial notice has been given to, or full plans deposited with, a local authority before the 1 December 2022 and either the building work to which it relates:*

- *Has started before that day: or*
- *Is started within the period of six months beginning on that day'.*

This fire strategy builds on the fire strategy completed by Innov8 Construction Solutions. The building amendment regulations 2022 present a design risk to the project and should be discussed with the Authority having Jurisdiction.

¹ Statutory Instruments, '2018 No. 1230 Building and Buildings, England, The Building (Amendment) Regulations 2018'.

² HM Government, The Building Regulations 2010, Approved Document B (Fire Safety), Volume 1 – Dwellings 2019 edition incorporating 2020 amendments (for use in England).

The key aspects of the building include;

- 11 two bed apartments over the ground, first, second, third, fourth and fifth floor.
- 5 one bed apartments over the first, second, third, fourth and fifth floor.
- Sixth floor roof terrace (garden) for residential use only.
- Automatic suppression systems in accordance with BS9251:2021;
- Emergency lighting to BS 5266 and BS EN 1838.
- The load bearing elements of structure to be provided with no less than 60 minutes fire resistance.
- All apartments to be enclosed by compartmentation with no less than 60 minutes fire resistance.
- Single staircases with 60 minutes fire resistance – protected staircase.
- Automatic opening vent in the protected stair.
- Dry riser provided in the protected corridor with fire service access within 18m of the inlet to BS9990; and
- A BS8629 – alert system for use by the fire and rescue services in buildings containing flats is not generally required for this building as it does not include a storey over 18m.

Conclusion

The developed fire strategy in the opinion of Surety meets the functional requirements of the Buildings Regulations 2010 in compliance with Part B (Fire Safety) for the proposed development.

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2 Introduction

Brunswick Living Limited have appointed Innov8 Construction Solutions who in turn have appointed Surety Fire Solutions Ltd. (Surety) to provide fire engineering services for the development of a vacant plot, northeast of the Vallance Centre Brunswick Street, Manchester. The works are building works as defined in Regulation 3(1)(a): the erection or extension of a building as defined in the Building Regulations 2010.

Therefore, for the purpose of this fire strategy report, the building is to comply with Part B of Schedule 1 of the Building (Amendment) Regulations 2018.

This report documents the concept design fire strategy for the premises and should be read in conjunction with the indicative fire safety drawings (provided separately).

This fire strategy report is intended to support the consultation with the building control body and the fire and rescue service to gain principal agreement for the building.

This fire strategy report is to be updated during the design phase (RIBA Stage 4) to capture all design changes.

2.1 Building Description

The proposed development comprises of 5 one bed apartments and 11 two bed apartments located in Manchester. Brunswick Street is a residential premises, purpose group 1(a) Residential (dwellings) flats.

The main building features are set out in the Table 1 below.

Table 1 - Building details

Building Element		Details
Building height	17.798m to the upper most storey (6 th floor) roof terrace	
Storeys	Ground, first, second, third, fourth, fifth and sixth storey (roof terrace)	
Purpose group	Purpose group 1 - Residential (dwellings) 1(a) flats	
Floor	Ground	One – 2 bed apartments
	First	One – 1 bed apartments Two – 2 bed apartments
	Second	One – 1 bed apartments Two – 2 bed apartments

Building Element		Details
Floor	Third	One – 1 bed apartments Two – 2 bed apartments
	Fourth	One – 1 bed apartments Two – 2 bed apartments
	Fifth	One – 1 bed apartments Two – 2 bed apartments
	Roof	Ancillary (roof garden) and Solar Voltaic panels

2.2 Surety Fire Solutions Scope

Brunswick Living Limited have appointed Innov8 Construction Solutions who in turn have appointed Surety Fire Solutions Ltd. (Surety) to develop the fire safety strategy for outline approval for compliance with Part B of Schedule 1 to The Building (Amendment) Regulations 2018³ (Part B).

2.3 Fire Engineering Design Specification

BS9991:2015⁴ has been used as the basis of the design for the premises in compliance with Part B supported by Approved Document B⁵ (ADB:2020) to supplement and support the overall project in compliance with Part B of Schedule 1 of the Building (Amendment) Regulations 2018.

All the design documents have been provided for the basis of the strategy by innov8 Construction Solutions and can be reviewed separately.

2.4 Statutory Legislation and Guidance

2.4.1 The Building Regulations 2010 (including 2018 amendments)

Part B of Schedule 1, Building (Amendment) Regulations 2018 sets out the functional requirements for achieving a reasonable level of fire safety to which all buildings in England must comply with. These 'requirements' are:

- B1 Means of Warning and Escape

³ Statutory Instruments, '2018 No. 1230 Building and Buildings, England, The Building (Amendment) Regulations 2018'.

⁴ BS9991-2015 Fire Safety in the Design, Management and Use of Residential Buildings – Code of Practice, BSI, 2015

⁵ HM Government, The Building Regulations 2010, Approved Document B (Fire Safety), Volume 1 – Dwellings 2019 edition incorporating 2020 amendments (for use in England).

- B2 Internal Fire Spread (Linings)
- B3 Internal Fire Spread (Structure)
- B4 External Fire Spread
- B5 Access and Facilities for the Fire Service

2.4.2 BS 9991-2015

BS 9991-2015⁶ Fire safety in the design, management and use of residential buildings has been used to supplement ADB for the fire safety design of the premises. BS 9991 provides recommendations and guidance for residential accommodation blocks and dwellings. This document has been used to assist in the development of this fire engineering strategy to demonstrate compliance with Part B.

2.4.3 BS 9251-2021

BS 9251⁷ Fire sprinkler systems for domestic and residential occupancies (code of practice) has been used to supplement ADB for the fire safety design of the premises. BS 9251 provides recommendations and guidance for residential and domestic sprinkler system. This document has been used to assist in the development of this fire engineering strategy to demonstrate compliance with Part B.

⁶ BS9991-2015 Fire Safety in the Design, Management and Use of Residential Buildings – Code of Practice, BSI, 2015

⁷ BS 9251, 'Fire sprinkler systems for domestic and residential occupancies – Code of practice', 2021

3 B1 Means of Warning and Escape

3.1 Evacuation policy

The building is designed to be occupied as flats (apartments); therefore, the building will operate with a 'stay put' or 'defend in place' fire strategy, whereby only the occupants directly affected by fire or smoke should need to evacuate. The remaining occupants should be able to remain in their apartment (a fully compartmented element) unless they choose to leave or are affected.

It should also be noted that other occupants may wish to evacuate, therefore the escape routes should remain tenable for means of escape at all material times.

Further advice should be provided for occupants to include a 'Stay Safe' person centred fire advice, the principle whereby:

- If a fire occurs in the apartment, the occupier 'Stays Safe' by leaving the property, informing all persons living within the dwelling, then informing the local authority fire and rescue service.

The other tenants would stay in their properties unless they:

- Are being directly affected when they should Stay-Safe and leave their property.
- They can hear the fire alarm in their property and want to Stay-Safe and leave.
- They are concerned with their own safety and should Stay-Safe and leave their property.
- They can see smoke or flame from their property and want to Stay-Safe by leaving their property.

Occupiers should not need to leave unless they are being directly affected by a fire in their property or smoke is affecting/making entry into their property, but if any tenant feels uncomfortable, they should be advised to Stay-Safe and evacuate if safe to do so.

3.1.1 Secure Information Boxes

A secure information box provides a secure facility to store information about a building for use by the fire service during an incident.

Blocks of flats (purpose group 1(a)) with a top storey more than 11m above ground level should be provided with a secure information box.

The box should meet all of the following conditions:

- a) Sized to accommodate all necessary information.
- b) Easily located and identified by firefighters.
- c) Secured to resist unauthorised access but readily accessible by firefighters.
- d) Protected from the weather.

For best practice see sections 2 – 4 of the NFCC / FIA guide, [here](#).

3.2 Means of warning

3.2.1 Apartments

All apartments should be provided with an automatic fire detection and warning system complying with BS5839-6, to Grade D1 Category LD1 automatic fire detection and alarm system, with sounders are to be provided in each apartment in accordance with BS 5839-6⁸, each with an integral stand-by supply. The interlink can be hardwired or radio interlinked.

Each apartment will be provided with interlinked detection comprising of a heat detector installed in every kitchen/lounge area and a minimum of a smoke detector installed in the protected lobby. The smoke detector should be positioned away from the bathroom to reduce the possibility of false alarms.

It is also recommended where possible to use multi-sensors (combined optical and heat sensors) to be used in the kitchen/lounge to enhance life safety.

3.2.2 Evacuation Alert System

An Evacuation Alert System is not generally required for this building as it does not include a storey over 18m.

3.2.3 Protected Stairs

3.2.3.1 *Single Staircase*

The common corridors are provided with automatic smoke detection to activate the automatic opening smoke vent (AOV) within the lobby and at the head of the stairs. These detectors are linked to the control panel but will not result in any alarm being raised.

Due to the defend in place evacuation strategy for the residential buildings, the stair widths are not capacity driven. The stair must be a minimum of 1100mm to provide adequate width for Fire Service use. This does not consider any requirements for compliance with Part M of the Building Regulations, which might necessitate a wider stair.

3.2.3.2 *Detection and AOV*

A Category L5 automatic fire detection and alarm system in accordance with BS 5839-1⁹ shall be provided to the protected lobby and stairs. The Category L5 system is provided to satisfy a specific fire safety objective, in this case, the operation of an Automatic Opening Vent (AOV) in the protected lobby and stair.

⁸ BS 5839-6, 'Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises', 2019.

⁹ BS 5839-1, 'Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in non-domestic premises', 2017

Due to the premises being designed for a stay-put fire strategy there is no general requirement for a sounding communal fire alarm in the building, as it will only be the occupants of the individual apartment affected that should evacuate.

The detection system in the protected stair is to operate the AOV in the protected lobby and at the head of the stairs to ensure the stairs are kept clear of smoke and products of combustion for firefighting and means of escape.

3.2.4 Ancillary Areas

Fire detection and alarm system coverage in the ancillary residential areas will be part of the Category L1 fire system as described in BS 5839-1 to prompt simultaneous evacuation in the following:

- Bin Store,
- Bicycle store,
- Plant room and
- Reception.

3.2.5 General

The main fire alarm panel (indicating equipment) should be in the ground floor entrance lobby. A colour zone and device plan mounted within a frame with a glass cover shall be provided adjacent to the main fire alarm panel in accordance with BS 5839-1:2017 Clause 23.2.2 e.

This should keep false alarms to a minimum and complements the requirements of ADB with regards to reduction of false alarms. False alarms cause disruption to the normal operation of a premises, creating a drain on fire and rescue service resources and can even seriously prejudice the safety of occupants, who might not react correctly when the system responds to a real fire if they have recently experienced several false alarms.

3.3 Means of escape

Exit provisions from the residents' shared areas, and other plant and storage areas will comply with the minimum requirements in the Table 2 below.

Table 2 – Exit routes and widths

	Number of Occupants		
	≤ 60 persons	> 60 & ≤ 110 persons	> 110 & ≤ 600 persons
Number of Exits	≥ 1*	≥ 2	
Door Swing	Any direction	In the direction of escape	
Minimum Exit Widths	≥ 750mm	≥ 850mm	5mm/person and ≥ 1050mm**
Minimum Stair Widths	≥ 1000mm **	≥ 1000mm **	5mm/person and ≥ 1100mm ***

Notes:

* A single exit is acceptable provided that the single direction escape distance is within the stated recommendations, otherwise more than one exit will be necessary.

** The width of exits is based upon Table 2.3 of ADB.

*** The width of escape stairs is based upon Table 3.2 of ADB.

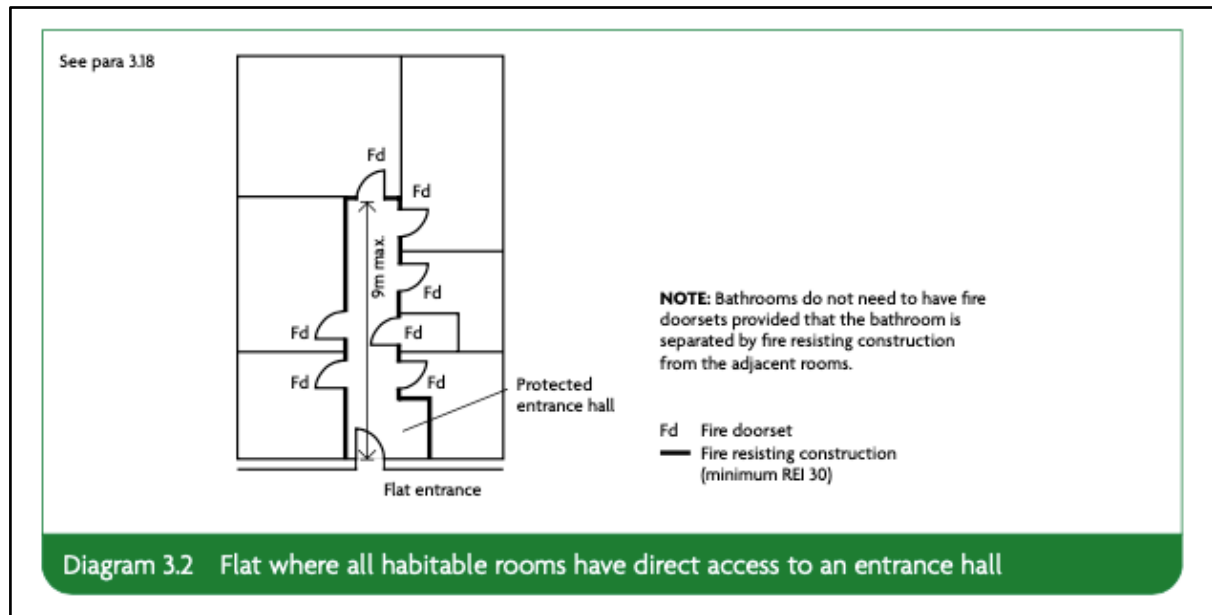
3.3.1 Internal Flats Travel Distance

Within each flat the maximum travel distance should be limited to 9m to the flat entrance door or the maximum travel distance in the protected entrance hall (lobby protection) should be no more than 9m. This limit may be extended to 20m where an automatic fire suppression system in accordance with BS 9251 (see Section 3.7) and an LD1 fire detection and alarm system in accordance with BS 5839:6 are installed (see Section 3.2.1).

The internal travel flat distance is adequate.

Due to the layout of the flats (travel distance greater than 9m), protected entrance halls will be provided (paragraph 3.18 – ADB) in accordance with Figure 1 - Diagram 3.2 (ADB). The fire doors onto the protected lobby should be at least FD30 standard or better (bathrooms do not require FD30 fire doors).

Figure 1 - Diagram 3.2, Flat layout requirements, ADB



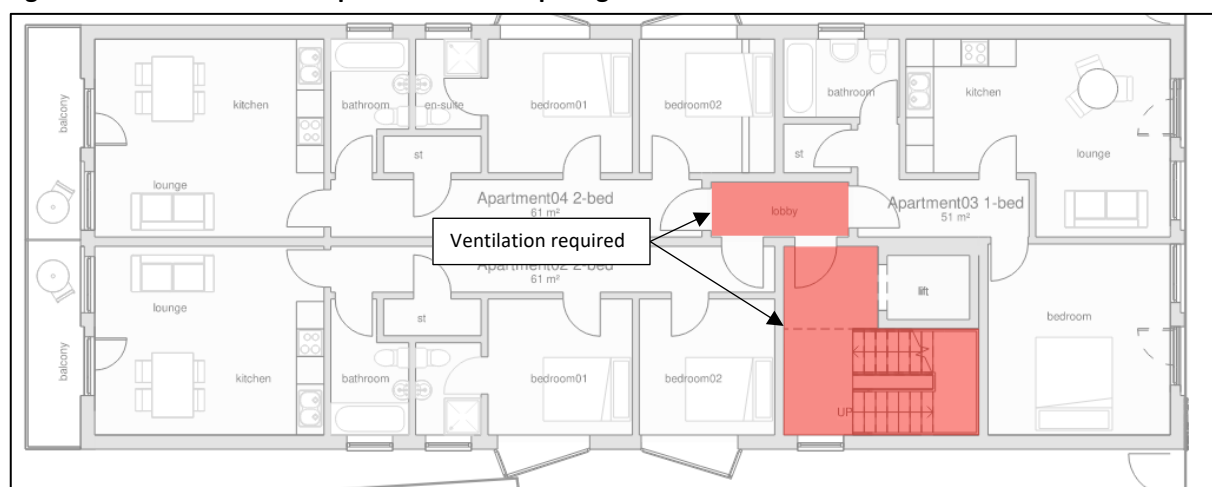
3.3.2 Travel Distance in Common Corridor

The building has a storey over 11m and three flats per storey. Therefore, the building is not considered a small single stair building in accordance with BS9991 (paragraph 7.5).

The apartment front doors open directly onto a small lobby with a maximum travel distance of approximately 3m to the protected stair (i.e., less than the maximum 7.5m).

The common corridor should be protected with a smoke shaft (via natural ventilation) provided in the central corridor adjacent to the protected staircase with makeup air being provided from the central protected stair (Figure 2) to ensure the stairs is kept clear of smoke and products of combustion. An AOV is to be located at the head of the stairs to ensure in the event of any smoke ingress into the stairs can be naturally ventilated.

Figure 2: Central corridor and protected stair requiring ventilation



3.3.3 Common areas

An AOV is to be provided in the protected staircase to ensure the stairs is kept clear of smoke and products of combustion and to ensure in the event of any smoke ingress into the stairs can be naturally ventilated.

The maximum travel distance in common areas should achieved the distances in Table 3 below.

Table 3: Maximum travel distances

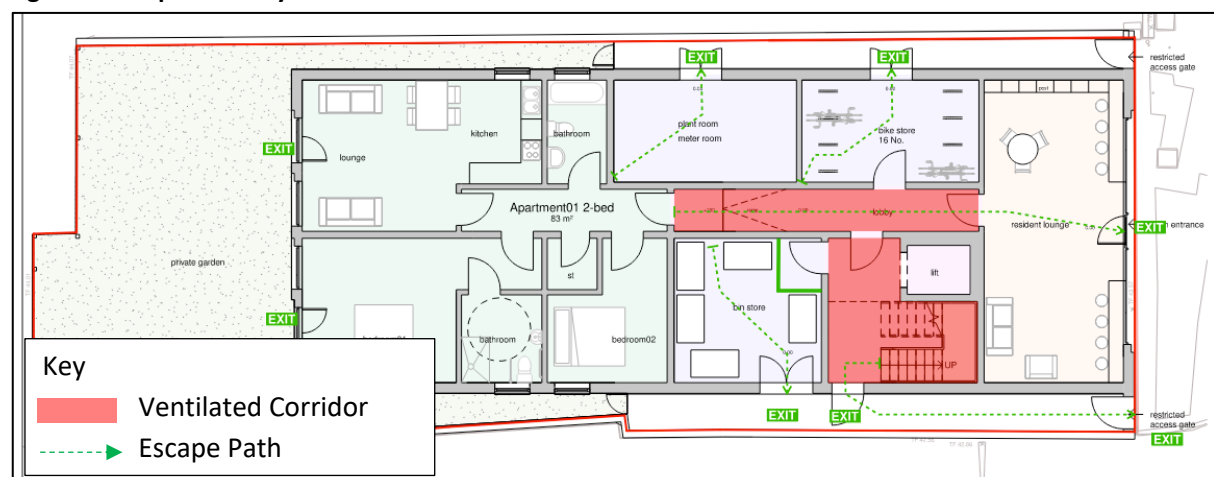
Area		Maximum Travel Distance	
		Single Direction	Two or More Directions
Plant areas	Places of Special Fire Hazard *	≤ 9m	≤18m
	Other rooms	≤ 9m	≤35m
	Overall, in an enclosed route	≤ 18m	≤ 45m
	Overall, in open air	≤ 60m	≤ 100m
Normal Hazard Storage (e.g., refuse stores)		≤ 25m	≤ 45m
All other enclosed areas		≤ 18m	≤ 45m
External Terrace		≤ 45m	≤ 100m

Notes:

- * A place of special fire hazard is defined as an area that will contain flammable liquids or other highly flammable substances. Examples include oil-filled electrical gear, boilers, fuel storage, generators etc.

Figure 3 indicated the escape pathways.

Figure 3: Escape Pathways at Brunswick Street



3.3.4 Ancillary Areas

The ancillary areas (reception area, bin store, bike store and plant room) will incorporate a simultaneous evacuation regime, whereby on confirmed detection of fire, the alarm will be raised throughout, and all occupants of these areas are required to evacuate simultaneously.

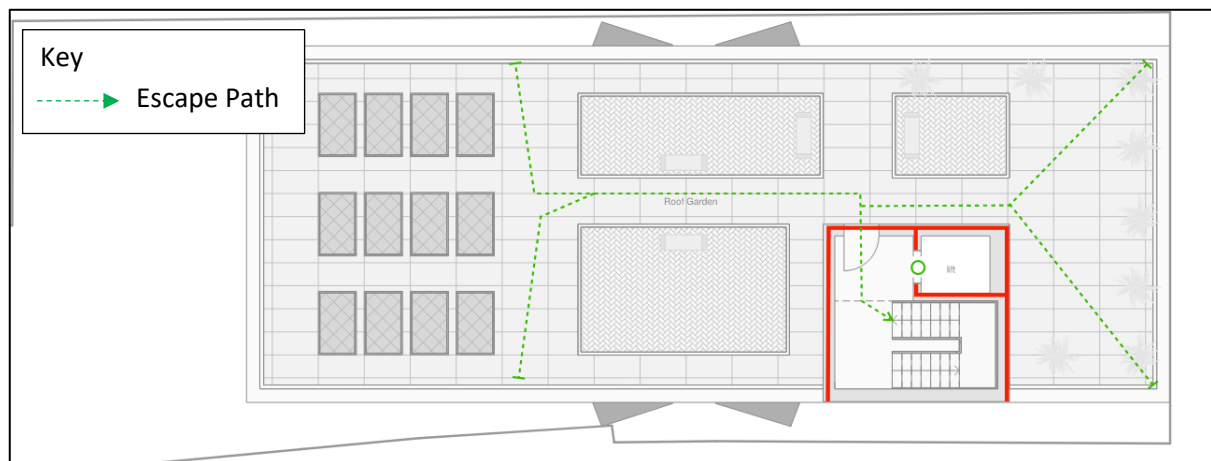
3.3.5 Ancillary (roof top garden) Area

The roof will include both a roof top garden and access to the solar voltaic panels for maintenance.

It is recommended to install a warning beacon and sounder in any remote location to ensure relevant persons are alerted in the event of a fire to enable simultaneously evacuation.

Capacity on the roof top garden is residential (building occupant use only) and limited to 60 persons in total due to the single stair condition (Figure 4). The operator needs to ensure they have an adequate fire safety plan in place to ensure all occupants can escape in the event of a fire including provisions for disabled residents.

Figure 4: Escape pathway into the protected stair on the roof terrace



Where solar PV panels are installed on the roof, routing of electrical wiring through combustible insulation should be avoided.

3.4 Occupants Requiring Assistance

In accordance with BS 9991, refuge spaces are not required for residential apartments as a 'stay put' strategy will be adopted. Therefore, the occupants requiring assistance to egress within the residential storeys can escape as follows:

- Fire within their apartment: Egress to common corridors which form the function of a protected space near to the stair (a place of relative safety) where a management process will be required to be developed to ensure persons with mobility impairment to be assisted to evacuate to a place of ultimate safety (outside the building).

- Fire anywhere else in the building: Remain in apartment in compliance with the stay put strategy, unless occupant wishes to evacuate.

3.5 Stair widths and final exits

The building is served with a single protected stair (section 3.2.3.1).

The common stairs should be designed and constructed as a protected stair and lift. This staircase should have an unobstructed width of 1100mm¹⁰. The protected staircase should discharge onto a final exit or into a protected corridor leading to a final exit.

Handrails and strings that do not intrude more than 100mm into these stair widths may be ignored.

3.6 Smoke Control

The building has a top storey floor height of greater than 11m, the travel distances are within the guidance provided within BS 9991. Therefore, the travel distances follow the recommendations within the government guidance.

3.6.1 Staircase Ventilation

The building has a floor height greater than 11m and the apartment lobbies access directly onto the staircase, therefore the staircase should have an AOV leading to the exterior of the building with a minimum free area of 1.0m² (with an aerodynamic free area of 0.7m²), activated on automatic detection in the common areas with an override switch for fire and rescue service use. The control mechanism should also have a secondary power supply provided as part of a life safety system.

3.6.2 Common Lobby Ventilation

The apartment front doors open directly onto a small lobby with a maximum travel distance of approximately 3m to the protected stair (i.e., less than the maximum 7.5m).

The common corridor should be protected with a smoke shaft (providing natural ventilation) provided in the corridor adjacent to the protected staircase with makeup air being provided from the central protected stair (Figure 2) to ensure the stairs is kept clear of smoke and products of combustion.

The cross-sectional area (free area) of the smoke shaft should be 1.5m², with a minimum dimension of 0.85m in any direction.

¹⁰ BS 5395-1:2010, Stairs – Part 1: Code of Practice for the design of stairs with straight flights and winders BSI 2010

3.6.3 Bin Store Lobby Ventilation

The bin store is to be provided with a lobby to the stair. The bin store lobby is to be provided with not less than 0.4m² permanent smoke ventilation by a mechanical smoke ventilation system to protect the ingress of smoke into the protected stair.

3.7 Automatic Fire Suppressions Systems

The building exceeds 11m in height therefore sprinkler protection should be provided throughout the building, which includes all apartments and ancillary areas. Sprinklers are not required in the common corridors and escape stairs where there is no storage or fire loading. The sprinklers will be required in the ground floor reception area due to the area not being fire sterile (see 3.7.2).

3.7.1 Residential Areas

The building height exceeds 11m and should therefore be provided with a Category 2 system designed and installed in accordance with BS 9251¹¹ (Table 1), with a design discharge density of 2.8mm/min per sprinkler head for a single head with a 30-minute supply. Any non-fire sterile communal building parts should be protected as category 2.

A minimum of one sprinkler flow switch will be provided in the system at each level as all apartments are provided with Category LD1 detection. This is to enable an alert signal in the common area / reception fire alarm panel on activation of the sprinkler system.

The following residential areas are not proposed to include a sprinkler system in accordance with Section 5.4 of BS 9251:2021:

- Bathrooms with a floor area less than 5m²
- Small cupboards with a floor area less than 2m²
- Common means of escape including protected staircase, bathrooms with a floor area of less than 5m² and small cupboards with a floor area less than 2m² where the only materials used conform to BS EN 13501-1:2018, Class B-s3 or better and B(fl) or better for flooring including subcategories d0, d1 and d2 for construction materials and s1 and s2 for flooring. Where this cannot be achieved, sprinkler protection in accordance with BS 9251:2021 will be required.

3.7.2 Non-residential areas

The building contains a mixture of uses via the ancillary and non-residential areas, however these are small areas (in accordance with Table 3 of BS 9251:2021) therefore the standard BS 9251 may be considered suitable in all areas.

The following areas are deemed to be 'non-fire sterile' areas, and as such they are provided with a Category 2 BS 9251 system with a discharge density of 2.8m/min, and 30 minutes of supply duration:

¹¹ BS 9251, 'Fire sprinkler systems for domestic and residential occupancies – Code of practice', 2021

- Plant room
- Bike store,
- Reception, and
- Bin store

The following areas are deemed to be areas where the extent of sprinkler coverage is not required, and as such they are not provided with a BS 9251 system:

- Service riser, and
- Lift shaft

Sprinkler protection is recommended in the reception areas due to the open plan reception area and letter boxes (i.e. the area is not fire sterile).

3.8 General Provisions

3.8.1 Emergency lighting

Emergency lighting will be provided in the common areas complying with BS 5266-1:2016¹². The common areas include escape routes, open areas, high-risk areas, and strategic points of importance including:

- Near each exit door intended to be used in an emergency including external escape routes until a place of ultimate safety can be reached.
- Near to stairs so that each flight of stairs receives direct light.
- Near change in levels.
- Mandatory emergency exits and safety signs.
- At each change of direction.
- At each intersection of corridors.
- Near to each final exit and outside the building to a place of safety.
- Near each piece of fire-fighting equipment and call points.
- Disabled toilets.
- All facilities exceeding 8m².

("Near" is normally considered to be within 2m measured horizontally.)

3.8.2 Emergency escape signage

In a single stair block of flats with one entrance and exit, there is not necessarily a need to install emergency escape signage, as it is generally considered, that if occupants have entered the premises via a given route, they will be familiar with the exit route from the premises as well.

¹² BS 5266-1:2016, Emergency Lighting – Part 1: Code of practice for the emergency lighting of premises, BSI, 2016

Fire exit signage is required at the following locations:

- Fire doors to storerooms, and electrical equipment rooms with a 'Fire Door Keep Locked' sign.
- Fire Door Keep Closed signs should be on each side of any fire-resisting doors that form part of the means of escape (e.g., cross-corridor and staircase doors) but does not include flat front doors.

Where emergency escape signage is required/used it will comply to BS 5499-4:2013¹³ – code of practice for escape route signage.

3.8.3 Wayfinding signage for the Fire Service

To assist the fire service to identify each floor in a block of flats with a top storey more than 11m above ground level, floor identification signs and flat indicator signs are to be provided (see Section 7.3)

3.9 Internal apartment planning

3.9.1 Apartments

The means of escape from the apartments is based on the guidance within BS 9991 utilising a protected flat lobby (apartments) prior to escaping into the protected staircase and evacuation at ground floor level to a place of relative safety (stair core) or ultimate safety (outside). The travel distance within each of these flat lobbies is less than 20m from the furthest point in the lobby (and total internal travel distance is less than 20m). Each apartment will have as a minimum Grade D1 Category LD1, smoke detection in the apartment lobby, a heat detector in the kitchen/lounge to BS 5839-6 and a sprinkler system in accordance with BS 9251:2021.

¹³ BS 5499-4:2013, Safety signs, Part 4: Code of practice for escape route signing

4 B2 Internal Fire Spread (Linings)

4.1 Surface lining

The internal surfaces (walls and ceilings) should not be a route for fire promulgation over the surface, increasing fire growth rate. This is particularly important in any circulation spaces and the means of escape where linings may offer the means by which fire spread is most likely to prevent occupants from escaping.

Therefore, the surface linings should comply with BS EN 13501-1:2018¹⁴ and Table 4 below.

Table 4 - Surface lining requirements

Location	European Classification
Small rooms of area not more than 30m ² in non-residential accommodation	D-s3, d2
Other rooms	C-s3, d2
Circulation spaces	B-s3, d2

The European classification includes 's3, d2' which represents s = smoke and d = flaming droplets, when a classification includes 's3, d2', this means that there is no limit set for smoke production or flaming/burning droplets. The full European classification can be reviewed in Appendix F.

¹⁴ BS EN 13501-1:2018, Fire classification of construction products and building elements, Part 1: classification using data from reaction to fire tests, BSI, 2018

5 B3 Internal Fire Spread (Structure)

5.1 Fire Resistance performance

Where fire resistance performance has been quoted in this report, it should be in accordance with either BS EN 1363:1¹⁵ or BS 476:20¹⁶ with the following nomenclature used:

- R – loadbearing capacity (resistance to collapse)
- E – Integrity
- I – Insulation

Where separating elements are quoted in this report, they are required to provide loadbearing capacity. Any separating elements and elements that perform both loadbearing and separating functions are required to achieve both integrity (E) and insulation (I) to the required fire resistance period quoted.

Loadbearing elements are required (unless otherwise stated) to achieve loadbearing capacity (R) to the required fire resistance period quoted in this report.

5.2 Loadbearing elements of structure

The internal structure shall be designed and constructed with materials that conform to British or European standards. The structural performances will be in accordance with Appendix B3 of ADB:2020.

The building will stand at 17.798m to the upper most floor (roof terrace), see Figure 5.

¹⁵ BS EN 1363-1:2012, Fire Resistance tests, Part 1: General requirements, BSI, 2012

¹⁶ BS 476-20:1987, Fire tests on building materials and structures – Part 20: Method for determination of the fire resistance of elements of construction (general principles) BSI, 1987

Figure 5: Brunswick Street, proposed section showing roof terrace



Table B4 (ADB) – minimum periods of fire resistance (ADB) give the following conditions for a residential block of flats with a top floor height above ground of not more than 18 metres:

The minimum level of fire resistance to the elements of structure shall be: **60 minutes fire resistance for the elements of structure**

All elements of structure shall achieve a minimum fire resistance standard of at least 60-minutes (60REI).

Elements of structure include:

- A member that forms part of the structural frame of a building, or any other beam or column.
- A load bearing wall or loadbearing part of a wall.
- A floor.
- A gallery (but not a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purpose or for maintenance of repair).
- An external wall.
- A compartment wall (including a wall that is common to two or more buildings).

Any beams or columns requiring fire resistance must be protected by a minimum of 60-minutes fire resistance in line with the requirements within Appendix B: Table B4.

The purpose of providing the structure with fire resistance is:

- To minimise the risk to occupants (life safety),
- To reduce the risk to firefighters who may be engaged on search and rescue operations,
- To reduce the danger to people in the vicinity of the building.

5.3 Compartmentation

5.3.1 Compartment floors

All floors within the building should be constructed as compartment floors to achieve a minimum level of fire resistance of not less than **60-minutes**.

5.3.2 Compartment walls

The following elements of structure should be constructed to achieve a minimum level of fire resistance as per the table below

Table 5 - Fire resistance requirements

Element of structure	Minimum level of fire resistance (EI in minutes)	Rating of fire door (minimum)
Loadbearing element of structure	60	-
All floors (to be treated as compartment floors)	60	-
Escape stairs and lift shaft	60	FD60s**

Walls separating individual dwellings	60	-
Element of structure	Minimum level of fire resistance (EI in minutes)	Rating of fire door (minimum)
Walls separating individual bedrooms within the flats*	30	FD30
Walls enclosing plant and refuse areas	60	FD60s
Enclosure to all life-safety equipment (e.g., generator rooms etc).	120	FD60s
Protected shafts	60	FD60s

Notes:

* Unless they are an element of structure when they are required to have a minimum fire resistance of 60 minutes

** Lift door to be FD30 as it is enclosed in the protected lift shaft apart from the roof terrace which is FD30 as it is in open air.

5.3.3 Provision of fire doors

Normally the fire door assemblies (including the frame, leaf's and associated hardware) separating elements within a building must achieve the same level of fire resistance as the wall or floor in which they are located. However, it is acceptable to reduce this standard and this is summarised in Table 6 below:

Table 6 - Fire door provisions

Area	Rating of fire door	Self-closing device
Doors onto a common escape stair	FD30s	Yes
Flat front door	FD30s	Yes
Internal bedroom doors* (minimum)	FD20	No
Internal kitchen/lounge door	FD30	No
Plant/refuse/lift motor room/Life safety equipment	FD60s	Yes, and to be kept locked shut

Service risers	FD60s**	To be kept locked shut
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Notes

* Except bathroom doors where a fire door is generally not required

** If the service riser opens directly onto a protected escape, intumescent strips and cold smoke seals are required, if the riser does not directly open onto a protected escape route they can be omitted.

Where a fire door denotes 's', an intumescent strip with cold smoke seal is required with a variance of 3mm $\pm$ 1mm tolerance around the door and frame. The threshold of the door should not exceed 5mm.

All fire doors should be tested in accordance with BS476:22¹⁷ or BS EN 1634:1¹⁸, cold smoke seals must comply with BS 476:31¹⁹ or BS EN 1634:3²⁰

5.4 Concealed spaces (cavities)

Fire stopping is required to seal or close a discontinuity or imperfection of fit between building elements that are required to have fire resistance (see Section 5.2). These must provide the same degree of fire resistance and insulation as the building element where it is installed (e.g., 60-minutes Integrity and Insulation)

Cavity barriers are used to close concealed spaces and prevent the passage of smoke or flame within a building. Cavity barriers are required to achieve a minimum standard of fire resistance of 30-minutes Integrity and 15-minutes Insulation.

5.4.1 Concealed spaces

All concealed spaces and cavities (not described in Section 5.4) must be subdivided with imperforate cavity barriers including;

¹⁷ BS 476-22:1987, Fire tests on building materials and structures – Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction, BSI, 1987

¹⁸ BS EN 1634:1:2014, Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance tests for doors, shutter assemblies and openable windows, BSI, 2014

¹⁹ BS 476:31 Methods for measuring smoke penetration through doorsets and shutter assemblies – Method of measurement under ambient conditions', 1983

²⁰ BS EN 1634-3:2004, Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 3: smoke control test for door and shutter assemblies, BSI, 2004

- Maximum cavity dimension does not exceed 20m (cavity linings achieve Class 0 or Class 1 to BS476 part 7²¹ and 6²² or equivalent European class to BS EN ISO 13501-1:2018²³) otherwise the cavity dimension should not exceed 10m in any direction (cavity barrier locations are noted in Section 5.4.3).

Table 7 - Cavity barrier provisions

Cavity Location	Class of surface / product exposed in cavity		Maximum dimensions in any direction (m)
	National class	European class	
Between roof and ceiling	Any	Any	20
Any other cavity	Class 0 or 1	A1 A2-s3, d2 B-s3, d2 C-s3, d2	20
	Not class 0 or 1	>C-s3, d2	10

Suitable cavity barriers should be provided vertically and horizontally to separate all dwellings from each other and on all windows/opening's and junctions on the external walls of the building.

5.4.2 Protecting escape routes

The residential stair should remain fire sterile (i.e. not include combustible materials) as it forms the main escape route for the building occupants and access for the fire and rescue service.

The ceiling is to achieve 60-minutes fire resistance (60 EI) to separate services from the escape route. Where this cannot be achieved, the ceiling should achieve a minimum of 60-minutes fire resistance (60EI) from above.

5.4.3 Junctions and compartment walls

Cavity barriers must be installed at;

- The junction between an external cavity wall and compartment wall/floor,
- Close around openings such as extraction vents etc,
- The junction between an internal cavity wall and compartment wall/floor (including any wall/door that forms part of the fire-resisting construction),

²¹ BS 476-7:1997, Fire tests on building materials and structures – Part 7. Method of test to determine the classification of surface spread of flame of products, BSI, 1997

²² BS 476-6:1989+A1:2009, Fire tests on building materials and structures – Part 6: Method of test for fire propagation for products, BSI, 2009

²³ BS EN 13501-1:2018, Fire classification of construction products and building elements, Part 1: classification using data from reaction to fire tests, BSI, 2018

- Edges, sides, and bases of cavities.

5.4.4 Window openings – cavity closers

Cavity barriers must be provided around the edge of the window details to ensure no direct route for fire and smoke into the cavity including cold smoke.

5.5 Protection of openings and fire stopping

Where services including all pipes and ductwork pass through a fire-resisting element or barrier, they should be adequately fire sealed, fire stopped or have fire resisting dampers installed, to ensure that the fire-resistance of that element is not compromised.

5.5.1 Ductwork

If air handling ducts pass through fire-resisting elements, the load bearing capacity, integrity. And insulation of the elements should be maintained using one or more of the following four methods. In most ductwork systems, a combination of the four methods is best to combat potential fire spread.

- Method 1 – thermally activated fire dampers.
- Method 2 – fire resisting enclosures.
- Method 3 – protection using fire resisting ductwork.
- Method 4 – automatically activated fire and smoke dampers triggered by smoke detection.

Where ducts pass between fire-separating elements to serve multiple flats, dampers or fire and smoke dampers should be actuated by both smoke detector-controlled automatic release mechanisms and thermally actuated devices.

Where ducts pass through escape routes, method 1 should be used as large volumes of smoke can pass thermal devices without triggering them. An ES classification fire and smoke damper which is activated by a suitable fire detection system (method 4) may be used for protecting escape routes.

5.5.2 Pipes

Pipework that passes through a fire-resisting barrier should meet the appropriate provisions within ADB, which can include the three options below:

- Proprietary seals (any pipe diameter) – Alternative A
 - Proprietary sealing has been demonstrated through testing to maintain the fire-resistance of the wall, floor, or cavity barrier
- Pipes with a restrictive diameter – Alternative B
 - Fire stopping may be appropriate around the pipe, keeping the opening as small as practically possible. The nominal internal diameter should be less than the guidance in the table below.
- Sleeving – Alternative C

Lead, Aluminium, Aluminium alloy, Fibre-cement, or uPVC (pipes complying with either BS 4514 or BS 5255), with a maximum diameter of 160mm, may be used with a sleeving of non-combustible pipe with the maximum sizes set out in Table 8.

Table 8 - Protection of pipes

Maximum nominal internal diameter of pipes passing through a compartment wall / floor			
Situation	Pipe materials and maximum nominal internal diameter (mm)		
	Non-combustible materials	Lead, aluminium, aluminium alloy, uPVC², fibre cement	(c) Any other material
1. Structure (but not a wall separating buildings) enclosing a protected shaft which is not a stairway or a lift shaft	160	110	40
2. Compartment wall or compartment floor between flats	160	160 (Stack Pipe) 110 (Branch Pipe)	40
3. Any other situation	160	40	40
Note: - Any non-combustible material (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe. - uPVC pipes complying with BS 4514:2001 and uPVC pipes complying with BS 5255:1989. - These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in Diagram 9.1. In other cases the maximum diameters against situation 3 apply.			

5.5.3 Provision of fire dampers

As this premises are residential accommodation (sleeping risk) all fire dampers should be interlinked to the buildings fire detection system in accordance with BS 9999. All fire dampers are to be tested to BS EN 1366-2²⁴ and classified to BS EN 13501-3²⁵ with the same insulation (I) and integrity (E) as the wall or floor through which they penetrate.

Dampers should not be generally fitted within any ductwork that services a kitchen due to the likely build-up or grease, which will affect their operation and therefore should be protected by another method (see 5.5.1).

²⁴ BS EN 1366-2:2015, Fire resistance tests for service installations, Part 2: Fire dampers, BSI, 2015

²⁵ BS EN 13501-3:2005+A1:2009, Fire classification of construction products and building elements. Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers, BSI, 2009

6 B4 External Fire Spread

The building abuts the site boundary on the east and west elevation.

Figure 6 denotes the site boundary (red line) and Figure 7 denotes where the projecting windows on two-bedroom flats meet the site boundary (red line).

The east elevation is within 0.75m of the boundary. The west elevation has sections within 1m of the boundary; however, this is not continuous along the whole elevation.

Figure 6: Ground floor site boundary

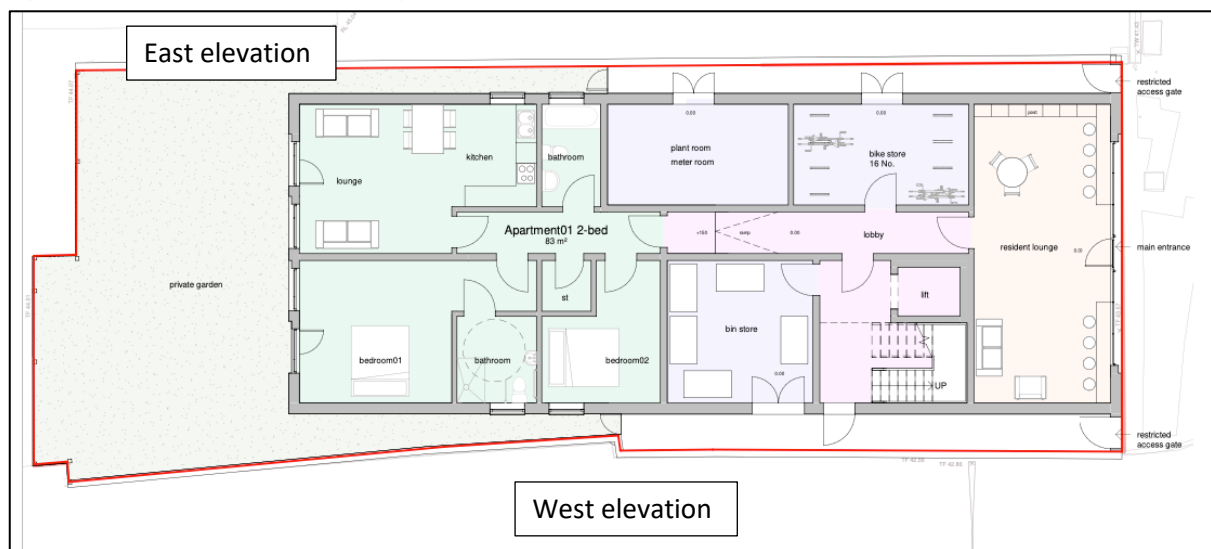
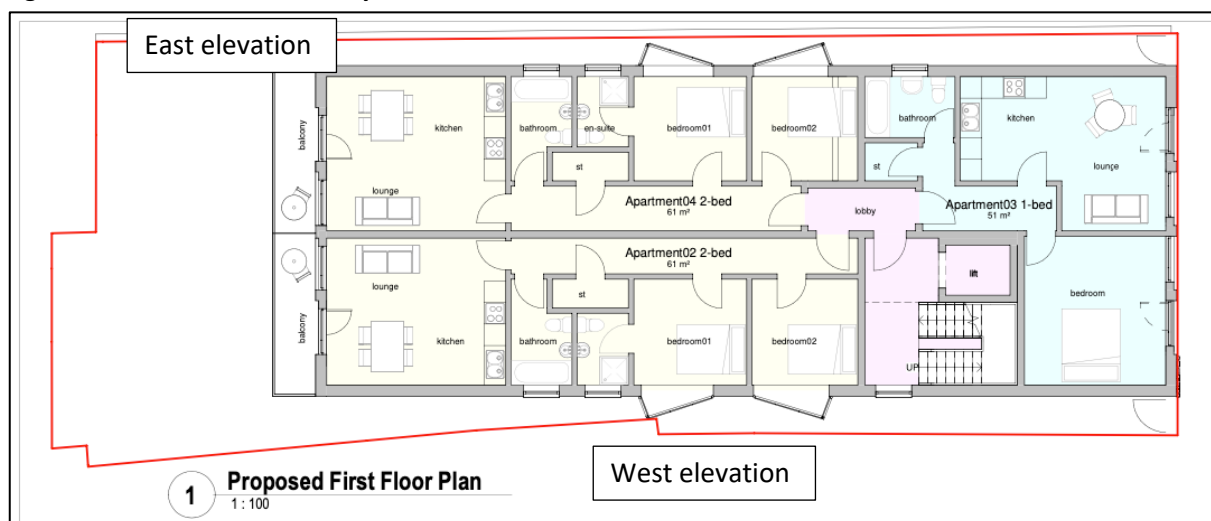


Figure 7: First floor site boundary



6.1 Regulation 7 (2) - (4) Information

Changes made to the building regulations 2010 include the new provision of regulation 7²⁶ (2)-(4) which came into full effect on the 21st of February 2019. This new regulation came into effect on the 21st of December 2018 for new application or buildings that commenced work after the 21st of February 2019.

The building amendment etc. (Amendment) (England) Regulations and associated guidance comes into force on 1 December 2022. The amendment regulations will extend Regulation 7 (2) to buildings (including Residential) with a storey over 11m. The external wall and associated materials will need to achieve A2,s1-d0 or A1.

Although there are some transitional arrangements including *'the regulations will not apply where a building notice or an initial notice has been given to, or full plans deposited with, a local authority before the 1 December 2022 and either the building work to which it relates:*

- *Has started before that day: or*
- *Is started within the period of six months beginning on that day'.*

Therefore, the external wall is recommended to comply with Regulation 7 (2) and the materials used in the external wall to achieve Euroclass A2,s1 – d0 or A1.

6.2 External wall makeup

6.2.1 Construction

The external wall is to be constructed with products classified to A2,s1-d0 or A1 – BS EN 13501 and will not support the promulgation of fire over the surface.

6.2.2 Plasterboard

Plasterboard conforms to A2-s1,d0 classified in accordance with BS EN 520:2004+A1:2009, by reference to Table B.1 and European Commission Decision 2006/673/EC, such that they are 'Classified without Further Testing' (CWFT).

Paragraph B1a of the amended ADB provides guidance and direction to Appendix B, and describes materials defined as CWFT in a published Commission Decision (2006/673/EC).

It is therefore the opinion of the Department for Levelling Up Housing and Communities (DLUHC) that plasterboard meets the requirements of A2,s1-d0 or better for use as part of the external wall makeup.

²⁶ Statutory Instrument, 2018 No.1230 Building and Buildings England, The Building (Amendment) Regulations 2018

6.2.3 Breather membrane

Membranes are controlled by ADB and therefore, need to achieve a classification to BS EN 13501-1: as B-s1,d0 or better.

6.3 Balconies

Balconies are generally not considered as part of the compartment floor and therefore do not require the same level of fire resistance. However, they are attached to the external wall and therefore they should not provide a medium for fire spread up and around the external envelope of the building. It is therefore recommended to ensure the external balconies are constructed of materials (including floor coverings) that are A2, s1-d0 or A1.

6.4 Projecting Windows

The refuse store is located below a projecting window on apartment two (bedroom). Therefore, the external wall and doors to the refuse store should be fire rated (60 EI) or the base of the projecting window should be fire rated (60EI) to ensure a fire in the refuse store does not affect the sleeping accommodation above.

6.5 Space separation

The building regulations require buildings to have suitable space separation requirements to ensure fire spread does not occur to neighbouring buildings. This strategy evaluates the radiation heat fluxes and boundary separating distances described in BR 187:2014²⁷ for compliance with Part B4 – External Fire Spread (separation distances) of Schedule 1 of the Building Regulations 2010²⁸.

The proposed building will be constructed with sixty-minute fire resistance compartment floors (60 EI) in accordance with BS 9991²⁹.

As the building abuts the site boundary on two sides, to the east and west side elevations, these two external walls need to achieve a minimum of 60-minutes EI from each side separately.

6.5.1 Boundary distances

The external envelope of the building must adequately resist the spread of fire over the walls and from one building to another. This method is described in the BRE report External Fire Spread: Building separation and boundary distances (Figure 8) and the principles have been used supplemented with a fire engineering assessment to analyse the requirements for this premises.

²⁷ BR187 – External Fire Spread, Building separation and boundary distances, Second Edition 2014

²⁸ Statutory Instrument, 2011 No. 1515 Building and Buildings, England and Wales, The Building (Amendments) Regulations 2011, No.1515 (2011), Pages 1-4

²⁹ BS9991-2015 Fire Safety in the Design, Management and Use of Residential Buildings – Code of Practice, BSI, 2015

The acceptance criterion within ADB for the assessment of fire hazard from one building to another is 12.6 kW/m² which will cause the piloted ignition of kiln dried timber.

The openings and relevant boundaries on each elevation have been summarised in Table 9, using plans provided by Innov8 Construction Solutions – summarised by the red line on Figure 6.

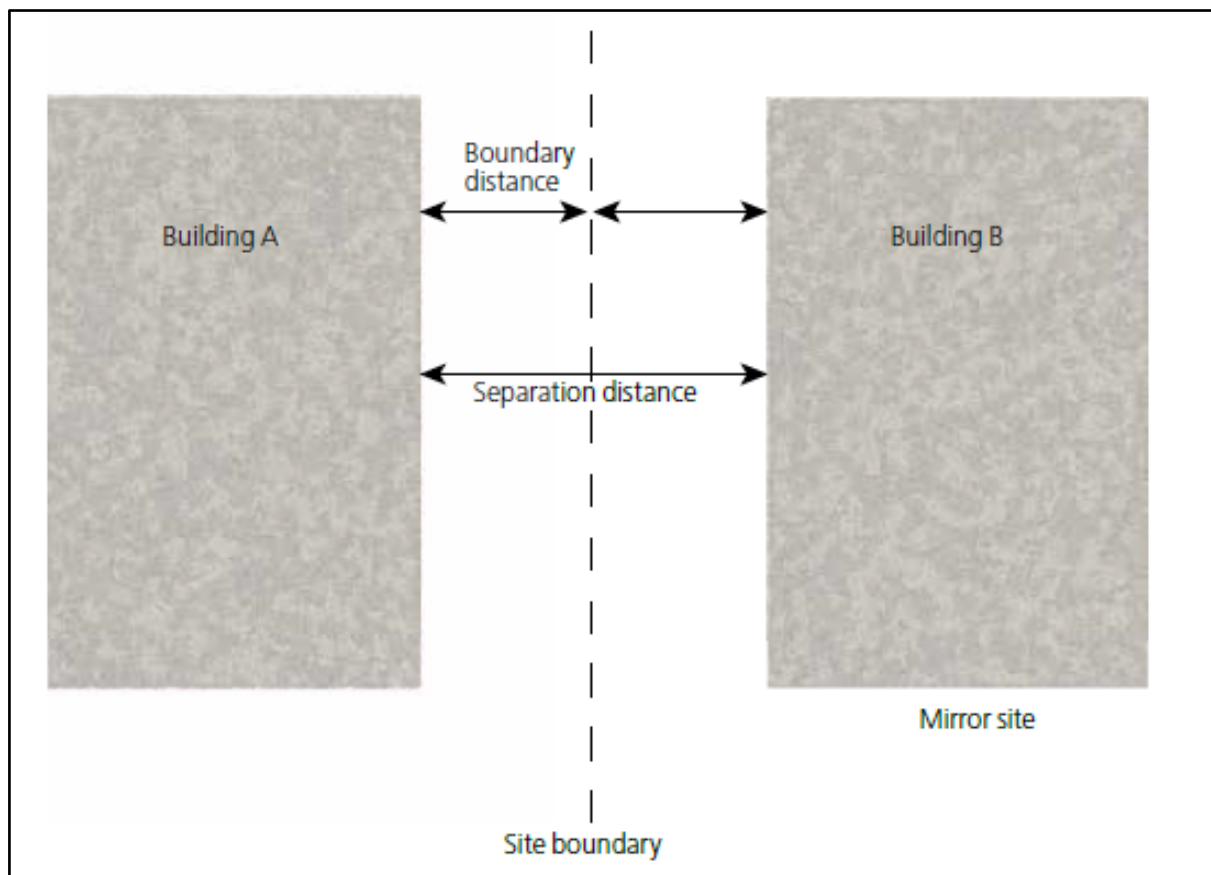
Table 9 – Boundary distances

Elevation	Notional boundary distance (m)	Fire resistance requirements
North	>5m	60EI from the inside
East	0.75m - 0m*	60EI from each side separately
South	5m to the centre line of the road	60EI from the inside
West	>1m to 0m**	60EI from each side separately

Note:

* The facade is situated 0.75m from the boundary, the projecting windows are approximately on the boundary site line

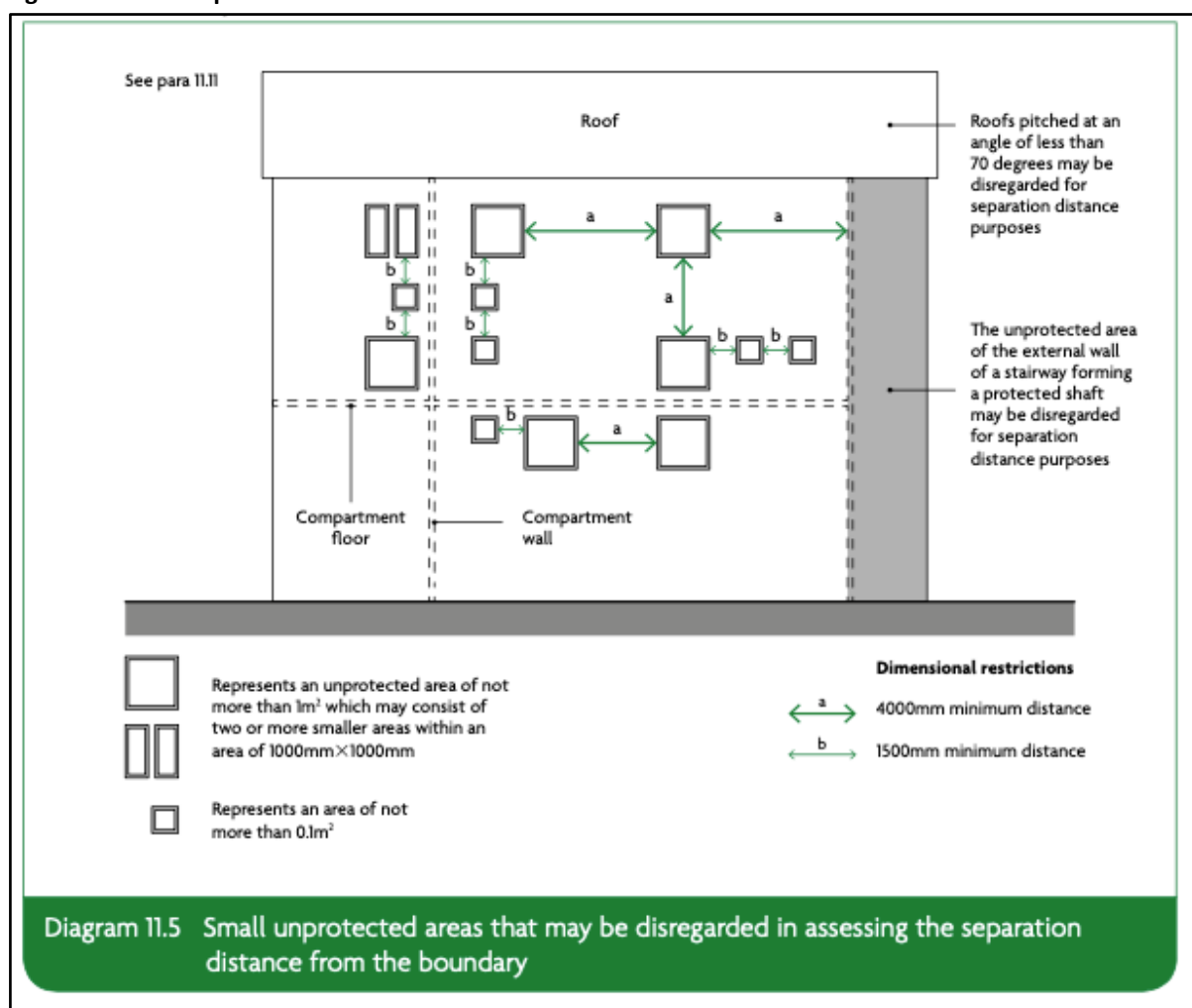
** The facade is situated approximately 1m from the boundary for the majority of the elevation, the projecting windows are approximately on the boundary site line

Figure 8 - Notional boundaries BR187

The east and the west external walls abut the site boundary; therefore, they need to achieve a fire resistance standard of 60EI from each side separately.

Where the external wall is not common wall (i.e., a wall dividing two separate demises), any openings (unprotected areas) should meet the conditions on Figure 9.

Figure 9 – Small unprotected areas



The external wall on the north and south elevation is at least 5m from the boundary and the centre line of the road (respectively).

The north and south elevations are 9.3m wide. The floor height (ground – fourth) are 2.925m apart from the fifth floor which is 3.173m. Therefore, in accordance with table A and table B (BR 187) the enclosing rectangle is 3m x 12m and 6 x 12 respectively.

Table 10: BR187 calculations

BR187 Criteria	Ground – fourth floor	Fifth floor
Enclosing rectangle	$3 \times 12 = 36\text{m}^2$	$6 \times 12 = 72\text{m}^2$
Unprotected area*	$9.35\text{m} \times 2.925\text{m} = 27.35\text{m}^2$	$9.35\text{m} \times 3.173\text{m} = 29.67\text{m}^2$
Percentage unprotected	76%	41%

BR187 Criteria	Ground – fourth floor	Fifth floor
Table A, 80% unprotected	Boundary distance – 3.0m	-
Table B, 50% unprotected	-	Boundary distance – 3.5m

Notes

* The unprotected areas have been simplified and no internal compartmentation has been included in the calculation to determine the boundary distances. These calculations will be updated during RIBA stage 4 design.

- Boundary distance for the north and south elevations = ~5m

Therefore, the external fire spread calculations for the north and south elevation are adequate for the unprotected area for the minimum separation distances set out in BR 187:2014.

6.6 Roof covering

Performance of the resistance of roofs to external fire exposure is measured in terms of penetration through the roof construction and the spread of flame over its surface.

Roof constructions are classified within the European system as $B_{\text{roof}}(t_4)$ – highest cl to $F_{\text{roof}}(t_4)$ in accordance with BS EN 13501-5³⁰.

Alternatively, the roof build-up can comply with the European Commission Decision 2000/553/EC³¹ without providing a fully tested system. To adopt this approach, all combustible materials on the roof build-up must be fully covered over by one of the following:

- Loose laid gravel with a thickness $\geq 50\text{mm}$ or a mass $\geq 80\text{kg/m}^2$. Each aggregate size must be between 4mm to 32mm.
- Sand or cement screed $\geq 30\text{mm}$ thick.
- Cast stone or mineral slabs $\geq 40\text{mm}$ thick; gaps between slabs should be suitably filled with sand, cement or similar to prevent exposure of combustible materials below.

³⁰ BS EN 13501: Part 5, 'Classification using data from external fire exposure to roofs tests', 2016.

³¹ Commission Decision 2000/553_EC 06.09.2000

7 B5 Access and Facilities for the Fire Service

The finished top floor height from fire service access level is less than 18m (ground level) however, the fire strategy adopts a mixture of external and internal firefighting provisions including:

- Perimeter access and
- Internal firefighting using a protected stair and dry rising main.

7.1 Firefighting access – External

The total floor area (m² total for all six floors including roof terrace) is approx. 1554m².

The building is primarily accessed on the south elevation with the access to the protected stair via the west elevation.

The vehicle access road will be provided by the existing highway to the front of the building which should typically provide the following;

Table 11 - Firefighting vehicle access requirements

Vehicle access requirements	
Minimum road width	3.7m (between kerbs)
Minimum width of gateways	3.1m
Minimum turning circle	16.8m (between kerbs)
Minimum clearance height	3.7m
Minimum carrying capacity	12.5 tonnes

7.2 Firefighting access - Internal

Brunswick is not required to be provided with a firefighting shaft, because the topmost occupied floor is under 18m in height, however, the building will be provided with a dry rising main in the protected stair to enable the fire and rescue service with a maximum hose laying distance of 60m on a route suitable for laying hose from the fire main outlet due to the enhancements from automatic fire suppression system.

The access to the internal stair is either by the restricted access gate to the side of the building or via the resident's lounge/ reception area. The resident's lounge/ reception area is not fire sterile; however, it is deemed adequate for the area not to be fire sterile for the following reasons:

- The building is only considered to have a fire in one location at any one time (i.e. either the residents lounge or elsewhere in the building such as a flat).
- The resident's lounge/ reception area is sprinkler protected by a residential and domestic sprinkler system which is designed to control the fire in the early stages and the fire and rescue service would be able to extinguish the fire from the ground floor.
- Occupants/ Residents do not have to pass through the resident's lounge/ reception area to evacuate the building (i.e. there are alternative means of escape for residents from the staircase via the side of the building).
- There is alternative means of access into the protected stair via the restricted access gate to the side of the building.

Although the resident's lounge/ reception area is not fire sterile, it is unlikely to affect the attending fire and rescue service's ability to control fire spread and is therefore deemed adequate.

7.2.1 Protected Staircase

The protected stair requirements include:

- Ventilated protected stair in accordance with BS 5395-1:2010³² (1100mm wide with an AOV of 1.0m² at the head of the stairs) and
- Dry rising fire main within the protected stair (with the inlet provided near the main entrance of the building and outlets provided on every floor level) to BS 9990³³

7.3 Wayfinding for the Fire Service

To assist the fire service to identify each floor in a block of flats with a top storey more than 11m above ground level, floor identification signs and flat indicator signs are to be provided.

7.3.1 Floor Identification

The floor identification signs should meet all of the following conditions:

- a) The signs should be located on every landing of a protected stairway and every protected corridor/lobby (or open access balcony) into which a firefighting lift opens.
- b) The text should be in sans serif typeface with a letter height of at least 50mm. The height of the numeral that designates the floor number should be at least 75mm.
- c) The signs should be visible from the top step of a firefighting stair and, where possible, from inside a firefighting lift when the lift car doors open.

³² BS 5395-1:2010, Stairs – Part 1: Code of Practice for the design of stairs with straight flights and winders BSI 2010

³³ BS 9990, 'Non automatic fire-fighting systems in buildings', 2015

- d) The signs should be mounted between 1.7m and 2m above floor level and, as far as practicable, all the signs should be mounted at the same height.
- e) The text should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.

7.3.2 Wording

The wording used on each floor identification sign should take the form Floor X, with X designating the number of the storey, as intended for reference by residents. The floor number designations should meet all of the following conditions:

- a) The floor closest to the mean ground level should be designated as either Floor 0 or Ground Floor.
- b) Each floor above the ground floor should be numbered sequentially beginning with Floor 1.
- c) A lower ground floor should be designated as either Floor –1 or Lower Ground Floor.
- d) Each floor below the ground floor should be numbered sequentially beginning with Floor –1 or Basement 1.

7.3.3 Signage

All floor identification signs should be supplemented by flat indicator signs, which provide information relating to the flats accessed on each storey. The flat indicator signs should meet all of the following conditions:

- a) The signs should be sited immediately below the floor identification signs, such that the top edge of the sign is no more than 50mm below the bottom edge of the floor identification sign.
- b) The wording should take the form Flats X–Y, with the lowest flat number first.
- c) The text should be in sans serif typeface with a letter height of at least half that of the floor indicator sign.
- d) The wording should be supplemented by arrows when flats are in more than one direction.
- e) The text and arrows should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.

7.4 Fire mains - Dry riser

The protected escape stair will be provided with a dry rising main located in the protected stair enclosure with an outlet on each level, designed and installed to BS 9990. The inlet for the dry rising main must be within 18m and in sight of suitable parking and access to the building by fire and rescue service appliances (including a suitable route for laying hose). The inlet for the dry riser is on the front elevation (Brunswick Street) next to the main entrance for the premises off the main road.

7.5 Hydrants

There are adequate external hydrants (Brunswick) within the local area and within 100m of the premises, however the operation and performance of the hydrant needs to be confirmed by the water undertaker.

7.6 Passenger Lift

The passenger lift shall comply with relevant requirements, including BS EN 81-73³⁴ and the designated landing shall be the Ground Floor. Therefore, the lift shall return to ground level upon activation of the fire detection system.

Provisions are required to prevent water ingress into the lift pit and suitable drainage from it.

It is not proposed to install fire curtains over the lift doors as the lift is in the ventilated stair core.

7.6.1 Evacuation Lift

Consideration should be given to install a suitable sized fire evacuation lift, suitable to be used to evacuate people who require level access (including from the roof top garden).

If provided the fire evacuation lifts should be in accordance with Section G.2 of BS 9999 and BS EN 81-76³⁵, and other relevant sections of BS EN 81, as appropriate.

7.6.2 Secondary Power Supplies

Secondary power for all fire and life safety system shall be provided in accordance with BS 9991 and BS 8519³⁶. Secondary power supply shall provide for the following systems:

- Fire detection and alarm system throughout the building.
- Emergency lighting.
- Smoke control systems including automatic opening vents and dampers.
- Fire and smoke dampers (as required).
- Fire suppression system and
- Evacuation lift if provided.

Details of the secondary power supply are to be provided by the MEP designer.

7.6.3 Emergency Lighting of Escape Routes

Emergency lighting of escape routes shall be provided to all escape routes and ancillary areas in accordance with BS 5266-1³⁷.

³⁴ BS EN 81-73, 'Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lift – Behaviour of lifts in the event of fire,' 2020

³⁵ BS EN 81-76, 'Safety rules for the construction and installation of lifts. Particular applications for passenger and goods lifts. Evacuation of persons with disabilities using lifts,' 2019 (Draft)

³⁶ BS 8519, 'Selection and installation of fire-resistant power and control cable systems for life safety, fire-fighting and other critical applications, 2020.

³⁷ BS 5266-1, 'Code of practice for the emergency lighting of premises', 2011.

7.6.4 Electrically Powered Doors/Locks on Escape Routes

Electrically powered locks to doors or gates on the means of escape routes shall return to the unlocked position for the following:

- On operation of the fire alarm system (i.e. fail to safe).
- On activation of a manual door release unit (green break-glass box) located on the approach side of the door/ means of escape.
- On loss of power to ensure residents can escape to a place of ultimate safety.

8 Fire Safety Design

A permit to work system is to be in place to manage fire risks from post-build contractors.

During the construction phase, buildings are particularly vulnerable to fire. It is important therefore that the site is well-controlled. Specifically, smoking areas for workers must be clear of the building and skips etc. must be kept with a clear separation distance. It is good practice to have extinguishing media placed around the curtilage of the site to enable any fire that may initiate in the exposed membranes to be quickly dealt with.

Reference should be made by site management to the Construction (Design and Management) Regulations 2015 specifically Part 4 (Appendix C). The Health and Safety Executive (HSE) requires a site-specific risk assessment to be undertaken to determine the impact of a site fire on neighbouring properties in accordance with HSG168 “Fire Safety in Construction” published in July 2022.

8.1 Handover

Further fire safety information is in 0 and Appendix D

The fire safety design (as documented in this report) has been developed to assist with the RIBA Stage 3 approval from the client.

Once the building works are completed, the AHJ will issue a completion certificate, and once the building is handed over, the Responsible Person(s) must comply with their duties under the Regulatory Reform (Fire Safety) Order 2005.

Upon occupation, the responsible person, in this case the person(s) having control of the premises is required by law to undertake a suitable and sufficient fire risk assessment. The fire risk assessment is the means by which this strategy is implemented but more importantly, maintained, throughout the life of the building.

The requirement is that the risk assessment is carried out by a competent person. Therefore, this may be done by themselves if they consider themselves competent, or by the engagement of a third-party competent person. A person is to be regarded as competent for the purposes of this strategy where they have sufficient training and experience or knowledge and other qualities to enable them properly to assist in undertaking the preventive and protective measures.

The responsible person(s) needs to develop a suitable and sufficient plan to assist mobility impaired persons to evacuate from the common areas to a place of ultimate safety. The responsible person(s) cannot rely on the attending fire and rescue authority to evacuate relevant persons. An evacuation lift will not be incorporated into the design as per the architects’ requirements.

Appendix A – Architectural Plans and Drawings

This fire engineering strategy should be read in-conjunction with the architect plans and drawings provided by Innov8 Construction Solutions and highlighted in the table below.

Table 12 - Architectural plans and drawings

Drawing Number	Revision Number
A1324(02)002 - Proposed Ground Floor_revF	F
A1324(02)003 - Proposed First & Second Floor Plans_revF	F
A1324(02)004 - Proposed Third & Fourth Floor Plans_revF	F
A1324(02)005 - Proposed Fifth & Roof Floor Plans_revG	G
A1324(02)013 - Proposed Section	A
A1324(02)006 - Proposed South Elevation_revG	G
A1324(02)007 - Proposed East Elevation_revG	G
A1324(02)008 - Proposed West Elevation_revG	G
A1324(02)009 - Proposed North Elevation_revG	G
A1324(02)010 - Proposed Street View_revG	G

Appendix B – Regulation 7 and 38 of the Building Regulations 2010

Regulation 7

This strategy is based upon suitable workmanship and materials as per Part 2, Clause 7 of the Building Regulations 2010.

The building, although less than 18m, the fire safety strategy is recommended to follow the guidance for external wall construction contained in the updated Regulation 7 (November 2018 amendments) on the use of materials and workmanship.

Regulation 38

Regulation 38 requires that, where building work involves the erection or extension of a relevant building, or relevant changes of use of a building, fire safety information shall be given to the responsible person at the completion of the project or when the building or extension is first occupied, it is recommended that this is in the form of an Operating and Maintenance Manual (O&M Manual).

This information must include as a minimum;

- The completed fire strategy for the building
- Management assumptions
- The evacuation strategy
- Escape routes and places of relative and ultimate safety
- Construction details of
 - Compartmentation
 - Fire doors
 - Cavity barriers
 - Fire stopping
 - Dampers
- Active systems
 - Smoke detection and alarm system
 - Detector locations
 - Fire alarm call points
 - Fire panel
 - Emergency communication systems
 - Emergency escape lighting
- Safety signage
- Firefighter facilities
- As built drawings

The information would normally facilitate the production of the fire risk assessment for the premises. This strategy should be maintained throughout the building works and all stakeholders are required to inform the Fire Engineers of any changes to the building design to ensure that the finished strategy accurately reflects the complete design. This technical document/strategy should then stay with the premises and should be reviewed should a significant change occur to the premises that would affect the information contained here within.

Appendix C – Construction Design and Management Regulations

Projects undertaken within Great Britain and Northern Ireland are subject to the requirements of the Construction (Design and Management) Regulations 2015³⁸ (CDM), health and safety requirements during construction and maintenance of construction sites.

This fire strategy is the basis for compliance with the functional and performance requirements for meeting Part B of Schedule 1, Building Regulations 2010 for the finished building and forms part of the Building Regulations submission.

Where any conclusions or recommendations have been arrived at which specify particular materials, products or forms of construction these will have been assessed, in accordance with CDM Regulation 9 (duties for designers) and this information must be made available to the CDM coordinator.

The construction phase can represent a significant risk of fire due to operations and hot works on site, therefore the measures outlined in HSG168³⁹ should be adopted to ensure suitable fire safety arrangements are in place for the single direction of travel.

Where the architect or other consultants use all or part of this report to specify works, they are understood to be competent in alerting the client, CDM coordinator, designer, contractor, and principal contractor of any issues arising under the CDM Regulations 2015, should any questions arise, they must be directed to Surety Fire Solutions as part of the consultation process.

³⁸ Statutory Instruments, 2015 No 15 Construction (Design and Management) Regulations 2015, Health and Safety, 2015

³⁹ Health and Safety Executive, HSG168 – fire safety in construction, HSE, 2010

Appendix D – Regulatory Reform (Fire Safety) Order 2005

The Regulatory Reform (Fire Safety) Order⁴⁰ (FSO) came into force on the 1st October 2006, consolidating nearly all previous fire safety legislation revoking the Fire Precautions Act 1971 and the Workplace Regulations 1992. The FSO places a general duty of fire safety upon occupation to undertake a suitable and sufficient fire risk assessment of relevant persons both in and around the premises taking into consideration the following areas

- Identifying fire hazards – sources of ignition, fuel, oxygen
- Identifying people at risk (relevant persons)
- Evaluate, remove and reduce the risk
- Recording the findings, plan and train where appropriate
- Reviewing the outcomes on a regular basis*

* Regular normally means on an annual basis

The building should be properly managed, and a Fire Safety Management Plan and Manual should be developed. The finalized fire strategy should be the basis of this risk assessment prior to occupation and once the building is in use. The management regime should be maintained and any variation in that regime should be the subject of a suitable and sufficient review of the Fire Risk Assessment.

⁴⁰ Statutory Instrument, 2005 No. 1541 Regulatory Reform, England and Wales, The Regulatory Reform (Fire Safety) Order 2005,

Appendix E – Building Regulations - Functional Regulations

Functional Requirements⁴¹

B1. The building shall be designed and constructed to provide appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used as all materials times.

B2. (1) To inhibit the spread of fire within the building, the internal linings shall –

- (a) Adequately resist the spread of flame over their surfaces; and
- (b) Have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.

(2) In this paragraph ‘internal linings’ mean the materials or products used in lining any partition, wall, ceiling or other internal structure.

B3. (1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period.

(2) A wall common to two or more buildings shall be designed and constructed so that it adequately resist the spread of fire between those buildings. For the purposes of this sub-paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building.

(3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following

- (a) Sub-division of the building with fire-resisting construction;
- (b) Installation of suitable automatic fire suppression systems.

(4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited

B4. (1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

B5. (1) The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters in the protection of life

(2) Reasonable provisions shall be made within the site of the building to enable fire appliances to gain access to the building.

⁴¹ Statutory Instrument, 2011 No. 1515 Building and Buildings, England and Wales, The Building (Amendments) Regulations 2011, No. 1515 (2011), Pages 1-4

Appendix F – BS EN 13501-1:2018 – European Fire Classification

Table 13 - EN 13501-1:2018 BSI

Class	Test method(s)	Classification criteria	Additional classification
A1	EN ISO 1182 ^a and	$\Delta T \leq 30^\circ\text{C}$; and $\Delta m \leq 50\%$; and $t_f = 0\text{ s}$ (i.e. no sustained flaming)	-
	EN ISO 1716	$PCS \leq 2,0 \text{ MJ/kg}^a$ and $PCS \leq 2,0 \text{ MJ/kg}^{b\ c}$ and $PCS \leq 1,4 \text{ MJ/kg}^{2\ d}$ and $PCS \leq 2,0 \text{ MJ/kg}^e$	-
A2	EN ISO 1182 ^a or	$\Delta T \leq 50^\circ\text{C}$; and $\Delta m \leq 50\%$; and $t_f = 20\text{ s}$	-
	EN ISO 1716 and	$PCS \leq 3,0 \text{ MJ/kg}^a$ and $PCS \leq 4,0 \text{ MJ/kg}^{b\ c}$ and $PCS \leq 4,0 \text{ MJ/kg}^{2\ d}$ and $PCS \leq 3,0 \text{ MJ/kg}^e$	-
	EN 13823	$FIGRA_{0,2\text{MJ}} \leq 120 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600\text{s}} \leq 7.5\text{MJ}$	Smoke production <i>f</i> and Flaming droplets/particles <i>g</i>
B	EN 13823 and	$FIGRA_{0,2\text{MJ}} \leq 120 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600\text{s}} \leq 7.5\text{MJ}$	Smoke production <i>f</i> and Flaming droplets/particles <i>g</i>
	EN ISO 11925 – 2 ⁱ : Exposure = 30 s	$F_s \leq 150 \text{ mm within } 60 \text{ s}$	
C	EN 13823 and	$FIGRA_{0,4\text{MJ}} \leq 250 \text{ W/s}$ and $LFS < \text{edge of specimen}$ and $THR_{600\text{s}} \leq 15\text{MJ}$	Smoke production <i>f</i> and Flaming droplets/particles <i>g</i>
	EN ISO 11925 – 2 ⁱ : Exposure = 30 s	$F_s \leq 150 \text{ mm within } 60 \text{ s}$	
D	EN 13823 and	$FIGRA_{0,4\text{MJ}} \leq 750 \text{ W/s}$	Smoke production <i>f</i> and Flaming droplets/particles <i>g</i>
	EN ISO 11925 – 2 ⁱ : Exposure = 30 s	$F_s \leq 150 \text{ mm within } 60 \text{ s}$	
E	EN ISO 11925 – 2 ⁱ : Exposure = 15 s	$F_s \leq 150 \text{ mm within } 20 \text{ s}$	Flaming droplets/particles <i>h</i>
F	EN ISO 11925 – 2 ⁱ : Exposure = 15 s	$F_s \leq 150 \text{ mm within } 20 \text{ s}$	

^a For homogeneous products and substantial components of non-homogeneous products
^b For any external non-substantial component of non-homogeneous products
^c Alternatively, any external non-substantial component having a $PCS \leq 2.0 \text{ MJ/m}^2$, providing that the product satisfies the following criteria of EN 13823: $FIGRA \leq 20 \text{ W/s}$ and $LFS < \text{edge of specimen}$, and $THR_{600\text{s}} \leq 4.0 \text{ MJ}$, and s1, and d0.
^d For any internal non-substantial component of non-homogeneous products
^e For the product as a whole
^f s1 = $SMOGRA \leq 30\text{m}^2/\text{s}^2$ and $TSP_{600\text{s}} \leq 50\text{m}^2$; s2 = $SMOGRA \leq 180\text{m}^2/\text{s}^2$ and $TSP_{600\text{s}} \leq 200\text{m}^2$; s3 = not s1 or s2
^g d0 = No flaming droplets/particles in EN 13823 within 600 s;
d1 = No flaming droplets/particles persisting longer than 10 s in EN 13823 within 600 s;
d2 = not d0 or d1.
Ignition of paper in EN ISO 11925-2 results in d2 classification
^h Pass = no ignition of the paper (no classification)
Fail = ignition of the paper (d2 classification)
ⁱ Under conditions of surface flame attack and, if appropriate to the end-use applications of the product edge flame attack

Appendix G – Quality Assurance

This fire strategy has been produced for Brunswick Living Limited. for residential apartments, Brunswick Street, Manchester and considers the details, architect plans and instructions provided by Innov8 Construction Solutions. It is provided for the stated purpose, has been prepared with skill and care by a competent (fire) engineer and is not intended for use by any other third party without prior permission of Surety Fire Solutions Ltd. and as such Surety Fire Solutions Ltd. shall not be liable for any such use or reliance on this report.

Revision	Description	Date	Author	Checked
03	Further update following review from Generation Ltd. - Draft	28.10.2022	MCF	WH
02	Further update following review from Generation Ltd. - Draft	17.09.2022	MCF	JF
01	Update following review from Generation Ltd. - Draft	14.09.2022	MCF	JF
00	Initial RIBA Concept design report - Draft	11.09.2022	MCF	JF

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General Notes
The Architect shall have no responsibility for any use made of this document other than for that which it was prepared and issued.
All dimensions should be checked on site. Do not scale from this drawing.
To be read in conjunction with all other Consultant's drawings.
The Architect to be immediately notified of any discrepancies.
Copyright on this drawing retained by the Architect.

LEGEND

- Site Boundary
- - - Outline Planning Approval

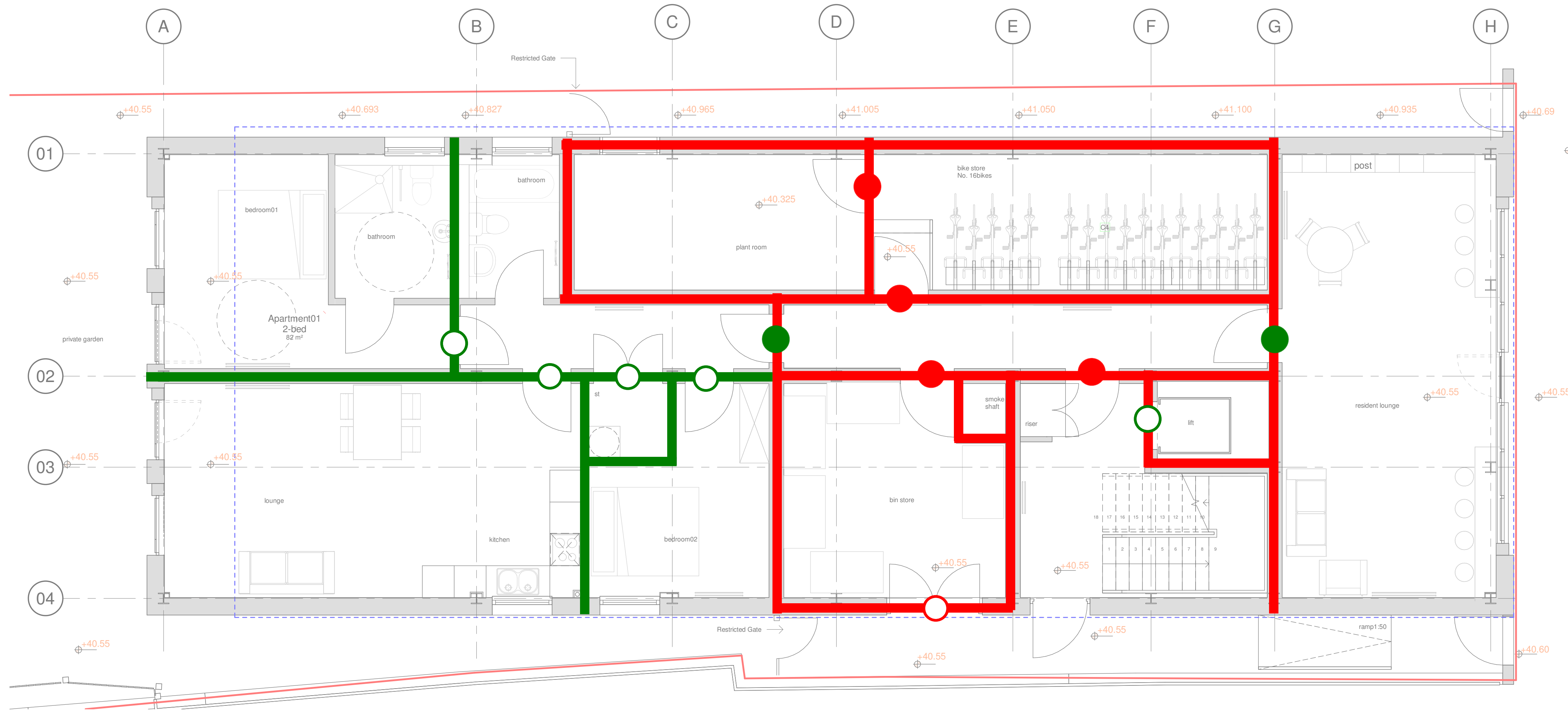
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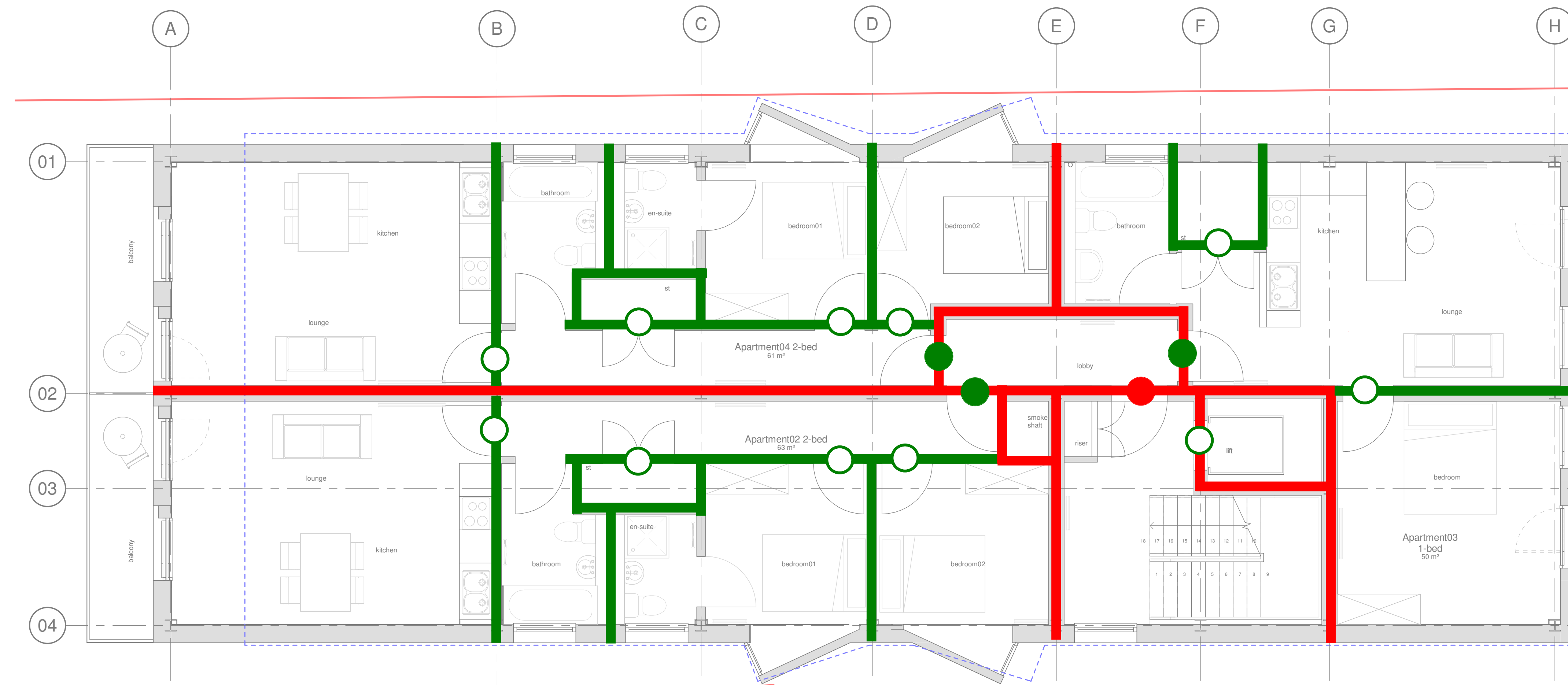
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— 30 minutes

Fire Doors

- ○ FD60S / FD60
● ○ FD30S / FD30



1 Proposed Ground Floor Plan
1:50



2 Proposed First Floor Plan
1:50

P1 26/10/22 SA SH Initial Issue
No. Date Dwn Ck App Revision or reason for issue

Client
Brunswick Living Ltd

create it studios
leave an impression

Create It Studios (NW) Ltd
Universal Square
Devonshire Street North
Manchester
M12 5JH
info@createitstudios.co.uk

Project Title
Brunswick Street

Scale / North Point
1:50 0 0.5 1 1.5 2m 1:50

Drawing Title
Proposed Ground and First Floor Plans

Drawing Number
Drawing Status
A1324(04)001
Preliminary

Revision
P1

LEGEND

- Site Boundary
--- Outline Planning Approval

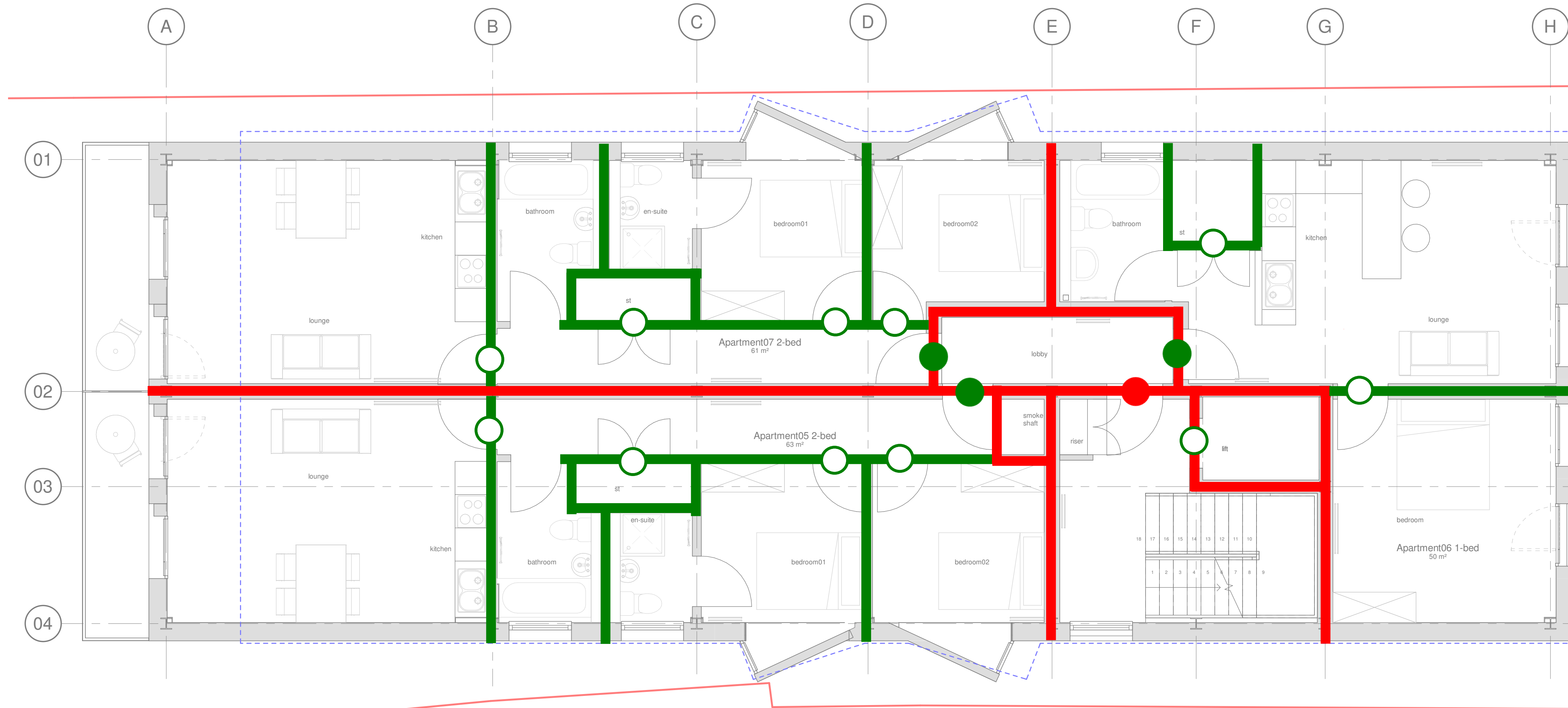
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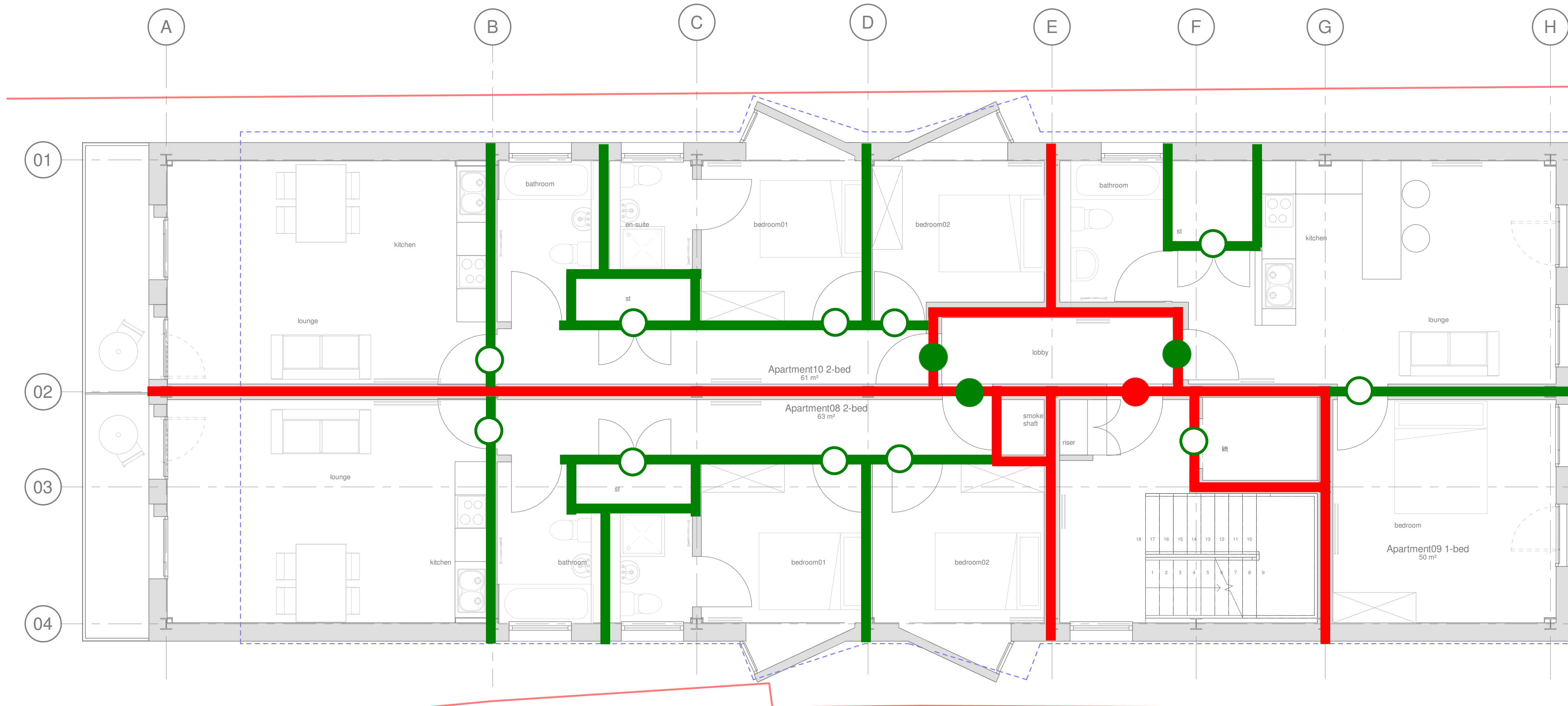
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Fire Doors

- ○ FD60S / FD60
● ○ FD30S / FD30



1 Proposed Second Floor Plan
1:50



2 Proposed Third Floor Plan
1:50

P1 26/10/22 SA SH Initial Issue
No. Date Dwn Chk App Revision or reason for issue

Client
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Project Title
Brunswick Street

Scale / North Point
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1:50

Drawing Title
Proposed Second and Third Floor Plans

Drawing Number
Drawing Status
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Preliminary

Revision
P1

LEGEND

- Site Boundary
- - - Outline Planning Approval

Key - Fire Safety Elements

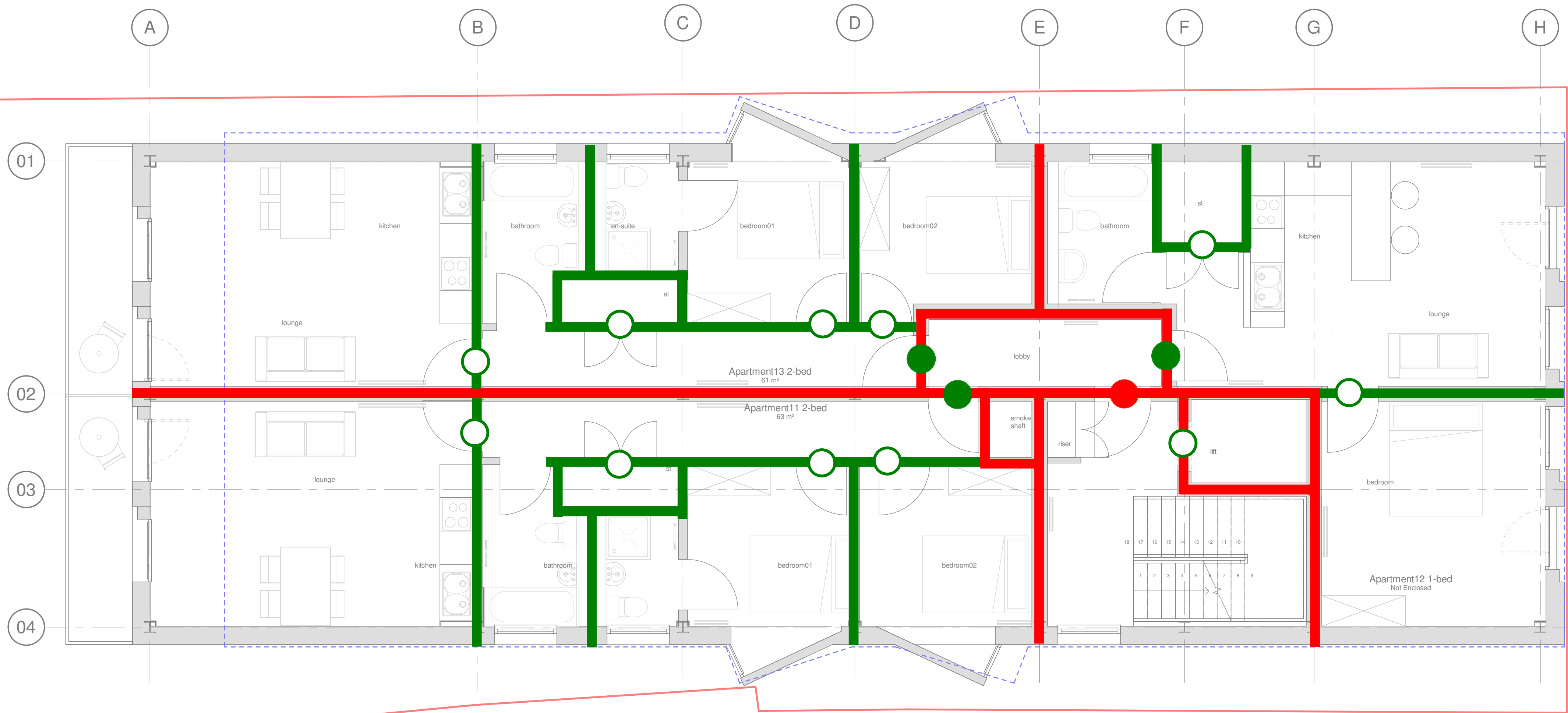
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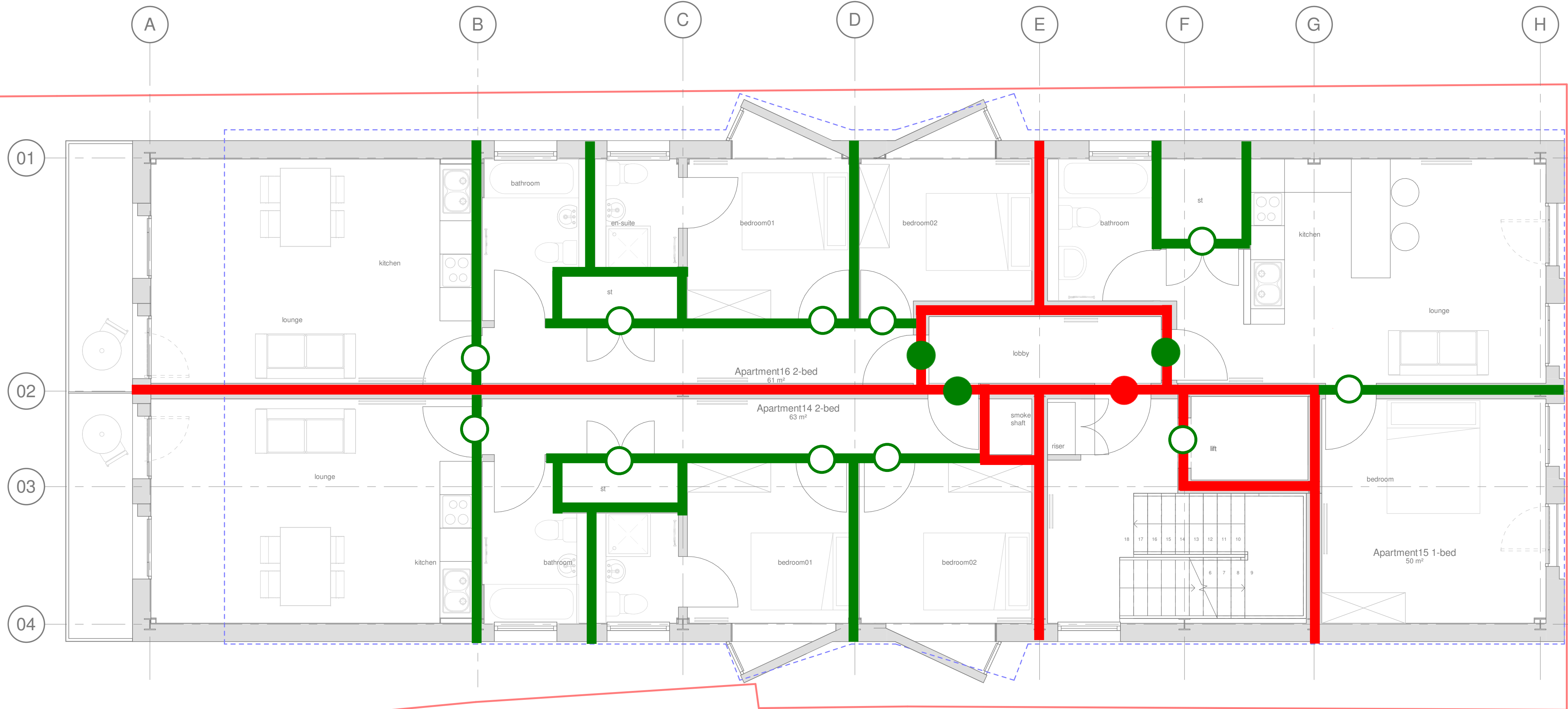
Fire Doors

- ○ FD60S / FD60
● ○ FD30S / FD30

1 Proposed Fourth Floor Plan
1 : 50



2 Proposed Fifth Floor Plan
1 : 50



P1	26/10/22	SA	SH	Initial Issue
No.	Date	Dwn	Chk	App
Revision or reason for issue				

Client
Brunswick Living Ltd

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Project Title
Brunswick Street

Scale / North Point
1 : 50
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1:50

Drawing Title
Proposed Fourth & Fifth Floor Plans

Drawing Number
Drawing Status
A1324(04)003
Preliminary

Revision
P1

LEGEND

— Site Boundary

- - - Outline Planning Approval

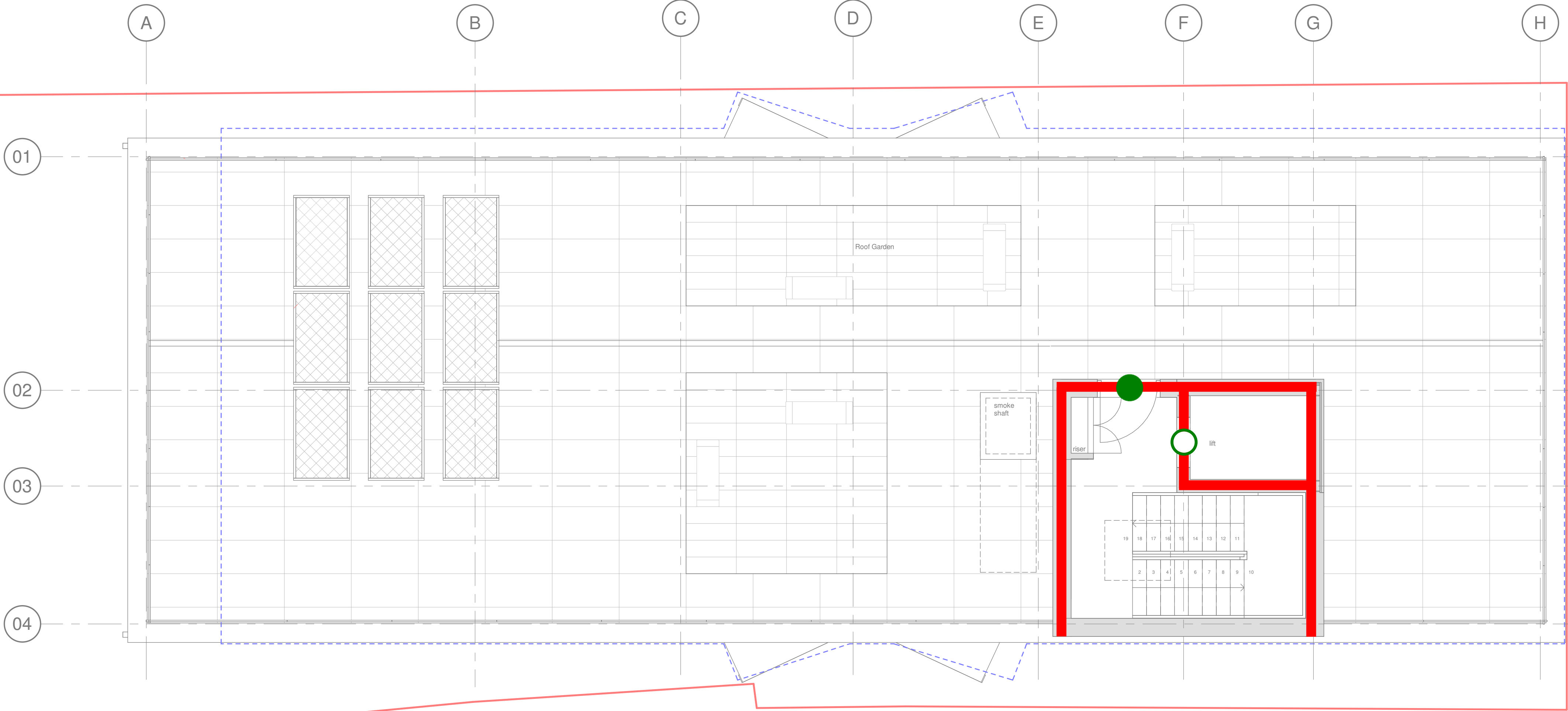
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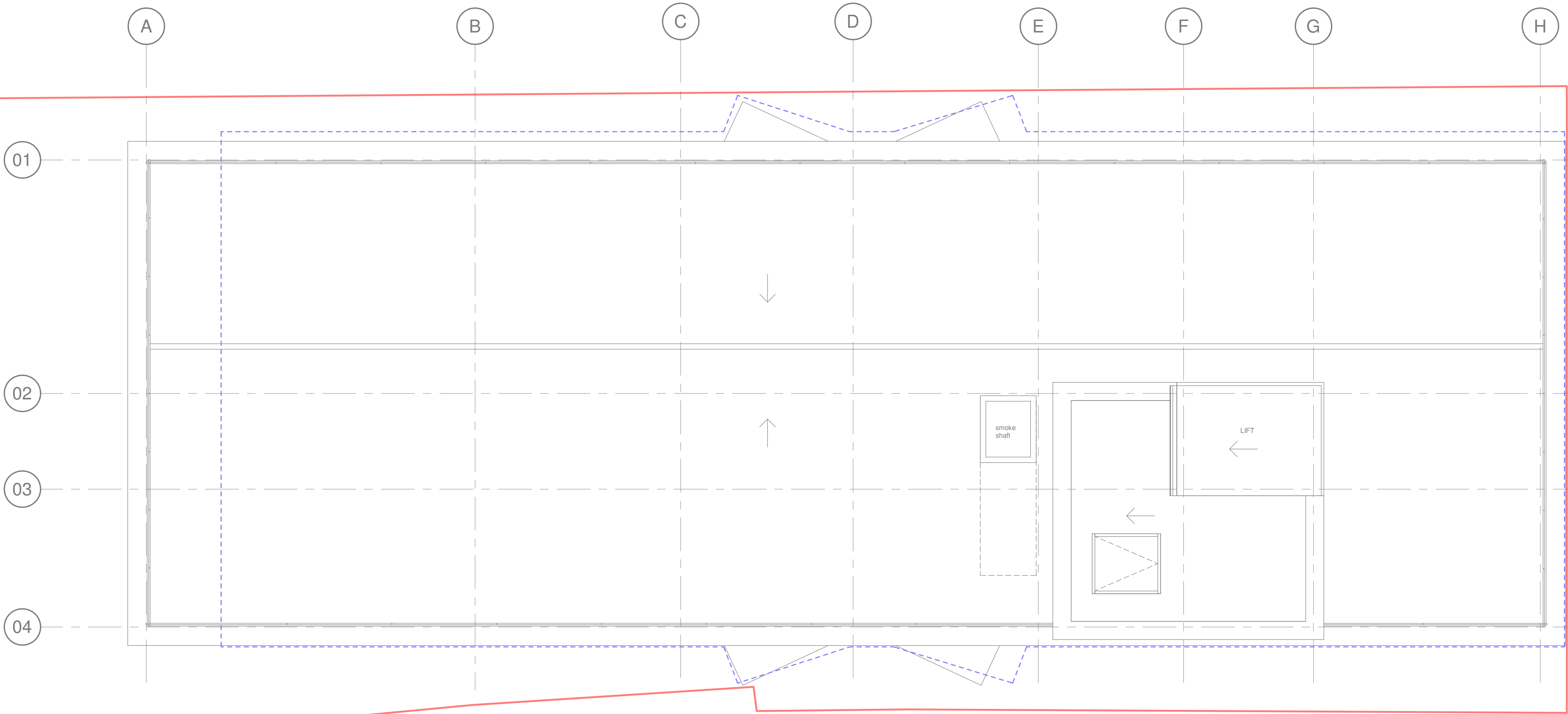
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- 30 minutes

Fire Doors

- FD60S / FD60
- FD30S / FD30



1 Proposed Roof Terrace Plan
1 : 50



2 Proposed Roof Plan
1 : 50