MARSHALL FIRE

Title:	Otterfield Road, West Drayton - Fire Strategy Report
Revision:	00
Date:	02 December 2024
Author:	Tony Hamilton BSc (Hons) MSc C.Build E FCABE

Rev	Description	Author	Approver	Date
00	RIBA Stage 4 initial issue	Tony Hamilton	Robert Clarke	02 December 2024

Contents

1. Executive Summary

The development consists of a 5-storey mixed use building (ground + 4 upper levels) creating 45 dwellings and a ground floor commercial unit. The detached building comprises of two adjoining blocks each served by independent stair shafts, which provide access to communal terraces at the third-floor level. Ancillary accommodation is located at ground level which includes plant, refuse storage, cycle store and electrical/comms.

The proposals outlined in this document are considered to demonstrate a level of fire safety equal to or greater than the general standard implied by compliance with the recommendations in BS 9991:2015 and BS 9999:2017. This level of safety therefore satisfies the functional requirements of Part B of the Building Regulations.

The fire strategy described in this report can be summarised as follows (note this is not an exhaustive list but outlines the main fire safety requirements. Please read the remainder of the report for the full requirements):

- The apartments will operate a typical “stay-put” residential escape strategy.
- Automatic sprinkler protection is to be provided throughout the building.
- All flats are to be used as rented accommodation; therefore, all units should be provided with an automatic fire detection and alarm system rated to a Grade D1, Category LD1 in accordance with BS 5839-6.
- Due to sprinkler and alarm provisions, the limit on internal travel distance in the flats can be increased to 20m. Protected corridors within flats can be omitted.
- Internal communal areas will be provided with automatic smoke detection only (with no sounders or call points). This will be provided solely to activate the smoke ventilation systems within the common parts and designated as a Category L5 system, designed and installed in accordance with BS 5839-1.
- The non-residential areas such as the bike store, bin store and plant rooms will operate under a simultaneous evacuation regime with no automatic fire detection or alarms.
- Evacuation lifts are provided to each stair core as required by the London Plan.
- Uppermost storey is under 18m; therefore, all loadbearing elements of structure should achieve at least 60 minutes structural fire resistance.
- Fire main outlets are to be positioned at every floor level, located within the stair, with hose laying distances limited to 45m from a protected stair, measured to the furthest point.
- Unprotected openings in relation to known boundaries from the main building are satisfactory.
- Fire Brigade fire appliance access is satisfactory with 45m hose criteria being achieved across the development.

The fire strategy for the proposed building complies with BS 9991: 2015, except for the following departures:

- The building management should provide a Personal Emergency Evacuation Plan (PEEP), conveying information, in regard to operation procedures of the evacuation lift in the event of a fire. Item TBC.
- From review of the plans, we would point out that the lobbies serving each stair would be prone to smoke logging during the means of escape phase, which would result in untenable conditions for people aiming to use the evacuation lifts. We suggest that additional lobbies or mechanical extract are considered.
- Nearest hydrant is 100m or more away from the proposed structure. Additional water provision will need to be considered.

The above summary is subject to agreement with the Approving Authority and the Local Fire Brigade.

2. Introduction

2.1 Overview

Marshall Fire has been appointed by Bugler Developments Ltd to provide Fire Safety Design Support for a development at Otterfield Road, West Drayton. Our role is to review and comment on proposed fire safety provisions and provide a RIBA Stage 4 fire strategy report. It is assumed that a Building Control submission has been made (date to be confirmed), therefore building codes applicable at the time of application will be used. Planning statement and earlier stage 4 produced by Robin Frankham applied BS 9991:2015, so this report continues to apply this standard. It should be noted that BS 9991:2024 came into force 30 November 2024, so we are assuming that relevant transitional periods are applicable.

2.2 Purpose of this report

This report notes how the design of the buildings will comply with the functional requirements of the Building Regulations 2010 (as amended). In doing so the guidance contained in BS 9991:2015 has been used, with the main structure of the report following the sections of Part B of the Building Regulations.

The approval status of the fire strategy should be considered as a risk until such time as the appointed Building Control Body has reviewed the proposals and provided their approval in principle. Once approved in principle the building should be constructed in accordance with the contents of this report and any amendments should be reviewed and approved accordingly by the Building Control Body.

The findings of this report are based on the information available at the time of writing this report. Marshall Fire cannot be held responsible for any subsequent changes to the design that we are not made aware of.

2.3 Scheme description.

The development consists of a 5-storey mixed use building (ground + 4 upper levels) creating 45 dwellings and a ground floor commercial unit. The detached building comprises of two adjoining blocks each served by independent stair shafts, which provide access to communal terraces at the third-floor level. Ancillary accommodation is located at ground level which includes plant, refuse storage, cycle store and electrical/comms.

Table 1: Block Heights

Block	*Height of highest occupied storey above the lowest ground level(m)*	*Hight of highest occupied storey in regard to fire brigade access (m)*
Block	13.80m (Ground plus 4 Levels)	13.80m

Figure 1: South elevation.

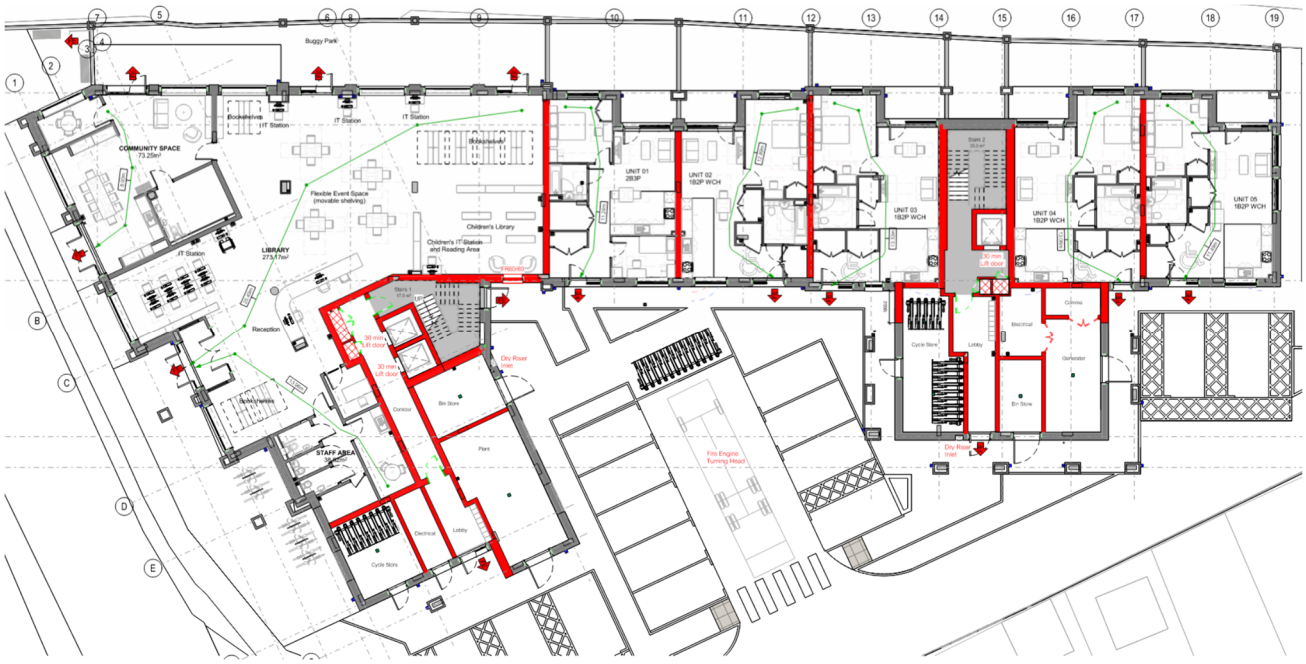

Figure 2: Ground floor layout (Dwg No: M9534-HUN-02-00-DR-A-05-4000).

Figure 3: First floor layout (Dwg No: M9534-HUN-02-01-DR-A-05-4001).

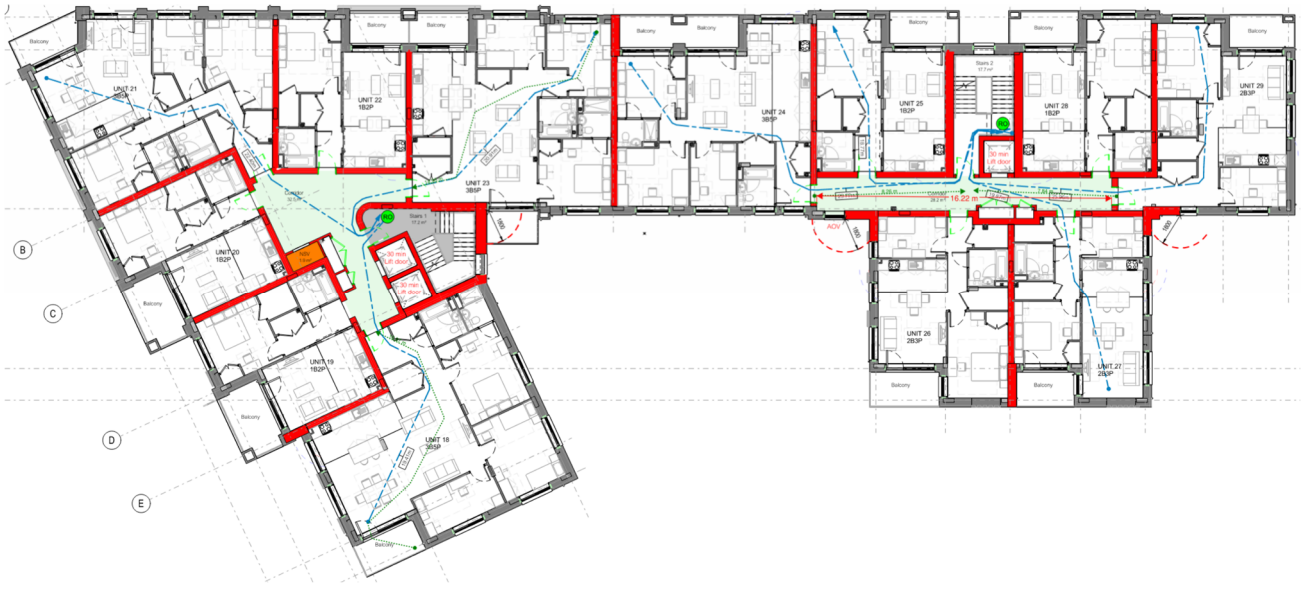

Figure 4: Second floor layout (Dwg No: M9534-HUN-02-02-DR-A-05-4002).

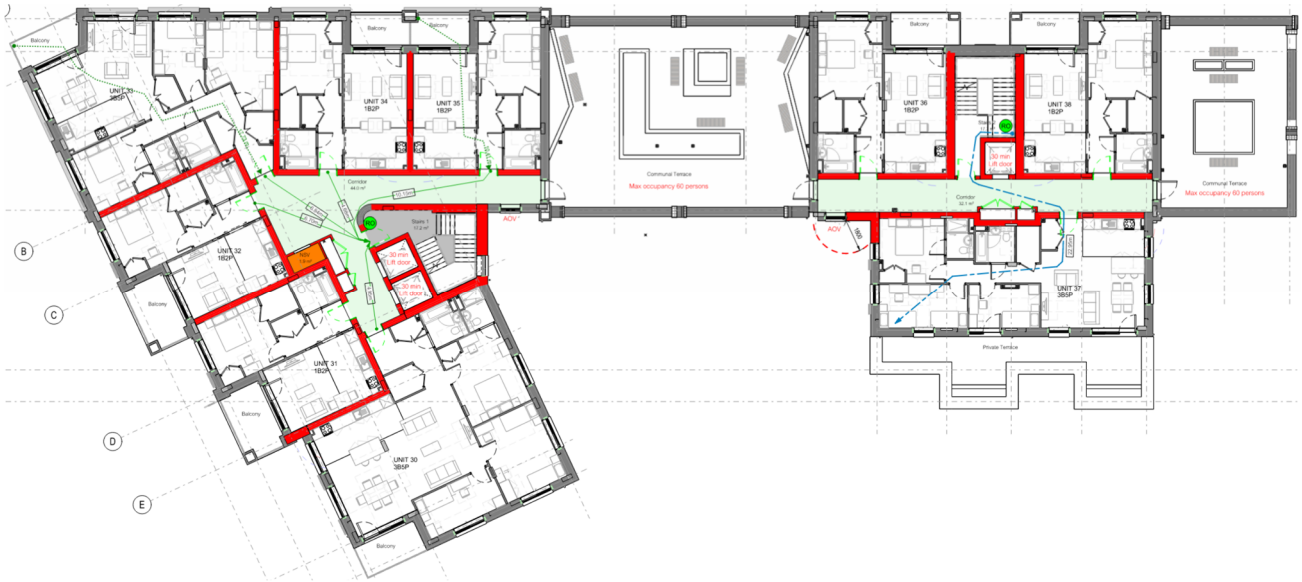

Figure 5: Third floor layout (Dwg No: M9534-HUN-02-03-DR-A-05-4003).

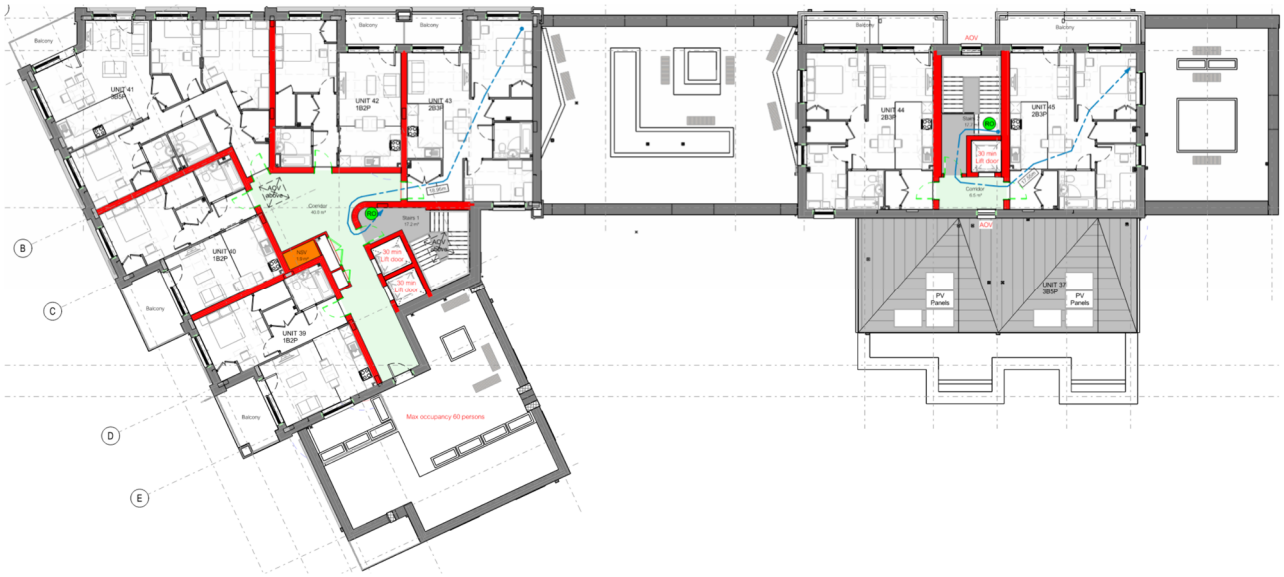

Figure 6: Fourth floor layout (Dwg No: M9534-HUN-02-04-DR-A-05-4004).

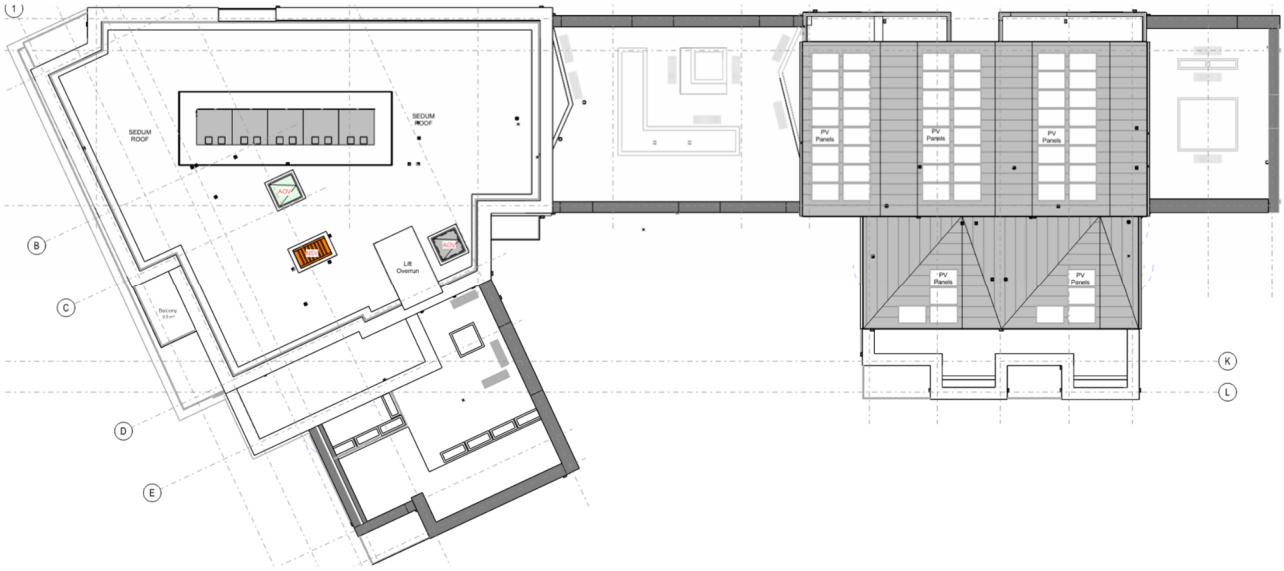

Figure 7: Roof layout (Dwg No: M9534-HUN-02-RF-DR-A-05-4005).

2.4 Report limitations.

This report is intended for use on this project only and the contents and approaches should not be applied to any other building. This report details how the building will be constructed and does not guarantee that the building has been constructed in accordance with this document. Marshall Fire cannot take any responsibility for any shortfalls in the standard of construction on site as this would lie with the installer.

This report is solely for RIBA Stage 4 and any alterations to the design will need to be recorded and updated as part of the Stage 4 Fire Strategy.

The proposals within this report are strategic only and any works listed herein will need to be appropriately designed and installed by others. Where it is considered that the proposals within this report may present a risk under the Construction (Design and Management) Regulations 2015 (CDM) these will be highlighted to the Principal Designer.

This report focuses on Schedule 1, Part B of the Building Regulations. Compliance under the other Parts of the Building Regulations will also need to be achieved through works undertaken by others.

The contents and findings herein are based on the information available at the time of publication and referred to within this document. The contents should be considered an approvals risk until formally approved by the appointed Building Control Body.

By complying with the recommendations in this report it will not ensure that fires will not occur, and ongoing management of the building is essential to ensure the fire risk is controlled as much as possible. This is controlled in part by the risk assessment required under the Regulatory Reform (Fire Safety) Order 2005. This legislation applies to the common areas in the building and requires that a fire risk assessment is undertaken and regularly reviewed (including whenever changes occur that might affect standards of fire safety within the building). The risk assessment will need to be made available to the Fire Service upon inspection of the building and any findings within the risk assessment are required to be addressed by the person responsible for fire safety within the building. If this is not undertaken the Fire Service have powers to serve notices on the building which could ultimately lead to it being shut down or penalties applied.

3. B1 - Means of Warning and Escape

Schedule 1 of the Building Regulations provides the following functional requirement in relation to B1, Means of warning and escape:

"The building shall be designed and constructed so that there are 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 at all material times."

3.1 Means of Warning and Evacuation Regime

3.1.1 Flats

The flats will utilise a typical "stay-put" residential escape strategy. Therefore, in the event of a fire within a flat, only the flat of fire origin would evacuate initially. Occupants of other flats can leave under their own initiative or under the control of the fire service as necessary when attending site.

All flats are to evacuate via the communal corridor and stair shafts.

3.1.2 Commercial and Ancillary Areas

In the event of a fire being detected in the commercial and ancillary areas, it is proposed that an alarm is raised in those areas only, to enable simultaneous evacuation.

3.2 Fire Detection and Alarm Systems

3.2.1 Flats

Initiation of an evacuation from a fire in a flat should be provided by an automatic fire detection and alarm system. As the flats are intended to be used as rented accommodation, each unit will be provided with an individual fire alarm system designed and installed as a Grade D1, Category LD1 in accordance with BS 5839-6. This will include heat detection in kitchens and smoke detection/alarms to all areas of each flat.

Please Note: Grade D1 is a system of one or more mains-powered detectors, each with a tamper-proof standby supply consisting of a battery.

Private balconies serving flats above 4.5m should be provided with a clear view of the internal access room, any cooking facilities should be remote from the balcony and positioned in a location that does not prejudice the escape route through the access room (i.e. 1.8m radiation zone plus 0.9m escape route). A fire detection and fire alarm should be positioned in the access room with an alarm system on the balcony.

3.2.2 Common corridors and stairs

The common access corridors and stairs will be provided with automatic smoke detection only (with no sounders or call points). This will be provided solely to activate the smoke ventilation systems within the common parts and to ground the lift, designated as a Category L5 system, designed and installed in accordance with BS 5839-1:2017.

3.2.3 Ancillary Areas

The non-residential areas such as the bike store, bin store and plant rooms will operate under a simultaneous evacuation regime with no automatic fire detection or alarms.

3.2.4 Community space

BS 9999 has been applied to the community space, with a B2 risk profile, this is due to occupants who are awake and unfamiliar with the building, with a medium evenly distributed fire load. Minimum acceptable detection and alarm system a Category M (manual system) in accordance with BS 5839-1.

3.3 Horizontal Means of Escape

The residential apartment entrance doors and storey exit doors are to achieve a minimum clear width of 850mm to comply with Part B and Part M of the Approved Documents. Due to the low occupancy on each floor level, 850mm is deemed sufficient as it can cater for up to 60 people where a single exit exists. This exceeds the requirements of BS 9991 and is used in order to provide a conservative approach.

All corridors and escape routes should be at least 1,200mm wide.

All means of escape routes leading to a final exit should be kept clear and maintained as a sterile area at all times.

3.3.1 Flats with Internal Hallways

Flats having an entrance hall on the same level as the flat entrance door, should have a maximum travel distance of 9m. However, this may be extended to 20m where sprinkler systems are provided in conjunction with a Category LD1 fire detection and alarm system.

.

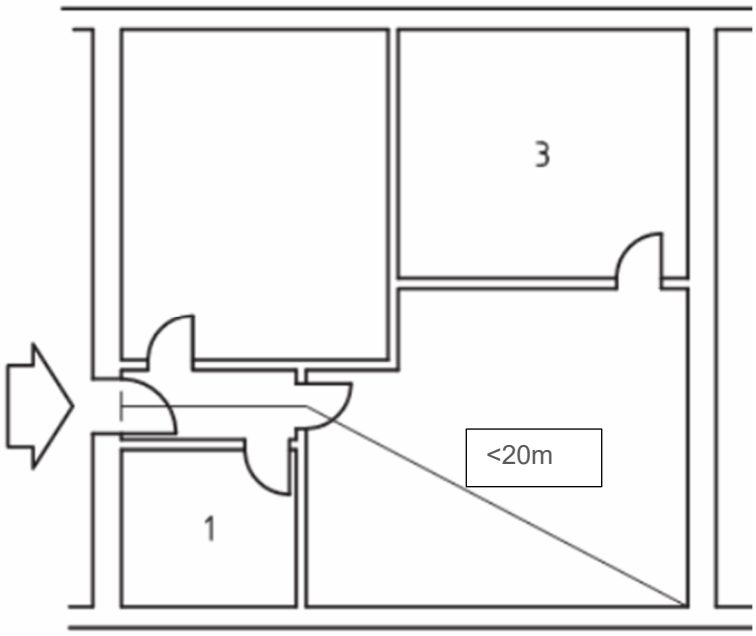

Figure 8: Flat with sperate habitable rooms.

Travel distances are compliant to all flats with corridors

3.3.2 Open plan flats

Open-plan flat layouts should not be provided for accommodation where the occupants are not capable of independent evacuation.

Open-plan flats that do not have protected corridors or hallways but have bedrooms that are inner rooms without having an alternative means of escape, and that are accessed directly from a lounge or similar type accommodation, should be fitted throughout with a Grade D LD1 fire alarm and fire detection system in accordance with BS 5839-6:2013, with a sprinkler system in accordance with item 5.5 of this report.

The following specific recommendations are taken from BS 9991:2024 and would be subject to acceptance by the approving bodies.

- The size of the open plan apartment should not exceed 16m x 12m (192m^2).
- Open-plan apartments should be situated on a single level only.
- The ceilings within the open plan apartment should have a minimum height of 2.25m.
- The kitchen should be enclosed in open plan apartments having an area exceeding 8m x 4m (32m^2).
- Open plan kitchens, where the escape route from a separate habitable room is through a living area containing a kitchen that is not located within a separate enclosure, the following recommendations should be met.

    a) All cooking facilities apparatus, with a fixed connection to the dwelling's electricity or gas supply should be located as far away from the escape route as possible. The edge of the cooking apparatus should not be less than 1.8 m away from an escape door, a door to an adjoining habitable room or means of escape route to an escape door.

b) All egress routes from habitable rooms to the escape door(s) from the dwelling should not be less than 0.9 m in width. No fixed obstructions (such as radiators or cupboards) should be located within the 0.9 m escape route.

c) A gap of 0.3m should be provided between the leading edge of the exit door from the space containing the cooking facilities and the 1.8 m zone from the cooking apparatus, to allow people with mobility impairments to access the door hardware. As illustrated in the Figure below.

The inclusion of thermal cut-off devices for cooking apparatus (e.g. as specified in BS EN 50615) can reduce the risk of ignition and is considered as good practice for open plan flats.

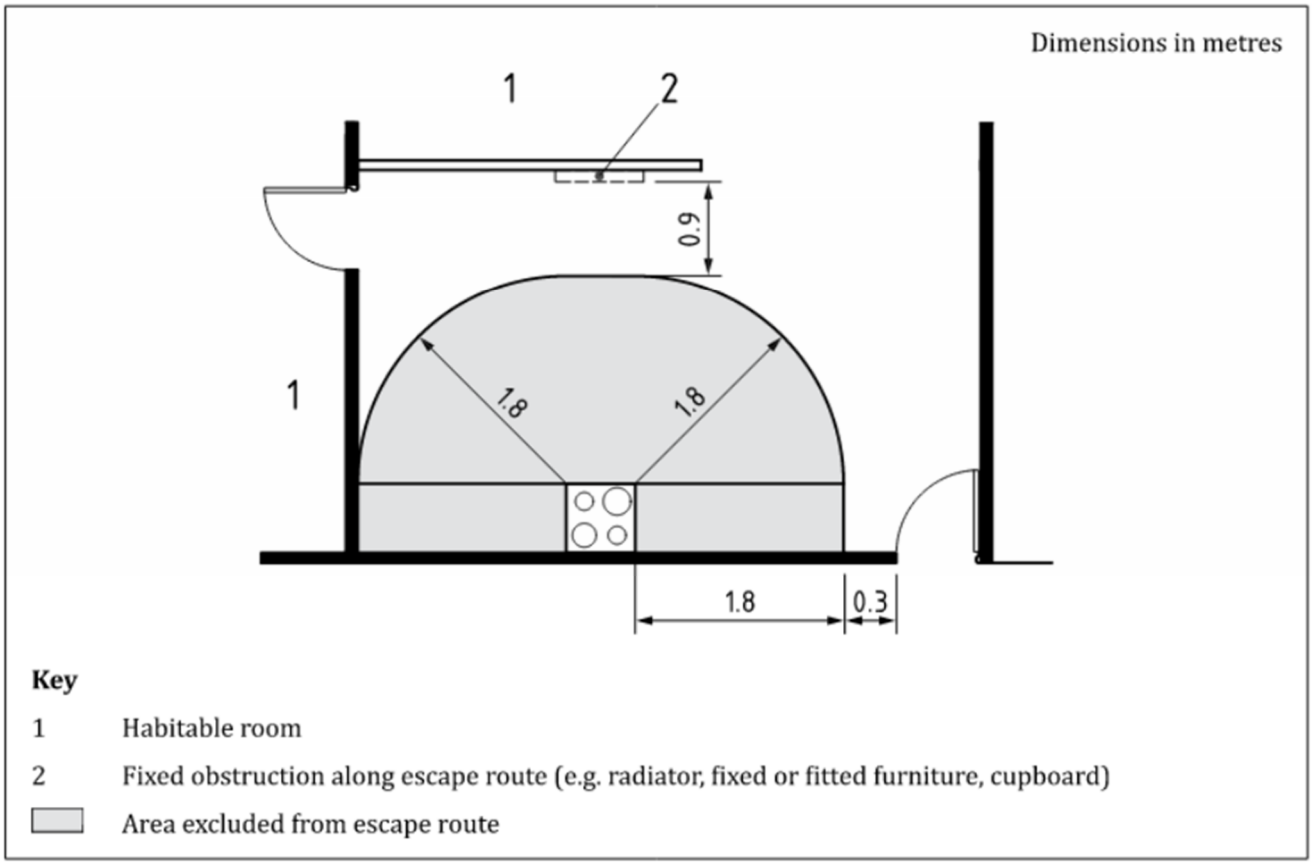

Figure 9: Minimum separation distances from hob for escape routes in open plan kitchens.

From review of the plans, the open plan travel distances and hob locations appear to satisfactory.

A Computational Fluid Dynamics (CFD) assessment and radiation calculations may be required to demonstrate safe egress. This will be determined by the Approving Authority.

3.3.3 Electrical wheelchair and mobility storage.

Electric charging points should not be located in common access corridors or protected stairways.

Where an area has been designated for storage of electric wheelchairs and mobility scooters within the building, this area should be separated from the means of escape by fire-resisting construction of not less than 30 min where the building is provided with sprinkler protection.

3.3.4 Flats with Private Balconies

Any apartment with a private balcony of more than 4.5m above the ground level are to meet the following recommendations:

- The escape route from the balcony should not pass through more than one access room.
- The interior of the access room should be clearly visible from all parts of the balcony. Alternatively, detectors can be provided to the balcony access room, giving warning that is audible on the balcony with the external doors in the closed position.

- Any cooking risk in the access room should be remote to promote suitable escape through the access room as detailed in the open plan flat criteria.
- Where the travel distance from the balcony access door to the furthest point on the balcony exceeds 7.5m it should be provided with an alternative escape route without going via the same access room or the access room should be provided with automatic smoke detection.

3.3.5 Residential Common Corridors

Maximum single travel distances are provided in Table 2 below:

Table 2: Travel Distance for residential accommodation.

Building	*Maximum permitted travel distance (m)*	
	One-way travel	*Two-way travel*
Common ventilated lobbies / corridors (max 15 m if sprinklers are fitted)	7.5m	30
Flat - Internal maximum travel distance	20.0m	n/a

From review of the received plans, the travel distances appear satisfactory.

3.3.6 Ancillary Areas

Recommended travel distance limits for ancillary accommodation are provided in Table 14 in BS 9991, which is reproduced below.

Table 3: Travel Distance for Ancillary Accommodation (Residential)

Location	*Maximum permitted travel distance (m)*	
	One-way travel	*Two-way travel*
Cycle Store	9	45
Transformer, battery and switchgear rooms	9	18
Boiler rooms	9	18
Refuse store	9	18
Communal lounge and common amenity areas	18	45
External rooftop plant	60	200

From review of the received plans, the travel distances are deemed satisfactory.

3.3.7 Community centre

BS 9999, B2 risk profile permits a minimum direct travel distance of 20m and alternative (two-way) travel of 50m. Please note that these figures are reduced by a third when the internal layout is not known.

Design occupancy is derived from BS 9999:2008, which provides a floor space factor for library reading area of 5.0 m^2 per person, the entire floor area is 389 m^2 / 5 m^2 per person, gives a design occupancy of 78 people, all doors on escape routes should open in the direction of escape.

A minimum of two final exits are required as occupancy exceeds 60 people, each final exit should provide an effective clear door width of not less than 850 mm, where unassisted wheelchair access is necessary. An effective clear width of 850 mm has the capacity to convey a maximum of 122 people (based on 500 / 4.1 mm per person using a B2 risk profile).

From review of the plans, travel distances within the ground floor community centre appear satisfactory.

3.4 Vertical Means of Escape

3.4.1 Residential

The vertical means of escape is considered acceptable given the means of escape policy from the apartments is stay-put. This will result in minimal occupants escaping in the event of a fire within an apartment. This is a standard approach and deemed acceptable given the high level of compartmentation within the building to protect the occupants from fire.

The minimum unobstructed width of common stairs for escape provisions should not be less than 750mm between strings/walls in order to achieve compliance with BS9991. However, Part M should be considered which confirms that principle communal stairs serving M4(3) should meet the provisions of Part K for a general access stair.

A stair width of 1.2 m width stair has been specified to Stairs 1 and 2 which are deemed satisfactory when assessed using BS 9991 fire safety guidance. Handrails are permitted to protrude up to 100mm on either side of the stair.

It is noted that each stair core also serves two external terraces, each individual terrace has a maximum occupancy of 60 people (2 x 60 = 120 people), assuming each terrace simultaneously evacuates into the stair, by using a Risk profile of C2 from BS 9999, this gives a figure of 2.90 mm per person for four floors, therefore we can ascertain that 414 people (1200 / 2.90) could safely descend to ground level. Stair width is considered satisfactory.

3.5 Persons of Reduced Mobility (PRM) evacuation

An evacuation lift will be provided per lift core, to meet the recommendations of the London Plan Policy D5. An evacuation lift, where provided should always be for evacuation purposes. It should be used routinely as a passenger lift. It should be designed and installed in accordance with the relevant provisions in BS EN 81-20 and BS EN 81-70. Ongoing maintenance and management of the lift will be in line with BS EN 81-20, BS EN 81-76, and any other applicable codes of practice and manufacturer's recommendations.

Minimum lift car size should be as a Type 2 in accordance with BS EN 81-70:2021. Minimum dimensions are 1100mm width x 1400mm depth (630kg), design to accommodate one wheelchair user and an accompanying person.

The behaviour of the lift upon the receipt of an evacuation signal, will prompt the lift to initiate automatic return of the lift to the designated floor and will hold the lift "service suspended" with doors open/closed at this level in accordance with BS EN 81-73, in order to allow passengers to leave the car and then allow the responsible person to switch the lift to evacuation mode in accordance with BS EN 81-76.

An evacuation lift shall have an intercom system for interactive two-way speech communication, whilst the lift is in evacuation mode. This shall allow communication between the evacuation lift car; the evacuation exit door and rescue panel. The main evacuation exit floor is at the same level as the fire brigade access point, the communication system can be as the communication system described in 5.12 of the BS EN 81-72 (firefighting lifts).

The building management should provide a Personal Emergency Evacuation Plan (PEEP), conveying information, in regard to operation procedures of the evacuation lift in the event of a fire. Item TBC.

3.6 Provision of Refuges

Under the current guidance within a residential apartment building, it is not required to allocate a defined refuge point or provide two-way communication devices as there is no onsite management and the risk of fire spread is low due to the high-degree of compartmentation.

3.7 Emergency lighting

Emergency lighting is to be provided in accordance with BS 5266-1:2016, design, installed and tested by a competent person. All escape routes should have adequate artificial lighting, capable of illuminating the escape routes to the following areas:

Table 4: Ancillary accommodation structural fire resistance.

Occupancy characteristic	Areas requiring emergency escape lighting
	• Ancillary accommodation normally accessible to the occupants. • All common escape routes. • Common stairs.