Barbican Estate

Barbican Residential Blocks

Mountjoy House – Fire Strategy Report

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Job number 279095-01

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Executive Summary

Arup have been appointed by the Barbican Estate (BE) to undertake a fire safety review of Mountjoy House, an existing building which is part of the Barbican Residential Development, located in the City of London. The purpose of the review is to determine the existing intent of the fire safety design and to document this intent in a fire strategy document (this report). The purpose of this report is as follows:

- To provide a single document that describes the fire safety precautions for Mountjoy House, including the fire safety principles and fire safety measures within the existing building;
- To compare the existing fire safety precautions with current standards including BS 9991 and BS 9999, and where applicable the latest update of the Approved Document B Volume 1.
- To consider the recommended improvements to existing residential buildings in Phase 1 of the Grenfell Tower Inquiry Report by Sir Martin Moore-Bick;
- Where there are gaps in the existing fire safety precautions against the current standards and if those gaps present a risk to the life safety of the occupants, recommend fire safety improvements to remediate the risk on an as nearly as reasonably practicable basis; and
- Where the gaps in the existing fire safety precautions present a low/negligible risk to life safety, the existing precautions are proposed to be retained (on the assumptions that they are maintained in good operational order).

BE as the Responsible Persons under the Regulatory Reform (Fire Safety) Order 2005 (RR(FS)O) has the duty to undertake remediation woks, as far as is reasonably practicable, to ensure the safety of the building and the occupants.

Mountjoy House was constructed in 1971 and contains 64 flats including six penthouses at the top of the building. The building consists of 7 residential floors above Podium level with a building height of 27m (assuming floor to floor height of 2.7 m) measured from the L03 floor level (firefighting access level at grade) to the floor level of the topmost occupied storey L7.

An open Podium level and L03 serves as the final discharge locations for the escape/firefighting stairs. The L03 is also the main firefighting access level to enter Mountjoy House. The building does not have any accommodation from L03 up to and including the Podium level.

A balcony runs around the perimeter of the building from L1 to L7 and connects to Thomas More House.

Existing Fire Safety Precautions – Overview

The key elements of the existing fire safety precautions for Mountjoy House can be summarised as follows (refer to Table 1 for Arup's recommendations):

- **Stay put strategy:** The building adopts a stay put evacuation strategy. In the event of a fire, only the occupants in the flat of fire origin evacuate the building. The rest of the building occupants will remain in place.
- **Available stairs**: There are two stairs (Staircase 24 and 26) that can be used for both means of escape for the occupants and means of access for firefighters. It is a priority to protect the stairs from being affected by a fire in the building. Staircase 24 which is part of Thomas More House serves as a means of escape for Mountjoy House as the two buildings are connected on every residential level. Note that Staircase 25 is not enclosed and not suitable as a protected escape route.
- **Plant/storeroom in stairs:** There is a storeroom within Staircase 25 (common stair) and a plant room within Staircase 26 (firefighting stair) on every level. The rooms are separated from the stairs by masonry/concrete walls but it is not possible to establish the fire rating of the door. This is a risk as a fire within these rooms may affect the use of Staircase 26 for means of escape, or cause smoke to spread to all levels via Staircase 25.
- **Flats on L1 – L7:** Each flat has alternative means of egress via the balcony or the flat main entrance to reach either one of the two firefighting stairs. However, for wheelchair-bound residents (Persons with Reduced Mobility – PRM), escape is only possible via the flat entrance and the travel distance to the entrance is greater than the limit within current guidance. This presents a risk to the life safety of the PRM occupant in the fire incident flat.
- **Duplexes on L6-7:** The duplex flats (603 – 608) extend up to L7 and are provided with alternative means of egress via the balcony on both L6 and L7 as well as the flat main entrance on L6.
- **PRM evacuation (in common area)**: For PRMs needing assistance with evacuation, there is no refuge area nor communication system to call for assistance. The procedure for evacuation of PRMs is also unclear. This presents a risk to the life safety of the all the PRM occupants in the building.
- **Exit signage and emergency lighting**: There are existing provisions however, the locations and types of existing exit signage is not compliant with the current standards. There are also locations with missing signage – this will need to be surveyed and amended where necessary. It is currently unclear whether emergency lighting is provided in the building. This is to be confirmed by BE.
- **Fire detection and alarm system**: Based on the site visit and the existing fire risk assessment, there is no detection or alarm system within the flats nor in the common areas of the building. Considering the extended travel distances for occupants (such as PRM occupants) who can only use the flat entrance as their escape route, the lack of early detection and warning in the flat presents a life safety risk to the occupant in the fire incident flat.
- **Structural fire protection**: Assuming all structural elements are reinforced concrete, the existing protection nominally meets the required fire rating in the current standard, based on a desktop review.
- **Flat entrance, refuse storage/post box and stair fire doors:** Assuming these are the same as the tested fire door in Thomas More House, they do not achieve

the required fire rating. The failure to maintain fire separation between the flat, stairs and plant rooms may compromise the stay-put strategy and the use of the stair for means of escape and firefighting. These issues present a life safety risk to occupants in the building.

- **Fire compartmentation**: Each flat, services riser, stair, lift shaft and storage room should form a separate fire compartment, to support the stay-put strategy. However, it has been confirmed by BE during the site visit that there is breach of compartmentation between the corner flats (X01, X02, X09 and X10 of every level) at the kitchen risers that span the entire building height. There is a risk of fire spread between flats on multiple floors. As the flat entrance doors do not achieve the required fire rating, there is a risk of fire spreading to the common corridor at every level affecting the means of escape for the entire building. This presents a life safety risk to occupants in the building. A sitewide survey to inspect any breaches in compartmentation is recommended. In addition, sprinkler provision is recommended to mitigate the risk of fire spread.
- **Fire suppression system**: The building is not sprinkler protected. Considering the breach of compartmentation sprinkler provision is recommended to mitigate the risk of fire spread.
- **Shunt duct arrangement (kitchen extract and toilet extract risers):** The use of a shunt duct for the toilet extract riser is considered an acceptable solution. However, the use of shunt duct for kitchen extract presents a risk of fire/smoke spread between the flats, breaching compartmentation (see above) and compromise the stay-put strategy. This presents a life safety risk to occupants in the building.
- **Separation from neighbouring buildings:** There is adequate separation distance to adjacent properties to minimise the risk of external fire spread between buildings.
- **Façade system:** There appears to be no combustible materials in the façade system, this is to be confirmed by BE.
- **Firefighting lift:** The specification of existing firemen's lifts is to be confirmed by BE.
- **Firefighting lobby ventilation:** the lobby to Staircase 26 opens at every level into a vent shaft, via a window. Some of these are in the open position and forms a route for smoke to spread between levels, affecting the use of Staircase 26 as means of escape. This presents a life safety risk to occupants in the building.
- **Dry riser main:** A dry riser outlet is located within each level of the firefighting stair or the firefighting lobby and all areas appear accessible within 45 m hose length from the outlets.

Recommendation for remedial actions

Recommendations for remedial actions are provided throughout the report (in green boxes) to mitigate the identified life safety risks due to the gaps in the existing fire safety precautions. A summary of the known gaps and the associated recommendations is provided in Table 1. The table will be reviewed and revised accordingly when further information becomes available e.g. emergency lighting system, lift specification.

These recommendations are provided prior to any considerations of existing site constraints and impact on the heritage aspects of the building. These may affect the feasibility of the recommended solutions, resulting in different options being explored. These activities should form one of the next steps in the project.

Interim measures

The recommendations may take some time to be fully implemented due to constraints on site. There are existing features in Mountjoy House that present unacceptable risks to the life safety of the building occupants. Some immediate actions are recommended to address these risks.

These immediate actions are temporary measures to address the risks, while permanent solutions are developed and implemented. These interim measures are not meant to replace the need for permanent solutions. The recommended interim measures are:

- BE to prepare Personal Emergency Evacuation Plan (PEEP) for residents with restricted mobility or on wheelchair as they are not able to evacuate via the balconies or down the stairs, so that the evacuation arrangement in the event of a fire is clear to each of them;
- BE to ensure balconies are kept clear of any stored goods to provide safe egress route for occupants.
- BE to keep all the windows in the SC26 protected lobby shut on every floor to reduce the risk of smoke entering the lobby and spread to other floors.

Next Steps

In addition to implementing the interim measures, it is recommended for BE to review the feasibility for implementation of the permanent remedial actions.

Once this has been completed, it is recommended for the CoL District Surveyor and the London Fire Brigade to be consulted, to seek their early agreement in principle.

Table 1: Identified gaps and recommended actions

Identified Gaps	Recommended Action	Benefits of the recommendation	Implementation constraints as defined by BE
Extended travel distance (for single direction of escape)	• Provide early warning to occupants within the flat by installing a minimum Grade D1 Category LD2 within the flats; • Provide detection and alarm system in common areas of the building; • Provide fire action notices throughout the common areas of the building for residents to be aware of the evacuation procedure.	• Early warning through automatic detection and alarm system will serve to alert occupants of a fire in their flat during the early stages of the fire and initiate evacuation before conditions in the flat becomes untenable. • Occupants will be made aware of the escape routes and procedures in the event of a fire, minimising time to evacuate the building.	
Evacuation of PRMs	• Preparation of Personal Emergency Evacuation Plan (PEEP) for PRMs. • As part of the PEEP, it may be necessary to provide refuge area and Emergency Voice Communication (EVC) system to Staircase 24 and Staircase 26 (firefighting stairs with firemen's lift).	• PRMs are well informed about their evacuation arrangement in the event of a fire. • Refuge area will create a safe refuge for PRMs to wait and to call for assistance.	
Sprinkler protection	For a building that adopts a stay-put strategy, it is recommended to maintain the fire compartmentation across the building. It has been confirmed by BE during the site visit that there are kitchen risers in the corner flats (X01, X02, X09 and X10) which span the entire building height. There are extended travel distances within the flats for PRM occupants in the building. As such this presents a risk to the lift safety of occupants and the installation of a sprinkler system in the building is recommended.	Provision of sprinklers will enhance the overall fire safety of the building, limiting the fire growth and enhance both life safety and property protection	
Exit signage	A survey is recommended to inspect and replace existing exit signage to comply with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report	Correct signage will serve to identify the stair discharge level and the route out of the building.	
Emergency lighting	A survey is recommended to inspect and replace existing emergency lighting to comply with BS 5266-1.	Emergency lighting will help allow occupants to evacuate safely, especially when traversing up/down the stairs.	
Compartmentation – corner flats with risers in the kitchen running through the building height.	BE confirmed there are currently risers in the kitchens of the corner flats that are not separated between the floors. It is unknown whether the riser is separated from the kitchen of every flat. It is recommended that BE commission a sitewide survey to inspect any breaches in compartmentation associated with these risers, and to undertake works to maintain the compartmentation in accordance with BS 9991.	This will help maintain the stay-put strategy and minimise the risk of fire spreading between the flats.	
Fire doors at flat entrance, firefighting stairs, plant/store rooms and storage/post box.	• It is recommended to replace all the fire doors to the stair, lobby, flat entrances, storeroom and the refuse storage/post box. • Doors to risers/plantrooms within the stair enclosures are to be inspected and repaired/replaced to maintain fire separation from the stair. • Keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.	• This will serve to maintain the availability of the stair for means of escape and firefighting activities. • Maintaining the stay put evacuation regime.	
Kitchen extract shunt duct system	Replace the existing extract hoods with recirculation type hoods, and implement one of the followings:	• The provision of fire and smoke dampers or blocking off the shunt ducts will serve to significantly reduce the risk of fire spread between compartments through the kitchen shunt ducts. • Maintaining the stay-put evacuation regime.	

Identified Gaps	Recommended Action	Benefits of the recommendation	Implementation constraints as defined by BE
	• Smoke and fire damper at the shunt duct riser activated by the fire alarm/detectors within the flat (this maintains the use of the riser for normal ventilation of the flat); or • To block off the shunt ducts and provide a fan on the external wall to draw out air from the flat into the balconies; or • Maintain the existing extract hoods and shunt duct arrangement by increasing the reliability of the main extract fan. This will require an additional duty standby fan (the fans to be rated at 400 ˚C for 90 minutes in accordance with BS EN 13501-4), with secondary power supply. The fans need to be adequately maintained to keep the main riser under negative pressure;	• The option of increasing the reliability of the main extract fan allows the day-to-day ventilation within the flat can be maintained.	

1 Introduction

1.1 Appointment and scope

Arup have been appointed by Barbican Estate (herein referred to as BE) to provide a fire engineering review of Mountjoy House, an existing building which is part of the Barbican Residential Development, located in the City of London.

This report provides a fire strategy for the existing building and captures the current fire safety measures and strategy as Arup understand it from recent reviews of documents, discussions with the BE management team and through a non-intrusive site visit undertaken on 07/03/2022.

Although Mountjoy House is an existing building, there is limited documentation available to explain the current fire safety information for the building. There is currently no fire strategy report for the building nor documentation which provides a cohesive record of the fire safety measures in the building. As such this fire strategy has been developed to act as a cohesive and detailed record of the current fire safety provisions (and can act as a benchmark for future building work).

1.2 Purpose of this report

Having a single documented fire safety strategy for Mountjoy House provides the required information to understand the fire safety principles and fire safety measures within the existing building.

It should also be noted that this fire strategy covers the residential floors, Level 1 to Level 7 of Mountjoy House. This report does not cover the services subway (L04).

This report will assist the BE when they wish to undertake future improvement and alterations to the building. It will also act as a benchmark in recording the fire safety strategy and enables anyone undertaking works on the building to understand what implications these may have in terms of fire safety.

Furthermore, this report documents any potential shortfalls in fire safety measures and enables BE to address these where necessary and document them in their Fire Risk Assessment (FRA) for the building where required.

The purpose of the report is as follows:

- Identify any inspections/tests that should be undertaken to create evidence of building operation where that is missing;
- Identify potential remediation measures, where current fire safety systems do not provide adequate fire safety for occupants;
- Provide a retrospective fire strategy report and associated fire safety drawings.

These goals are identified to be provided for four different typologies of building to give an overall fire strategy for all 22 buildings within the Barbican Residential Development.

Areas that require more information/ confirmation is required from BE are identified by brown text throughout this report.

1.3 Barbican residential Development

The buildings in the Barbican Residential Development were constructed from 1960 to 1982. There are 22 buildings in total as shown in Figure 1. There is a distinctive design feature across the Barbican Residential Development, which is the provision of a podium. It was constructed with an intention of providing a liveable urban environment for pedestrians and acts as ground level for the buildings[1].

In terms of fire safety design, the podium level throughout the Barbican Residential Development is considered as an access level for all of the buildings. Access level is defined in BS 9991 as ‘level used for normal access to the building that either incorporates, or leads directly to, a place of ultimate safety’. Therefore, the podium is considered a place of ultimate safety, serving as the exit discharge level for the stairs.

Figure 1: Overview of the Barbican Residential Development (Image courtesy Barbican Living)

Arup in conjunction with BE have identified four different block typologies which are common across the residential development. The typologies are as follows:

- High rise tower – Cromwell Tower;
- Terrace block type 1 – Andrewes House;
- Terrace block type 2 – Ben Jonson House;
- Terrace block type 3 – Mountjoy House.

[1] Barbican Estate, *Barbican Living, https://www.barbicanliving.co.uk/, (accessed 16 March 2021)*

Flats across Mountjoy House are generally privately owned by leaseholders with a small portion of the flats being owned by the BE and let out to tenants.

2 Fire Safety Goals

2.1 Statutory and policy goals

The legislation, regulations and relevant standards contained within the following sub-sections have been referenced as part of Arup's review of the existing building. These are the requirements that are applicable to the existing building.

2.1.1 Regulatory Reform (Fire Safety) Order 205

The Regulatory Reform (Fire Safety) Order 2005 (RR(FS)O) places a general duty of fire safety care on employers, occupiers and owners of almost all premises and requires them to take such fire precautions as may be reasonably required to ensure that premises are safe for the occupants and those in the immediate vicinity.

The responsible person has a duty to carry out a fire risk assessment which must focus on the safety in case of fire of all 'relevant persons'. The risk assessment should pay particular attention to those at special risk, such as the disabled and those with special needs, and must include consideration of any dangerous substance likely to be on the premises.

A fire risk assessment (FRA) was undertaken in January 2018 by Frankham Risk Management Services. A number of risks have been identified and need to be resolved in order to comply with RR(FS)O. Reference to these items has been included in the relevant sections of the fire strategy.

2.1.2 BS 9991:2015

To benchmark compliance with the RR(FS)O, the existing building has been assessed against the guidance in BS 9991:2015 - Fire safety in the design management and use of residential buildings – Code of practice (see Section 2.1.2). This is a guidance document which provides a means of demonstrating compliance with the life safety requirements of Part B of the Building Regulations 2010 (as amended) (herein referred to as "BS 9991"). This is used as the benchmark in developing the fire strategy for the building.

BS 9999 and ADB Volume 1 will also be referenced where applicable.

2.1.3 Barbican Estate fire safety goals

Through meetings with the BE, Arup has identified that the main objective of this fire safety review is the life safety of the building occupants. Arup is not aware of any additional requirements for property protection, either from BE or their insurer. This is to be confirmed by BE.

2.2 Proposed methodology

The existing fire safety precautions of Mountjoy House are compared with the current recommendations in BS 9991. Where the provisions and recommendations align, no

further action is required, and the existing provisions are recorded in this report to form the building fire strategy.

Where the provisions are not deemed to comply with the recommendations of BS 9991, it has been qualitatively assessed to identify the life safety risks to the building occupants due to those non-compliances or gaps in the fire safety precautions. The outcomes of the assessment will result in one of the following:

1. Where considered acceptable to remain as existing, recommend retaining the current provisions; or
2. Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate.

It should be noted that as the building is existing, it is not feasible for all provisions to be in line with current fire safety standards. Where appropriate, the relevant guidance documents at the time of construction of the building have also been used as reference.

2.3 Referenced documentation

The following information has been used to inform the Mountjoy House fire strategy and fire safety systems provisions:

- Meetings between Arup Fire and BE between February 2022 to March 2022;
- Barbican Living website;
- Various email correspondence between Arup and BE between February 2022 to March 2022;
- Referenced documents and drawings listed in Table 2;
- Visual non-intrusive site visit undertaken on 07/03/2022;

Table 2: Referenced documents and drawings

Document title	Produced by	Date	Revision
Mountjoy House External Fire Risk Assessment	Frankham Risk Management Services	Jan 2018	-
CP 114:1957 *British Code of Practice, The Structural Use of Reinforced Concrete in Buildings*	British Standards Institution	1957	-
CP 3: 1962 *British Code of Practice Chapter IV Precautions against fire Part 1. Fire precautions in flats and maisonettes over 80 ft in height*	British Standards Institution	1962	-
BS EN 1992-1-2-2004: Eurocode 2 *Design of Concrete Structure Part 1-2: General rules – Structural fire design*	British Standards Institution	2004	-
Abridged results from the test of 86 Thomas More House (double lead door and single leaf door)	CTO S.A.	Jan 2020	-
Drawing no 22 5588 Corner blocks X & XI Level 120 23 layout	Ove Arup & Partners	Jan 1964	Rev B
Drawing no. 22 509 Block X Layout plan at 120 40	Ove Arup & Partners	May 1963	Rev B
Drawing no. 22 520 Block X Crosswalls 1210 N 1245 N 1315 N	Ove Arup & Partners	April 1964	Rev A

2.4 Limitations and assumptions

2.4.1 Limitations of report

This document summarises the findings of our work carried out to date. It does not attempt to quantify actual elements of fire performance, such as fire resistance periods, across the building in its existing state as physical intrusive works would be required to do this. It is Arup's understanding that intrusive investigations into the building are not planned to be carried out.

There are no architectural layouts of the building. Structural plans of Mountjoy House have been obtained through Arup's archive and used to better understand the building layout. However, this is not a complete set covering the building and is limited to some levels of the building only. The fire strategy drawings provided as part of this report are based on those published on the Barbican Living website. In using these documents, it is assumed that the layouts remain representative of the current arrangement in Mountjoy House.

BE should undertake the necessary tests/inspections to confirm that the fire safety systems will operate as intended in a fire event.

The information documented in this fire strategy is limited to the amount of information covered through the following:

- Desktop review;
- Consultation with the BE;
- Visual non-intrusive site visit undertaken on 07/03/2022, where the areas visited included outside and inside of Mountjoy House
  - Car park level L03 (fire service access level);
  - Podium level;
  - Common area (lift lobby, stairs) on some of the Residential levels (L1 – L7);
  - Flat 210.

The fire strategy does not represent the condition for the entire building.

2.4.2 Summary of key assumptions

The following key assumptions have been made to form a basis of the fire strategy for Mountjoy house. BE should confirm if these assumptions are suitable for the project.

- Any current or future building works and their impact on the fire strategy are outside the scope of this document;
- No further inspection/survey is planned such as intrusive investigation on the building;
- The building is not currently undergoing any changes, with no change in occupancy nor material alterations;
- The fire strategy drawings within the report are in line with the current building layout;
- Structural drawings are only available from the drawings referenced in Table 2. It is assumed that all other levels have a layout that is in line with the two levels and follow the same fire safety principles throughout the building;
- The doors from Thomas More House (which have undergone fire testing) are assumed to be the same as the ones from Mountjoy House;
- All elements shown in the structural drawings are assumed to be elements of structure and therefore loadbearing;
- The thickness of structural elements (i.e. slab depth or wall thickness) are assumed to be the same throughout the building;
- All structural elements are reinforced concrete;
- The concrete covers over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building;
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 (Section 4.3.1) a utilisation factor of 0.7 has been assumed for conservatism;
- The fire resistance requirements given in CP114 cover loadbearing capacity, integrity and insulation;
- There is no fire stopping register for the building. The condition of the fire stopping at penetrations on fire rated construction is unknown. It is assumed that fire stopping remediation actions will be undertaken as part of ongoing maintenance;
- Boundary distances have been taken to the mid point from Mountjoy House to adjacent buildings;
- Staircase 24 in Thomas More House serves as a means of escape for Mountjoy House as the two buildings are connected;
- Staircase 24 and 26 are firefighting shafts (provided with a protected lobby, firefighting stair and firemen's lift).

3 Mountjoy House

Mountjoy House was completed in April 1971. It is a terrace block which is attached to Thomas More House and runs at 90 degrees built above Mountjoy Close. The building contains 64 flats in total.

The building consists of two stairs (Staircase 25 and Staircase 26) where Staircase 25 is a common open stair and Staircase 26 is a firefighting stair provided with a firefighting lobby and fireman's lift. The building is connected to Staircase 24 (which is part of Thomas More House, refer to Figure 2) via a protected lobby accessed from Staircase 25. Staircase 24 in Thomas More House is considered an alternative escape route from Mountjoy House. Staircase 25 is not considered a compliant escape route as it is not fire separated from the common corridor (with entrances to two flats) at every floor.

The building consists of seven floors (above Podium level) with a building height of 27 m measured from fire service access level (L03) to the bottom of the topmost occupied storey. The *Grenfell Tower Inquiry: Phase 1 report* defines high-rise buildings as buildings over 18 m in height and hence Mountjoy House is considered a high-rise building. There are no floors below Podium level.

The building comprises of the following:

- Roof level (plant rooms);
- L1 – L7: Residential flats (10 flats on each residential level, and 6 duplex maisonettes in L6 – L7);
- Podium level (resident main entrance);
- L03: Fire service access via car park from Aldersgate Street;
- L04 Subway level.

The roof level is only accessible to BE staff via fixed ladders within the Staircase 26 protected lobby.

L04 which is known as the 'subway' is connected to Mountjoy House via Staircase 26. It contains services and extends throughout the Barbican Estate. The area is excluded from the scope of this document.

There are balconies that runs along the entire perimeter of the building connecting to Staircase 24 and 26. These balconies serve from L1 to L7, but not from Podium levels and below.

The two firefighting shafts (Staircase 24 and 26) are accessed from the L03 carpark, from Aldersgate Street into the car park. Staircase 24 which is in Thomas More House, can also be used for Mountjoy House as the two buildings are connected through a protected lobby.

On a day to day basis, occupants from L03 or Podium level take the lifts or stairs to access their flats.

The building comprises a central corridor with flats on either side. The balcony that is accessible from each flat ‘wraps’ around the building. The layout and the section of Mountjoy House is as shown in Figure 2 and Figure 3.

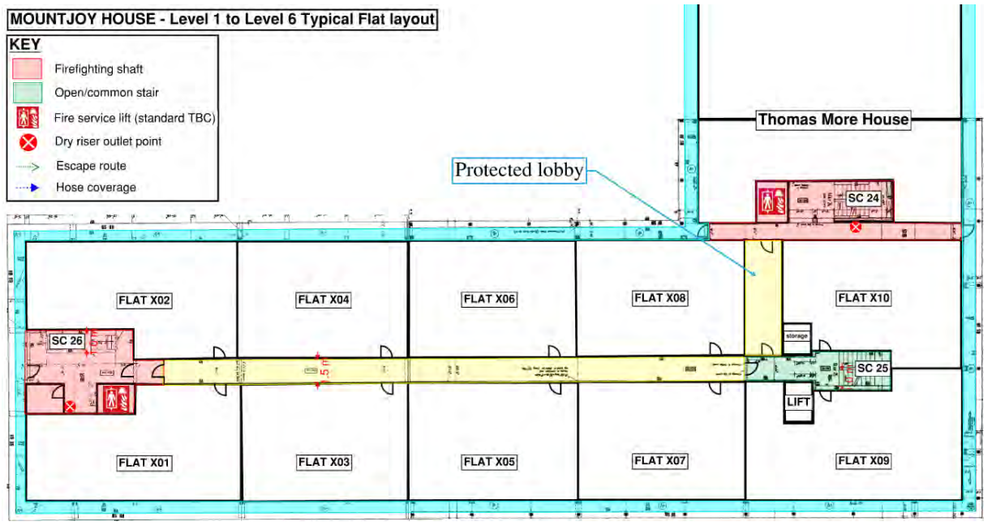


Figure 2: Typical flat layout of Mountjoy House (balcony indicated in blue)

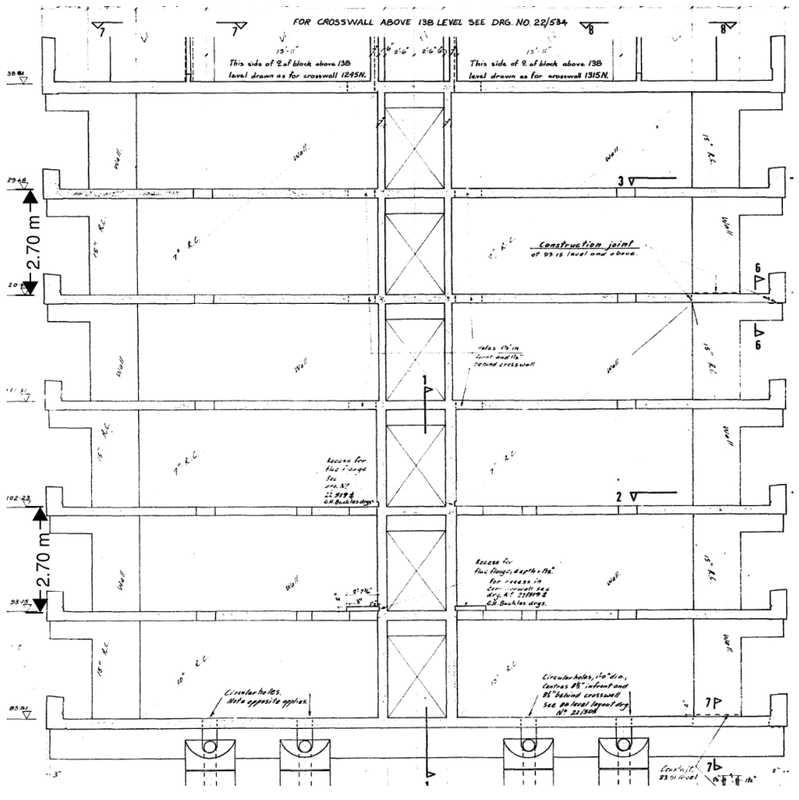


Figure 3: Section of Mountjoy House

4 Fire Strategy Summary

This section of the report provides an overview of the fire strategy for Mountjoy House. It provides the following:

- The recommendations of current guidance;
- The current provisions in Mountjoy House;
- Identification of non-compliances against the current provisions;
- If there are non-compliances identified, three possible solutions through a qualitatively assessing the risks:
    1. The non-compliance is considered to present a life safety risk and requires remediation. Recommendations are made to improve the current provisions to bring them more into line with current prescriptive guidance; OR
    2. The non-compliance is not considered to represent a high life safety risk such that it requires additional safety measures to what is already provided. It is considered acceptable to be retained; OR
    3. More information/confirmation is required from BE (brown text) to confirm any further actions needed.

Where a non-compliance has been identified and a recommendation has been made after a risk assessment, these have been highlighted in green box.

4.1 Means of warning and escape

4.1.1 Evacuation strategy

Mountjoy House operates under a defend in place/ stay put strategy where only the occupants in the flat of the fire origin evacuate the building. The rest of the building occupants are not alerted to the fire and can remain in place while the fire brigade deal with the incident. The defend in place strategy is a common strategy for residential buildings in the UK.

It is recommended that information is given to residents regarding the meaning of the stay put strategy and the arrangements for means of escape are available to them if a fire were to affect their flat. It was noted from the site visit that fire action notices are not definitive enough in communal areas. It is recommended for signage to be replaced with clear instructions to residents, explaining their fire actions, including the stay put policy and their nearest escape routes.

Whilst the above approach is compliant with the recommendation of BS 9991, the *Grenfell Tower Inquiry: Phase 1 report* recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. Mountjoy House has two protected stairs (concrete construction) at opposite ends of the building. The building is of concrete construction and the façade mainly consists of timber doors, timber framed windows and concrete construction (does not appear to be combustible cladding). Hence, the facility to simultaneously evacuate the building is a lower priority recommendation, compared to other remedial works for Mountjoy House. However, this should be considered in conjunction with the provision of automatic detection and alarm system in the flats, if the additional infrastructure to implement the simultaneous evacuation facility is minimal. Refer to Section 4.1.9 for additional details on the fire detection and alarm system.

4.1.2 Means of escape within flats

From BS 9991, flats having an entrance on the same level should have all habitable rooms to be accessible from an internal hallway and have an alternative exit from the flat. There are no maximum travel distance recommendations in this arrangement. Where a flat is not provided with a protected corridor or alternative exits, travel distance from anywhere within the flat to the flat entrance door should be limited to 9 m.

For occupants who are able-bodied (refer to Section 4.1.6 for evacuation Persons with Reduced Mobility, PRM), the flats are provided with two escape routes; via the flat entrance and via the balcony connected to the flat as shown in Figure 4.

The current means of escape arrangement is considered acceptable.

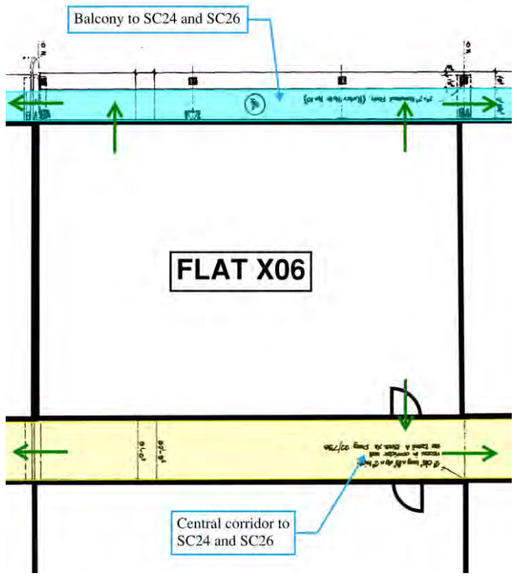


Figure 4: Means of escape from a flat

All flats are provided with alternative escape routes from the habitable rooms via the balcony.

There are six duplex layouts in Level 6 to Level 7 (Flats 603 – 608) which have open stairs connecting two levels. It has been confirmed by BE that the duplex flats have flat entrance in Level 6 and are provided with access to balconies on each Level 6 and Level 7 and hence there will always be alternative means of escape for both levels.

4.1.3 Means of escape in common areas

Residential levels (L1 – L7)

BS 9991 provides recommendations for building scenarios where the flats are provided with a single means of escape either via a balcony or via internal corridors.

For Mountjoy House, the horizontal means of escape from each flat consists of the flat main entrance leading to either Staircase 24 or Staircase 26 via the central corridor as the primary means of escape. Alternatively, there is a route via the balconies to access one of the two staircases. As all flats are provided with alternative means of escape, the current arrangement is considered acceptable.

The width of the balcony is 560 mm at pinch point with privacy screens fully open. It was identified during the site visit that stored goods are located along the balcony in certain levels of the building as shown in Figure 5. These should be removed so that the escape route remains unblocked.

Figure 5: Stored goods in balconies

Recommendations:

- It is recommended to maintain the management procedure in place to keep the balconies clear of any obstacles at all times. This is to provide a clear escape route for occupants to evacuate in an emergency.

Plant area

BE confirmed the plant rooms are located above L7 and can be accessed by the fixed ladders provided within the protected lobby of Staircase 26 as shown in Figure 6.

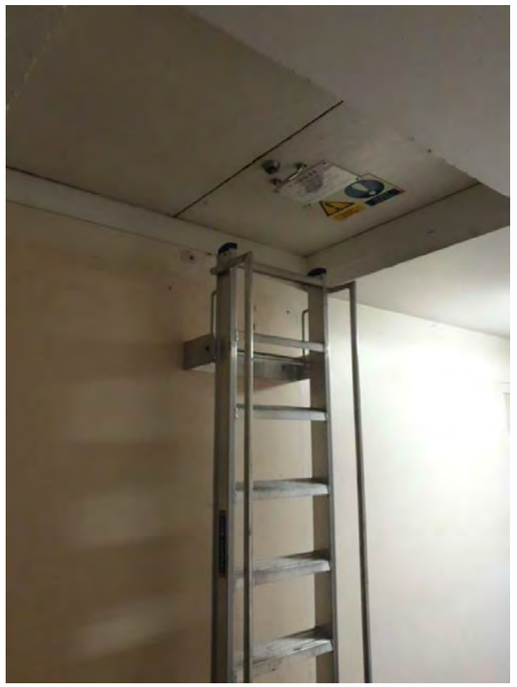


Figure 6: Fixed ladder to plant area in L7 Staircase 26

4.1.4 Vertical means of escape (stairs)

Minimum width

The stairs are recommended by BS 9991 to be no less than 750 mm, measured between the walls and/or balustrade (if protruding less than 100 mm from the walls). A minimum 2 m clear height shall be maintained. BS 9991 also states firefighting stairs should have an unobstructed width of 1100 mm.

Mountjoy House is provided with three stairs as follows:

- Staircase 24 & Staircase 26: firefighting stairs with a width of 1000 mm from L03 to L7;
- Staircase 25: Common open stair width a width of 1000 mm from L03 to L7.

Staircase 25 is not considered a compliant escape route as it is not fire separated from the common corridor, which has entrances to two flats at every floor.

Refer to Section 4.5.3.1 for details of the firefighting stairs.

Central corridor

Flats X01 to X08 opens into the central corridor, with Staircase 25 and 26 at either ends of the corridor. Both stairs are separated from the corridor by a door. However, Flats X09 and X10 opens directly into the Staircase 25. There is access to Staircase 24 from the landing of Staircase 25 via a protected lobby, as shown in Figure 7 below. The furthest travel distance to reach a protected stair from any of the flats is 21.4m (Flat X05 & 06 to Staircase 24).

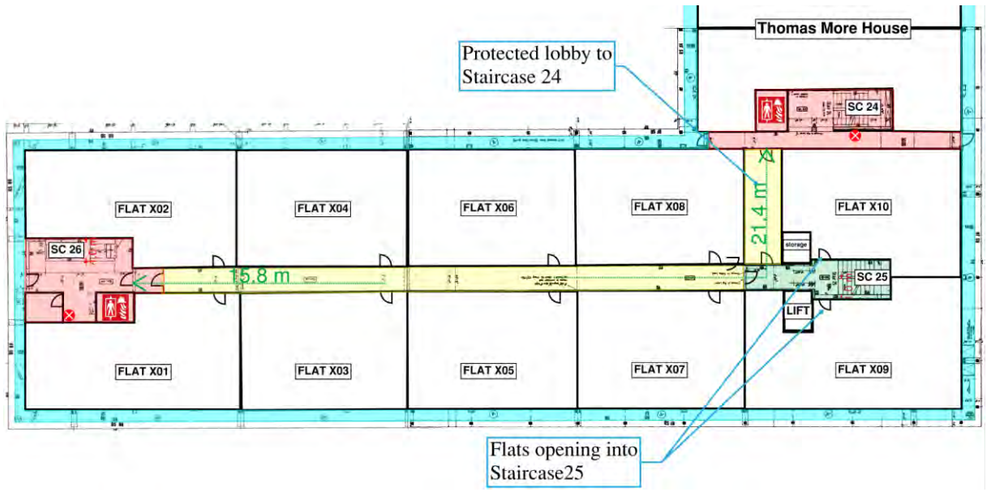


Figure 7: Connection to the stairs from the flats in Mountjoy House

4.1.5 Final exits

Level of discharge

Final exits are available on both Podium Level and L03 (carpark level). All residential levels will exit via the Podium level using firefighting stairs.

In accordance with BS 9991, discharge from final exits should meet the following recommendations:

- Protected stairs should discharge directly to a final exit;
- Final exits should discharge directly to a walkway or open space that allows for the rapid dispersal of persons away from the vicinity of the building, which is achieved by the Podium level and L03;
- Final exits should have a level threshold;
- Final exits should be sited such that they are clear of any risk from fire or smoke.

It has been confirmed during the site visit that Podium level is an open public walkway and L03 is an open car park as shown in Figure 8 where both areas are mainly non-combustible construction. Both Podium level and L03 is levelled/step free.

Figure 8: Final exit on to Podium Level (left) and L03 Carpark level (right)

The Podium level is an external walkway which runs along Mountjoy House and connects to other buildings in the Barbican Residential Development and adjacent development.

4.1.6 Evacuation of PRMs

Mountjoy House currently does not have an evacuation strategy or Personal Emergency Evacuation Plan (PEEP) for Persons with Restricted Mobility. In this report, the term PRM is used to mainly refer to occupants who are wheelchair bound, but the term is applicable to occupants with varying levels of mobility.

As discussed in Section 4.1.2, each flat in the residential levels (L1 – L7) have alternative escape routes via the balconies. However, there is a change in level between the flats and the balconies. As such, the balconies will not be accessible to PRMs. Therefore, for PRMs there is only a single means of escape using the flat entrance to enter the central corridor to reach either Staircase 24 or 26.

Existing provisions

Travel distance

BS 9991 recommends maximum travel distance of 9 m for single means of escape within flats protected by automatic detection system that do not have a protected entrance hall.

As there is only a single means of escape for PRMs, the travel distances within the flat should be limited to 9 m from the furthest point in the flat. It is Arup's understanding that there are different internal layouts throughout the building. The flat with the greatest internal travel distance is Flat type 28 with 13.7 m which exceeds the recommendations of BS 9991, as shown in Figure 9 below.

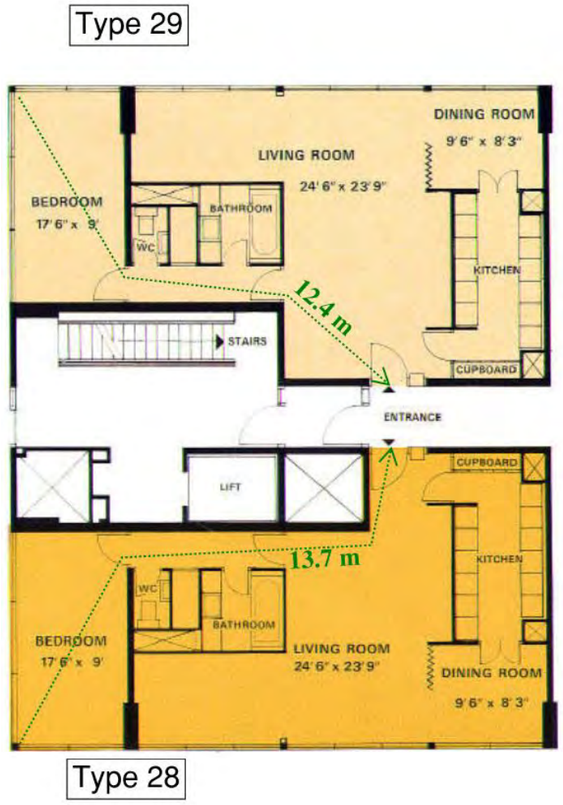


Figure 9: Flat type 28 with greatest travel distance within the flat

Safe refuge

The occupants can travel to Staircase 26 which is a protected area separated from the central corridor by a fire door. The occupants travelling towards Staircase 25 and flats opening on to Staircase 25 can travel to Staircase 24 via a protected lobby. Staircases 24 and 26 are both provided with ventilation at the top of the stairs, by way of louvred doors to outside (roof terrace). The adequacy of the vent in maintaining a safe environment in the stair for PRMs to seek refuge is not reviewed.

The occupants can use the lift (if safe to do so) to Podium level or L03 to evacuate from the building. There is no emergency voice communication (EVC) system in the building.

Lift grounding system

The current lift mechanism is not programmed for grounding as there are no detectors within the lift shafts. BE to confirm what standard the lifts were installed to.

Recommendations:

- BE to put in place management plan and evacuation strategy for the evacuation of occupants, in particular for PRMs which includes preparing PEEP as an immediate action. Consider whether the lifts in Staircase 24 and 26 will be used for evacuation.
- As part of the PEEP, it may be necessary to provide refuge area and Emergency Voice Communication (EVC) system to Staircase 24 and Staircase 26 (firefighting stairs with firemen's lift)
- Review the adequacy of the vents at the louvred doors in maintaining a safe environment in the stair for PRMs to seek refuge – if not, consider opening the doors automatically for smoke venting.
- Provide an automatic fire detection and alarm system for each flat (Section 4.1.9 for details).
- Clear briefing to all occupants of Mountjoy House on available escape routes.

4.1.7 Exit signage

BS 9991 recommends exit signage to be in accordance with BS 5499-4 and BS ISO 3864-1. In particular, for stairs that serve storeys both above and below the point of final exit, the final exit should be immediately apparent by the provision of additional signage.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that in all high-rise residential buildings, floor numbers are clearly marked on each landing within the stairways and in a prominent place in the lobbies such that they can be seen in normal conditions and in low lighting and smoky conditions.

Existing provisions

BE to confirm if emergency exit signage is lit in Mountjoy House.

During the site visit, it has been identified that there is currently no signage within the protected stairs to notify occupants where the discharge level is. BE advised that there is a sitewide inspection (currently paused) to examine the condition of existing signage and to replace them where necessary.

Recommendations:

- BE to carry out a sitewide inspection and provide exit signage in accordance with BS 5499-4, BS ISO 3864-1 and the additional recommendations from the Grenfell Tower Inquiry: Phase 1 report.

4.1.8 Emergency lighting

In accordance with BS 9991, emergency lighting should be provided in accordance with BS 5266-1.

Existing provisions

BE to confirm if Mountjoy House is provided with emergency lighting system and what back up power supply is provided. During the site visit, it was not possible to determine the light fittings that are part of the emergency lighting system.

Proposed Improvements

A full survey on emergency lighting is recommended and to remediate any of the non-compliances throughout the building for emergency lighting to be in line with BS 5266-1.

4.1.9 Fire detection and alarm

BS 9991 recommends that flats in multi-storey buildings shall be provided with an alarm and detection system in line with BS 5839-6. The recommended system for an existing flat with no floor greater than 200 m^2 is Grade D1 Category LD2, where Grade D1 is a provision of one or more mains powered detectors each with a sealed in standby supply consisting of a battery. Category LD2 is a system incorporating detectors in all circulation areas that form part of the escape routes from the premises, and in all specified rooms that present a high fire risk to occupants, including kitchen and the principal habitable room.

In addition to the recommendations of BS 9991, the Grenfell Tower Inquiry: Phase 1 report recommends that all high-rise residential buildings, existing and new, are provided with facilities to allow the fire and rescue service to simultaneously evacuate the building. High-rise buildings are defined as buildings over 18 m in height and hence Mountjoy House is considered a high-rise building.

Existing provisions

The External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that some flats were provided with smoke detectors however did not function when tested.

During the site visit it was confirmed that the common areas are not provided with a fire detection and alarm system.

In the case of privately owned flats, it is the responsibility of the owners to install an alarm and detection system. It should be noted that this is only a recommendation by BE as the freeholder, and not compulsory. BE has no record of the flats that are equipped with such system within the flats.

It is recommended to provide a detection and alarm system for all the flats of Mountjoy House, due to the following reasons:

- Provision of a detection and alarm system is a basic fire safety expectation in almost all buildings in order to provide early detection of fire which will result in early evacuation of residents in residential areas, particularly considering the sleeping risks.
- An improvement to evacuation of PRMs, with a single means of escape and requiring assistance to evacuate to the place of ultimate safety.
- Due to the potential risk of fire/smoke spread via the riser in the kitchen are for corner flats (X01, X02, X09 and X10 flats) arrangement (see Section 4.3.2) the detection and alarm system provides improvement by providing early warning in case of breach of compartmentation.

Note that BS 5839-6 gives recommendations for new and existing premises separately. There are specific systems identified for existing premises which shows the importance of providing adequate fire detection and alarm system for existing buildings and not just for new builds.

Recommendations:

- Provide a Grade D1 Category LD2 system in line with BS 5839-6 is recommended for all the flats of Mountjoy House.
- If automatic ventilation to staircases 24 and 26 are necessary (subject to a review of the ventilation by the louvred doors), provide detection system in the lift lobby to activate the vent system.
- If the lift is used for evacuation as part of the PEEP arrangement, provide detection system in the lift shaft.
- The facility to simultaneously evacuate the building should be considered in conjunction with the recommendations above, as the additional infrastructure to implement such facility may be relatively minimal.

4.1.10 Fire suppression

Based on BS 9991, sprinkler protection is required for buildings with a floor higher than 30 m above ground level. However, the recent revision of ADB Volume 1: 2020 amendment states that the threshold building height (for residential buildings) for the provision of sprinklers has been reduced from 30 m to 11 m.

Existing provisions

Mountjoy House is not provided with sprinkler protection. The building height from L03 to the topmost occupied storey is 27 m.

Proposed improvements

British Standard Code of Practice CP3: Chapter IV (1962) which was the relevant code at the time Mountjoy House was built (1971) did not require any sprinkler protection to high-rise residential buildings. There is no requirement in the Building Regulations for existing buildings to comply with the current guidance, except where building works have taken place.

Sprinklers were not required at the time of construction.

However, the building adopts a stay-put policy, which relies on maintaining compartmentation between each flat and between the flat and the common areas. It has been confirmed by BE during the site visit that there is breach of compartmentation between the corner flats (X01, X02, X09 and X10 of every level) at the kitchen risers that span the entire building height. It is unclear if there is compartmentation between the flats and the risers. This is a risk to life safety as it compromises the stay-put strategy. There is a higher risk on fire spread between the flats which compromises the stay put strategy. As the flat entrance doors do not achieve the required fire rating, there is a risk of fire within the flat spreading to the common corridor for every level affecting the means of escape for the entire building.

Due to these factors, it is recommended that a sprinkler system is provided.

BE have confirmed that insurers (from their consultation on the 23/07/2021) have no requirement to install sprinklers anywhere within the Barbican Residential.

Recommendations:

- Install sprinklers, as a solution to mitigate multiple risks including compartmentation and flat entrance doors.

4.1.11 Smoke control

In order for fire and smoke to be directed outwards and upwards, BS 9991 recommends the balcony to be open sided. The opening should be at least 50% of the vertical plane and uniformly spread across the surface. The opening should be at least between the top of the balustrade at 1.1 m and the soffit to the balcony above.

Balcony existing provisions

From visual inspection during the site visit, the balcony appears (refer to Figure 5) to be open for at least 50% of the vertical plan.. As Mountjoy House is provided with alternative means of escape from the flat, the current arrangement is considered acceptable.

4.1.12 Refuse storage cupboard and post box

BS 9991 recommends refuse rooms provided for the storage of refuse should be separated from other parts of the building and should not be located within or accessed directly from common stairs. Rooms provided for the storage of refuse should be approached only by way of a protected lobby having not less than 0.2 m^2 of permanent ventilation or a suitable mechanical alternative.

Existing arrangement

Every flat in Mountjoy House is provided with a refuse storage cupboard and a post box adjacent to the flat entrance door, for the use of the flat occupants only. The refuse storage and the post box is accessible from both the common area outside the flat and within the flat; they comprise of a metal frame cupboard with asbestos backed doors on both the common area side and the flat side.

There is no ventilated lobby provided and no other mitigation measures provided in Mountjoy House for refuse storage areas.

Proposed improvements

The current arrangement does not comply with the recommendations of BS 9991. Refuse storage is considered a high fire hazard area and the location within the common areas poses a risk to the occupants. A fire involving the refuse can cause fire and smoke to affect the use of the common areas. It is therefore critical for the door separating the refuse storage and common areas to be a fire rated door.

As a recommendation to this non-compliance, the doors to the refuse storage and post box from the common area should be fire rated to 30 minutes with smoke seals. Although this does not fully meet the current recommendations of BS 9991 (which would require a ventilated lobby), this is considered an improvement to the current arrangement. The recommended additional detection and alarm system in each flat will serve to provide early warning in the event of a fire in the flat. The new fire rated door separating the refuse storage from the common area will serve to limit fire and smoke spread, maintaining the use of the stairs for means of escape and protected refuge.

Recommendations:

- If doors to the refuse storage and post box on the common areas are not fire doors meeting the current standard, it is recommended for new fire doors (FD30S) to be provided.

4.1.13 Storeroom in Staircase 25

BS 9991 states that no storeroom should open directly to a common stair. Instead, there should be a ventilated lobby between the storeroom and the stair.

BS 9999 states storage areas greater than 1 m^2 in area but not greater than 450 m^2 (other than refuge storage areas) need to be separated from other parts of the building with a minimum standard of fire resistance of 30 minutes.

Existing provisions

There is a storeroom within Staircase 25 on every landing between L1 to L7 as shown in Figure 10. There are also two flats (corner flats, type X09 and X10) on every floor that also open directly onto the staircase 25.

The site visit did not include the storeroom (resident private store and locked) but from the structural drawings, the room appears to be of concrete construction. In case of a fire in the storeroom, smoke may spread out of the room and affect the escape routes of the corner flats on every floor. Able bodied residents are able to evacuate using the balconies, but PRM residents will not be able to evacuate using their flat entrance. This scenario should be considered in the planning of the PEEP.

Similar to the flat entrance door, the door to the storeroom should maintain fire separation between the room and the common corridor.

Proposed improvements

Refer to Section 4.3.3 for recommendation on fire door.

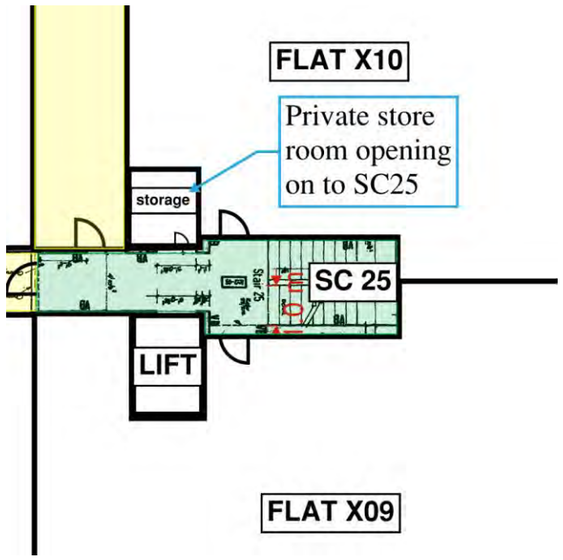


Figure 10: Current layout of storeroom opening on to Staircase 25

4.1.14 Back-up power supplies

BS 9991 states that life safety systems are to be provided with a secondary power supply. The primary power source should generally be taken from the public electricity supply, with secondary power being supplied from an alternative utility supply from another substation, a generator or uninterruptable power supply (UPS) or batteries.

Where practicable, power supplies should be provided via two separate intakes into the building from the same external substation or via a single intake and a standby generator.

Existing provisions

Mountjoy House is provided with a number of life safety systems including emergency lighting, firefighting stair ventilation and firemen's lifts. Secondary power supply to the following life safety systems should be confirmed by BE:

- Emergency lighting
- Firefighting lifts
- Automatic vent for firefighting stairs
- Illuminated emergency exit signage

4.2 Internal fire spread (linings)

BS 9991 recommends the following for wall and ceiling linings:

- Circulation spaces / common corridors – Class 0 in line with BS 476-7 (national class) or Class B-s3, d2 or better in line with BS EN 13501-1 (European class);
- Within apartments – Class 1 in line with BS 476-7 (national class) or Class C-s3, d2 or better in line with BS EN 13501-1 (European class).

Existing provisions

There is no information on the wall and ceiling linings across the common areas of Mountjoy House as well as within the flats. Based on the site visit, the walls appear to be concrete for the common areas including the firefighting stair. BE to confirm.

As concrete finish is expected to achieve Class A1, it meets the recommendations of BS 9991. However, this is based on the assumption that wall and ceiling linings are concrete finishes throughout all areas of the building. If there are areas within the building where the above requirements are not likely to be achieved, they will need to be reviewed and addressed separately.

4.3 Internal fire spread (structure)

4.3.1 Structural fire resistance

Under BS 9991 guidance, unsprinklered buildings greater than 18 m but less than 30 m in height shall be provided with 90 minutes fire resisting construction for load bearing capacity. Elements of structure supporting the firefighting shafts are required to achieve 120 minutes.

Elements of structure are required to achieve loadbearing capacity (R) only, however when certain elements also act as separating elements (i.e. walls) integrity (E) and insulation (I) are also required.

Existing provisions

Information on the existing building structure is based on the structural drawings in the Arup archive. It has been assumed that all elements (i.e. walls, slabs, etc.) shown in the structural drawings are elements of structure and therefore loadbearing.

Based on the structural drawings (drawing number 22 509) the following information on structural elements was obtained:

- Common stair wall thickness: 0.18 m;
- Walls between flats: 0.35 m;
- Firefighting stair wall thickness: 0.25 m;
- Floor slab thickness (excludes balcony slabs): 0.22 m.

The above dimensions have not been verified through site inspections.

The following guidance documents have been used to assess the potential fire rating offered by the dimensions of the walls and slabs:

- BS EN 1992-1-2-2004: Eurocode 2 Design of Concrete Structure Part 1-2: General rules – Structural fire design (Eurocode 2), which is the current guidance; and
- CP 114:1957 British Code of Practice, The Structural Use of Reinforced Concrete in Buildings, which is the relevant code at the time of construction.

In assessing the potential fire rating, the following assumptions are made:

- The thickness of structural elements stated above apply throughout the building;
- All structural elements are reinforced concrete;
- The concrete cover over the reinforcement bars meet the values stated in the relevant guidance at the time of construction (CP 114); there is no information on the depth of the existing concrete covers for this aspect to be assessed;
- Floor slabs are simply supported one-way slabs throughout the building;
- No structural calculations are available and therefore the utilisation factor of the structural members is unknown. When checking against the requirements of Eurocode 2 a utilisation factor of 0.7 has been taken as conservatism;
- The fire resistance requirements given in CP 114 cover loadbearing capacity, integrity and insulation;
- Structural drawings used are only for one floor and it is assumed the dimensions are consistent throughout the building height.

Table 3: Summary of structural element thickness against code requirements

Existing structural element	Existing element thickness	Eurocode 2 requirements	CP 114 requirements	BS 9991 requirements	Comments
Common stair wall (Staircase 25)	180 mm	170 mm (REI 90)	101.6 mm (REI90)	R90	Achieving both the Eurocode 2 and CP 114 for REI90 rating
Walls between flats	350 mm	170 mm (REI 90)	101.6 mm (REI90)	R90	Achieving both the Eurocode 2 and CP 114 for REI90 rating
Firefighting shaft wall	305 mm	160 mm (REI 120)	101.6 mm (REI 120)	R120	Achieving both the Eurocode 2 and CP 114 for REI120 rating
Floor slab	220 mm	100 mm /120 mm	127 mm	R90	Achieving both the Eurocode 2 and
		(REI 90/120)	(REI 90 and 120)		CP 114 for REI 120 rating

The thickness of the structural elements to meet the required fire ratings appear to meet both the current guidance and the relevant guidance at the time of construction.

4.3.2 Fire compartmentation

Fire compartmentation is required to limit fire spread within the same building and protect means of escape. BS 9991 recommends the following fire ratings:

- Compartment walls between flats: FR60 REI;
- Compartment walls that are also part of the load-bearing elements: FR90 REI;
- Compartment floor: FR90 EI (refer to Section 4.3.1 above);
- Firefighting shafts: FR120 REI;
- Any risers penetrating compartment floors: FR90 REI;
- Fire stopping – same level of fire resistance as the compartment wall / floor through which it passes.

Note: Load bearing capacity (R) only required for load bearing elements.

Existing provisions

Information on the existing construction is based on the structural drawings in the Arup Archive.

There is currently no drawing or information available on the material nor the thickness of the riser construction in each of the flats.

Kitchen risers in corner flats

During the site visit it has been informed by BE that the kitchen risers for all corner flats (X01, X02, X09 and X10) are not provided with any separation between the floors and run through the entire building height. Each flat type is served by one riser. It is not known whether there is adequate compartmentation/separation between the riser and each flat. This poses a risk as fire and smoke in one flat could spread to other flats through the riser.

Compartmentation should be maintained between each flat, to align with the stay-put evacuation strategy. Depending on the type of services within the riser (no information provided), the following are the options in maintaining compartmentation:

- Provide fire separation at the vertical riser construction and each flat – any services penetrations between the flats and the riser are to be fire-stopped;

- Provide fire separation at each floor within the riser – services within the riser are to be fire stopped at each floor.

Recommendations:

- Carry out an intrusive survey to assess the current compartmentation between each flat and the riser. New compartmentation should be installed if the current provision does not achieve fire resistance of 90 minutes.

4.3.3 Fire doors

BS 9991 recommends the specification, installation and maintenance of hinged or pivoted pedestrian fire doors to be based on BS 8214. This standard recommends fire rating of doors to be tested in accordance with either BS 476-22 or BS EN 1634-1.

The following fire rating requirements are based on Table 12 of BS 9991:

- Fire door separating firefighting stair and firefighting lobby: FD30S;
- Passenger/firefighting lift landing door: FD30
- Fire door separating a flat from a space in common use; FD30S;
- Enclosing a protected shaft forming a lift well or service shaft: FD60.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that owners of all residential buildings containing separate dwellings (whether or not they are high-rise buildings):

- Carry out an urgent inspection of all fire doors to ensure they comply with applicable legislative standards; and
- Be required by law to carry out checks at not less than three-monthly intervals to ensure that all fire doors are fitted with effective self-closing devices in working order.

Existing provisions

There is no information on the existing doors for Mountjoy House. However, based on the information provided in the document 'Abridged results from the test of 86 Thomas More House (double leaf door and a single leaf door)' issued by CTO S A on 21/01/2020, the fire doors in Thomas More House have not satisfied requirements for 30 minutes (EI 30) class door. The fire doors were tested in accordance with PN EN 1363-1:2012 and PN EN 1634-1+A1:2018.

Although the test was not carried out specifically for the fire doors in Mountjoy House, BE confirmed that the doors in Mountjoy House are identical to those in Thomas More.

The fire door separating each flat from the central corridor and onto the stairs is critical for maintaining the availability of the stairs for means of escape. In particular, PRM evacuation relies on the corridors as a single means of escape to enter a place of relative safety (protected stairs).

Recommendations:

- A survey should be carried out to inspect the existing doors that should be fire doors throughout the building. This includes flat entrance doors, doors to the storeroom, all doors to and within Staircase 24 and 26, stair lobby doors, doors to refuse and post box cupboards.
- Where found not to provide the required standard of fire resistance, they are recommended to be replaced to be in accordance with current standards.
- BE to keep records of inspection and testing of fire doors in the future, at not less than three-monthly intervals to ensure that all fire doors are in working order.

4.3.4 Cavity barriers

Clause 33.1. of BS 9999 recommends that cavity barriers should be provided to close the edges of cavities, including around openings. Cavity barriers should be provided at the junction between an external cavity wall and every compartment floor and compartment wall. It also needs to be provided at the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly which forms a fire resisting barrier.

Existing provisions

BE to confirm if there are any cavity barriers in the building. This is outside the scope of this report.

4.3.5 Fire stopping

BS 9991 (Clause 24.4 and Figure 24) recommends that where a building service passes through a compartment wall or floor it shall be adequately fire stopped in line with the compartment fire resistance.

Existing provisions

There is currently no information on the provision of fire stopping for Mountjoy House. BE to advise.

Recommendations:

- It is recommended for BE to carry out a sitewide inspection of fire stopping and undertake fixing of any defective fire stopping to ensure fire compartmentation is maintained.

4.3.6 Kitchen and toilet shunt duct risers

In accordance with BS 9991, vertical ventilation ducts should be enclosed throughout their height with fire resisting construction. Where a horizontal ventilation duct penetrates the fire resisting construction, BS 9999 recommends four different methods of maintaining the fire separation at the penetration:

- Method 1: thermally actuated fire dampers;
- Method 2: fire resisting enclosures e.g. fire rated plasterboards;

- Method 3: protection using fire-resisting ductwork;
- Method 4: automatically actuated fire and smoke dampers triggered by smoke detectors.

BS 9999 Section 32.5.2.2 also states that Methods 1 and 4 should not be used for extract ductwork servicing kitchens and this is due to the likely build-up of grease within the duct which can adversely affect the effectiveness of any dampers.

In the Barbican Residential Development, it is understood that a common approach to maintain fire separation between flats is to use shunt duct arrangement for the kitchen and toilet extract ventilation ducts. The purpose of shunt duct is to avoid the need for fire protection using the methods described above. A shunt duct arrangement comprises of branch ductwork (‘s’ or inverted ‘s’ shaped) that are connected to the main extract ductwork as shown as Figure 11. In addition to the downward bend of the shunt duct, a fan at the top of the main extract ductwork maintains a negative pressure that stops smoke from spreading out of the ductwork.

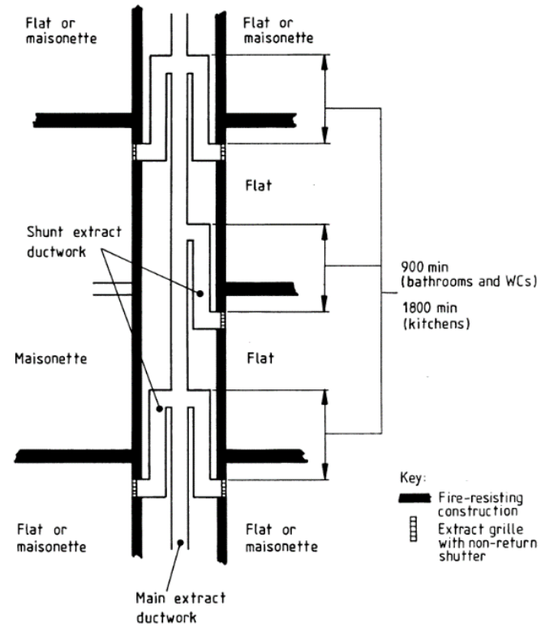


Figure 11: Layout of shunt duct system (BS 5588 Part 9)

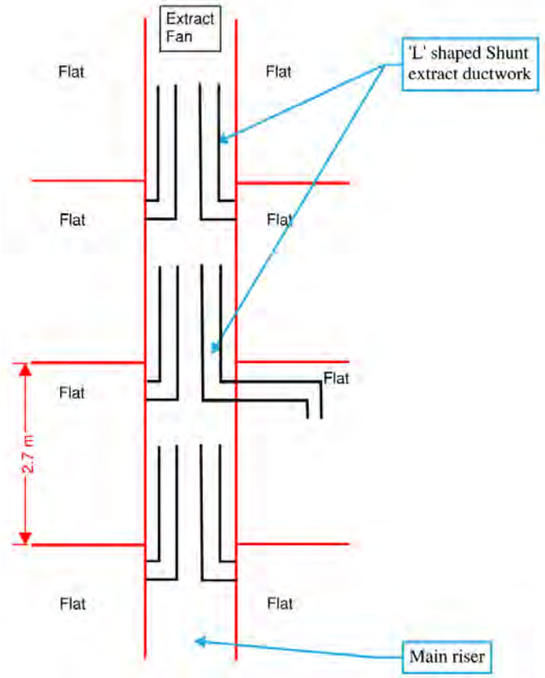


Figure 12: Existing layout of shunt duct system in Mountjoy House

Shunt duct arrangement is a recognised approach in BS 5588-9:1999 – *Fire precautions in the design, construction and use of buildings Part 9: Code of practice for ventilation and air conditioning ductwork*, for extract ductworks serving toilets. However, it is not normally acceptable for use in kitchen extraction because of the fire risk inherent in kitchens. The guidance mentions that if a shunt duct is used for kitchen extraction, careful consideration should be given to possible pressure differentials within the system to avoid the transfer of smoke and other products of combustion from one dwelling to another by means of the ductwork system. This guidance has been withdrawn and is no longer referenced in other current standards including the Approved Document B.

Existing provisions

BE confirmed during the site visit that Mountjoy House uses shunt ducts for both kitchens and bathrooms, each provided with a separate main extract ductwork.

BE confirmed the shunt ducts in Mountjoy House have the same arrangement and material as Andrewes House. However, the dimensions of the shunt ducts are currently unknown.

In Mountjoy House, it is understood that the main kitchen extract riser and the shunt ducts are of concrete construction. Dimensions of the concrete construction are unknown, but likely to have some inherent fire rating. The kitchen extract riser is located within the kitchen and serves all the flats on the same vertical stack. The extract fan is located at the top of the main riser and on continuous operation (BE confirmed the capacity of the current fans are 10 cbm/s). BE also confirmed that the shunt ducts are 'L' shaped as shown in Figure 12 instead of the more common 'S' shaped as shown in Figure 11. The frequency of maintenance and cleaning, and the internal grease builds up within the vertical portion of the shunt ducts and within the main extract risers are unknown.

The toilet extract riser is located within the toilet of each flat and serves all the flats on the same vertical stack. The side backing on to the toilet wall contains asbestos and the rest of the walls are concrete.

Proposed Improvements

Whilst the use of shunt duct in lieu of other forms of fire protection is no longer in line with current UK guidance, their use for toilet extract risers is still allowed in other countries (Australia – AS 1688.1; USA – International Building Code). Considering the low risk nature of toilets and provided that the installations are in line with the details of the guidance, the use of shunt ducts for toilet extract risers is considered acceptable provided improvement is made to increase the reliability on the extract fan.

However, those standards that recognise allow the use of shunt ducts do not recommend them for kitchen extract risers. The presence of grease in the duct may affect the effectiveness of the shunt system in maintaining fire and smoke separation. Failure of compartmentation between the flats presents a life safety risk to the occupants.

Provision of a fire detection and alarm system is one of the improvements, providing early warning before the single escape route via the flat entrance is compromised. In addition, the risk of fire spread via the shunt duct can be reduced by replacing the existing extract hoods with recirculation type extract hoods and maintaining the compartmentation between the flats.

Recommendations:

It is recommended to replace the existing kitchen extract hoods with recirculation type hoods, and implement one of the following:

- Smoke and fire damper at the shunt duct riser activated by the fire alarm/detectors within the flat (this maintains the use of the riser for normal ventilation of the flat); or
- To block off the shunt ducts and provide a fan on the external wall to draw out air from the flat into the balconies; or
- Maintain the existing extract hoods and shunt duct arrangement by increasing the reliability of the main extract fan. This will require an additional duty standby fan (the fans to be rated at 400 ˚C for 90 minutes in accordance with BS EN 13501-4), with secondary power supply. The fans need to be adequately maintained to keep the main riser under negative pressure.

4.4 External fire spread

4.4.1 Fire spread to neighbouring buildings

Buildings must maintain the minimum separation distance from the site boundary to protect themselves and adjacent buildings against external fire spread. A building that is located less than the required separation distance from the site boundary will be required to be provided with mitigation measures to prevent fire spread such as fire rated external walls. In accordance with BS 9991, there are four methods used to determine the maximum permissible amount of unprotected façade. In this case, the most appropriate method is the enclosing rectangle in line with BR 187.

Existing arrangement

There is no information available on the location of the site boundary in relation to Mountjoy House. If there are no site layout available, the building boundaries or the relevant boundaries will be measured using Google Maps as shown in Figure 13 and as follows:

- North: 118.3 m
- East: 33.1 m
- South:42.6 m
- West: 13.8 m

An external fire spread calculation has been undertaken for a single flat using the above assumed boundary distances and Figure 13. The enclosing rectangle method in line with BR 187 was carried out. The results show that no protection is required to the facades. Please refer to Appendix B for the calculation.

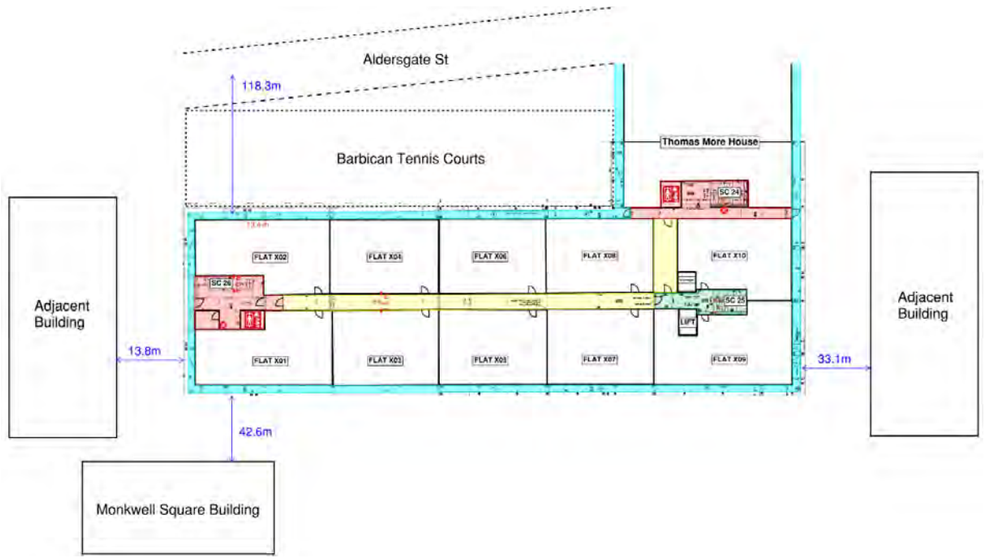


Figure 13: Existing arrangement for Mountjoy House and adjacent buildings

4.4.2 Façade materials

BS 9991 recommends the following material classifications for external surfaces of the façade of buildings greater than 18 m in height:

- Areas < 1 m from the boundary – Class 0 (National class) or Class B-s3, d2 or better (European class);
- Areas > 1 m from the boundary and > 18 m in height – Class 0 (National class) or Class B-s3, d2 or better (European class).

The Building Regulations also require materials which become part of an external wall (i.e. cladding material, insulation product, filler material – not including gaskets, sealants and similar) and specified attachment (e.g. balcony) of a residential building with a storey at least 18 m above ground level to achieve European classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009 entitled 'Fire classification of construction products and building elements. Classification using the test data from reaction to fire tests'.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that the owner and manager of every high-rise residential building be required by law to provide their local fire and rescue service with information about the design of its external walls together with details of the materials of which they are constructed and to inform the fire and rescue service of any material changes made to them.

Existing provisions

It is assumed all elevations of Mountjoy House are provided with solid concrete construction. This is to be confirmed by BE.

The concrete panel is considered to achieve Class A1, and therefore it meets the recommendations of BS 9991.

In the case of balconies, BE confirmed the build-up consists of concrete paving slabs sitting on top of a felt membrane. The felt is a membrane and therefore under Regulation 7(3) of Approvement Document B, is exempt from having to meet the requirements for a European Classification of A2-s1, d0 or better.

It is also recommended to provide information about the design of external walls and details of the materials in the fire notice box for the fire and rescue service to be able to have access to the information when they arrive on site.

4.4.3 Roof materials

BS 9991 recommends buildings where the roof is at least 6 m away from any point on the relevant boundary needs to be provided with a roof covering designation of minimum AD or BD in line with BS 476-3 (equivalent to $E_{roof}(t4)$ classification in line with BS EN 13501-5 European classifications)

Existing provisions

No information provided. BE to confirm roof material to carry out further review.

4.5 Access and facilities for the fire service

4.5.1 Fire main inlet

BS 9991 recommends buildings fitted with dry fire mains should have fire appliance access:

- within 18 m of, and within sight of, a suitable entrance giving access to the dry fire main; and;
- within sight of the inlet for the emergency replenishment of the suction tank for the dry fire main.

Existing provisions

Mountjoy House is provided with one dry riser main inlet point for Staircase 26 and another inlet point for Staircase 24 located within the car park area in L03, with outlets that can be accessed as shown in Figure 14.

The dry riser inlet for Staircase 24 is labelled for Thomas More House, even though it also serves as the second firefighting shaft for Mountjoy House.

Recommendations:

- Engagement with London Fire Brigade to familiarise them with the firefighting access and facilities to Mountjoy House, in particular the sharing of Staircase 24 with Thomas More House.
- Amend the label for the dry riser inlet for Staircase 24, to include the name for Mountjoy House.

Figure 14: Fire inlet points for Staircase 26 (left) and Staircase 24 (right)

4.5.2 Fire service access

BS 9999 recommends that the distance between the fire vehicle parking location to the firefighting entry point of the building should not exceed 18 m in length. In addition, the entry to the firefighting shaft at fire and rescue service access level (vehicle access level) should be directly from open air or by way of a protected corridor not exceeding 18 m in length.

Existing arrangement

Firefighting access into the building is directly from the carpark area at L03, accessed via Aldersgate Street where the firefighting vehicle has space to park in front of either Mountjoy House or Thomas More House as shown in Figure 15. The distance between the fire service vehicle parking location and the inlet point needs to be confirmed by BE.

Figure 15: Fire vehicle parking location

4.5.3 Facilities for the fire service

BS 9991 recommends buildings with a floor higher than 18 m above fire and rescue service access level should be provided with firefighting shaft(s) containing firefighting lifts. A sufficient number of firefighting shafts should be provided to meet the maximum hose distance of 45 m to cover all parts of the building.

Firefighting shafts should be constructed in accordance with the recommendations given in BS 9999.

Mountjoy House is provided with one firefighting shaft (Staircase 26) and an additional firefighting shaft from Thomas More House (Staircase 24). Both are provided with a firefighting stair, dry riser, fireman's lift and firefighting lobby.

4.5.3.1 Firefighting stairs

BS 9999 recommends a firefighting stair should have an unobstructed width (measured between the walls and / or balustrades) of 1.1 m. the width should be kept clear for a vertical distance of 2.0 m.

BS 9999 also recommends only services associated with the firefighting shaft should pass through or be contained within the firefighting shaft.

Existing provisions

The firefighting stair in Mountjoy House connects L03 (car park level) to L7 with a width of 1000 mm.

There is a plant room within the firefighting stair landing areas as shown in Figure 16 below. The door should be inspected to determine the fire rating and to maintain fire separation from the firefighting stair.

Figure 16: Plant room within Staircase 26

Recommendations:

- Refer to Section 4.3.3 for fire doors.
- Engagement with London Fire Brigade to discuss the firefighting access routes and the reduced stair width.

4.5.3.2 Firefighting lobby

BS 9999 recommends the firefighting lobby to have a clear floor area of not less than 5 m^2 and not exceed 20 m^2 for lobby serving up to four lifts. All principal dimensions should not be less than 1.5 m. The purpose of not allowing a large lobby area (exceeding 20m^2) is to avoid the lobby being used for storage.

Existing provisions

There is a protected lobby which separates the Staircase 26 from central corridor leading to the rest of the flats. Staircase 24 is also separated from Staircase 25. The current arrangement is considered acceptable as there is an additional layer of separation between the protected stairs from the flats.

During the site visit, it was noted that the central corridor and the Staircases 24 and 26 are relatively free from storage and decorative items.

4.5.3.3 Firefighting lifts

In line with BS 9991 and BS 9999, new firefighting lifts installations should be in accordance with BS EN 81-72:2020.

In addition, the Grenfell Tower Inquiry: Phase 1 report recommends that the owner and manager of every high-rise residential building be required by law to carry out:

- Regular inspections of any lifts that are designed to be used by firefighters in an emergency and to report the results of such inspections to their local fire and rescue service at monthly intervals;
- Regular tests of the mechanism which allows firefighters to take control of the lifts and to inform their local fire and rescue service at monthly intervals that they have done so.

Existing provisions

There are firemen's override switch for each lift, located at the fire service access level. However, BE advised that the lifts do not meet the current standard for firefighting lift and do not have any backup power supply.

BE to confirm specification for lifts in Staircase 24 to 26, and the design standards for those lifts.

4.5.3.4 Smoke control for firefighting lobby and stair

BS 9991 recommends that all firefighting shafts should be provided with a smoke ventilation system.

In buildings with balcony approach, the firefighting stair should be provided with an openable vent with a free area of 1 m^2 at the top of the stair, which can be remotely operated at fire and rescue service access level. In addition, a minimum ventilation opening of 1.5 m^2 (free area) is to be provided for the firefighting lobby at each level.

Existing provisions

Staircase 24 has a vent at the top of the stair (dimensions not available) that is manually activated from a switch at the fire service access level (Level 03). At each level, the stair lobby (also the lift lobby) has a vent that opens onto the external balcony. Refer to the Figure 17 below.

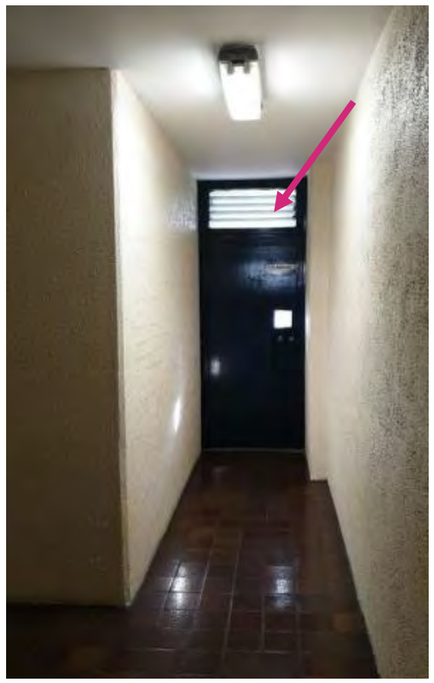


Figure 17: Stair/lift lobby vent (red arrow) for Staircase 24

Staircase 26 has a louvred door (louvre area is 1.5m x 0.55 m – unlikely to achieve 1m^2 free area) at the top of the stair that opens onto the external balcony. The lift is within the stair enclosure. A lobby separates the stair from the common corridor at each level. The lobby opens into a vent shaft at every level via an openable window as shown in Figure 18 (with Georgian-wired glass). Some of these windows were in the open position and will cause smoke to spread between the floors if smoke were to enter the lobby.

Figure 18: Openable vents in the firefighting lobby to Staircase 26 upper portion (left), open position (right)

Recommendations:

- Keep the windows at the vent shaft (Staircase 26) shut.
- Engagement with London Fire Brigade to inform them of the ventilation arrangement for the shafts.

4.5.4 Dry riser and hose coverage

BS 9991 recommends buildings greater than 18 m and less than 50 m in height should be provided with a dry riser system. In the case of unsprinklered buildings, no part of a storey should be more than 45 m from a riser outlet located in the firefighting shaft.

Existing provisions

There are dry riser outlets located within each of the firefighting stair enclosures as shown in Figure 19. All areas of the building are within 45 m.

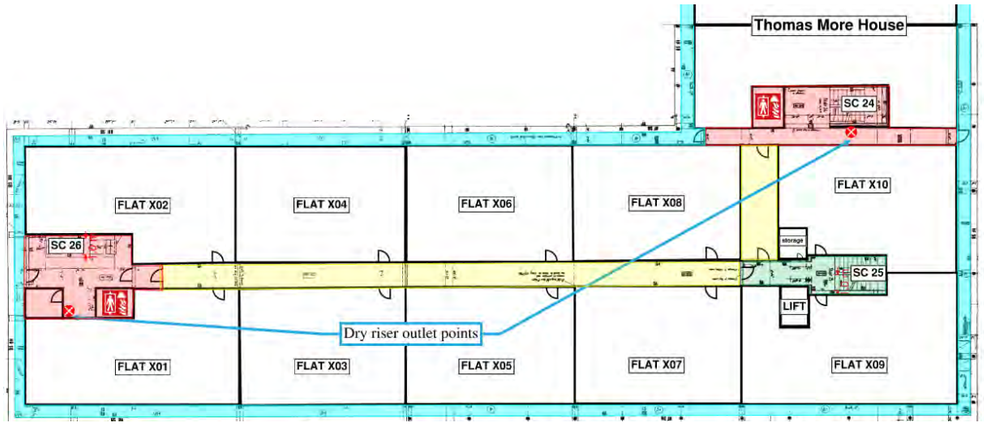


Figure 19: Dry riser outlet points in the building

4.5.5 Water supply for firefighting operations

External hydrants should be provided within 90 m of a dry fire main inlet. Based on the information provided from BE, existing hydrant is within 90 m of Mountjoy House.

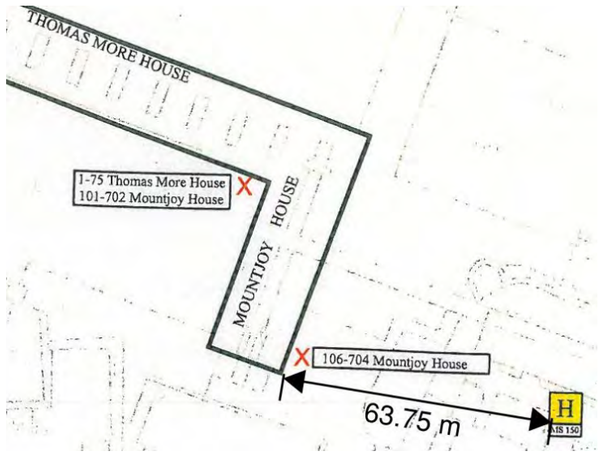


Figure 20: Location of existing fire hydrant

4.6 Fire safety management

In addition to the active and passive fire safety precautions described in the previous sections, robust fire safety management plan and procedures are important for maintaining the fire safety of a building in a holistic manner. In preparing a fire safety management plan (Arup is not aware of an existing plan), the relevant items to be included in the plan are listed and described in Table 4 below. These are based on the recommendations in BS 9991.

Table 4: Fire safety management

Item	Proposed Design
RR(FS)O	Under the Regulatory Reform (Fire Safety) Order legislation, the owner of the building (BE) is fully responsible for fire safety. This includes on-going fire risk assessment, appropriate maintenance of fire safety systems and training of staff. Although not required by fire safety guidance, it is recommended for the fire risk assessment to include the internal areas of the apartments (for example a spot check of vacant apartments). This will serve to mitigate the risk of any amendments to the building which may have an adverse impact on the fire strategy safety (e.g. breaches in compartmentation).
Fire awareness of residents	Due to the nature of residential premises whereby it is difficult to enforce fire safety management within the apartments, there is risk of the residents' actions affecting the implementation of the fire strategy – e.g. by covering smoke detectors or creating penetrations in compartment walls. To minimise the risk of occupants affecting the performance of the fire safety features in the building, all residents must be made aware of their responsibilities in regard to fire safety at the beginning of their residence. It is recommended for all relevant fire safety information should be provided in a tenant handbook. It is the responsibility of the building operators to inform the residents of the defend-in-place evacuation strategy. Residents should also be informed that they are always provided with the option to leave and that they do not have to stay in place in the event of a fire.
Evacuation of PRMs	The evacuation of PRMs will need to be carried out by the BE staff or the fire and rescue service. The responsible person for fire safety (as defined under the RR(FS)O) will need to ensure that each PRM has a personal emergency evacuation procedure (PEEP), and where required, sufficient training and equipment are provided to staff to assist with the evacuation.
Staff training	Sufficient number of BE staff should be adequately trained in fire prevention, fire protection and evacuation procedures including evacuation of PRMs.
Maintenance and testing	An accurate record of fire precautions and procedures for operating and maintaining any fire protection measures within the building, are necessary to enable the owner or end user to plan, document and implement control processes for maintenance and testing of fire safety systems to ensure that they operate effectively in the event of a fire.

Item	Proposed Design
	The External Fire Risk Assessment prepared by Frankham Risk Management Services in January 2018 states that maintenance records have not been recorded up to date and requires to be updated. This includes systems such as: • Firefighting lifts; • Fire alarm and fire detection system; • Fire doors; • Emergency lighting and signage; • Fire stopping registers; • Records of fire brigade attendance.
Control of work on site	The means to control work on site should be determined (e.g. repairs to structure, hot work, cleaning of ductwork). A work control system should include clear lines of responsibility communicated to contractors.
Emergency planning	A good relationship with the fire and rescue service has benefits as it ensure that the fire and rescue service is able to have an appropriate pre-determined response strategy for Mountjoy House and enables the owner to seek advice where appropriate. Any changes affecting the layouts, fire safety systems, fire growth characteristics, and other relevant factors should be communicated to the fire service.
Fire safety documentation	Fire safety information that sets out the basis on which the fire safety design was planned (i.e. this Fire Strategy Report), the fire safety management plan, the staff responsibilities etc. should be kept up to date and stored in a document management system that allows the information to be easily retrieved in the future.
General housekeeping	Good housekeeping is essential to reduce the likelihood of a fire starting or developing, and escape routes being blocked. This includes: • Maintaining all escape routes free from obstruction/ or combustibles; • Fire doors to perform as intended; • Arrangement for waste control and disposal or accumulation of waste; • Floor surface of escape routes to be maintainable, even and slip-resistant. The Fire Risk Assessment also states that fire extinguishers should be removed from the building as it could be mishandled by the residents who are not trained. The management team sure ensure there are no fire extinguishers in the common areas of the building.

5 Conclusion

The purpose of this fire safety review of Mountjoy House has been to determine the existing intent of the fire safety design and to record the findings in a fire strategy report (this document).

This report describes the existing fire safety precautions in the building and compares them with current standards BS 9991 and BS 9999, and where applicable the latest update of the Approved Document B Volume 1.

Where the fire safety precautions comply with the current standards, no further action is proposed and the fire information will form part of the building fire strategy. Where the precautions are not deemed to comply with the current standards, they have been qualitatively assessed to identify the life safety risks to the building occupants due to those non-compliances. The outcomes of the assessment will result in one of the following:

- Where considered acceptable to remain as existing, recommend retaining the current provisions as long as the provisions are being maintained in good operation conditions; or
- Recommendations on possible options for enhancements/upgrades where the current fire safety provisions are considered inadequate;

BE will then consider any constraints to implement the recommendations made by Arup.

Refer to Table 1 for the full list of recommendations and the reasons/benefits behind those recommendations.

Appendix A

Fire Strategy Mark up

A1 Means of warning and escape

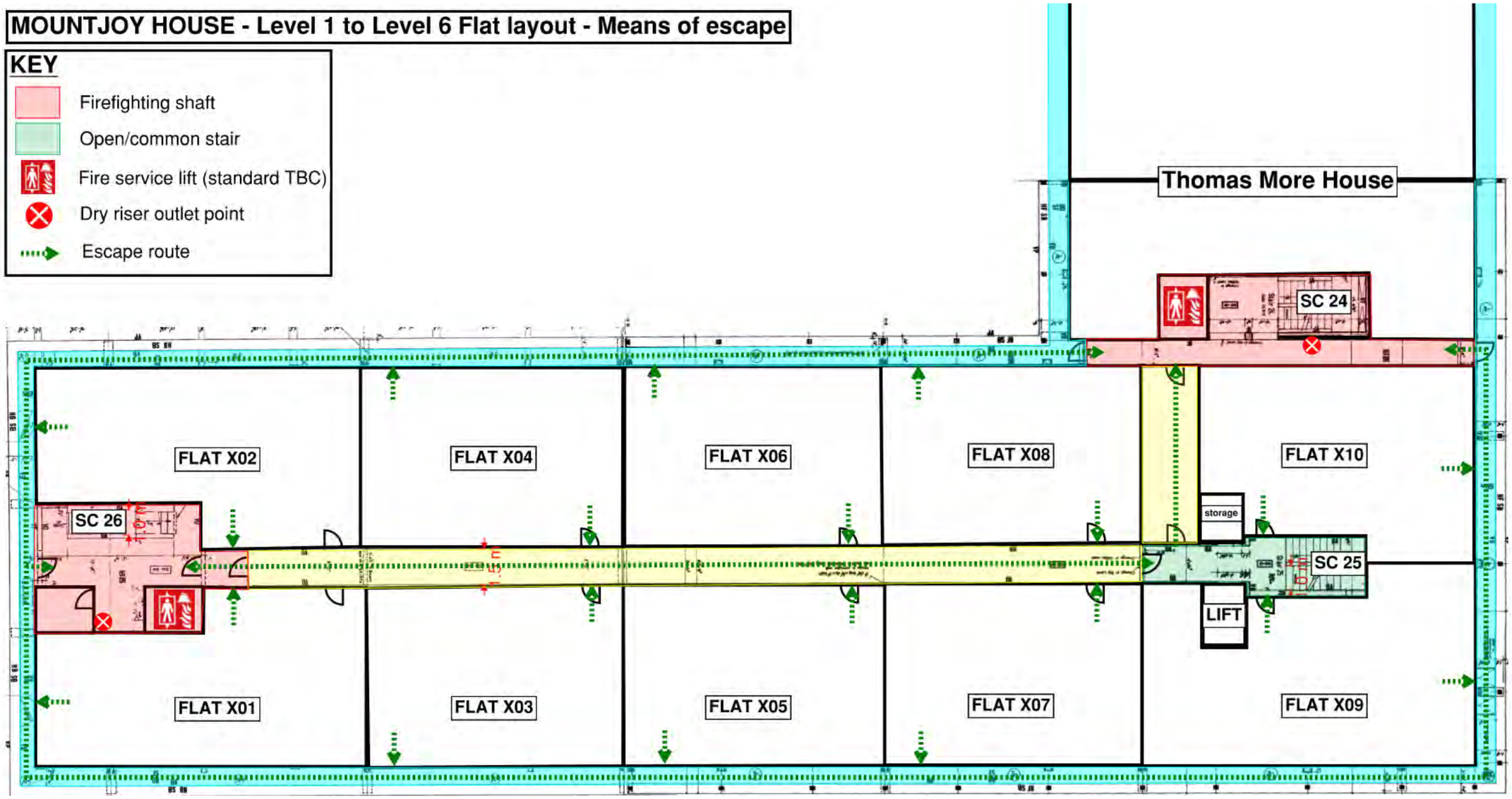


Figure 21: Means of warning and escape for typical residential level (L1 - L6)

A2 Firefighting access and facilities

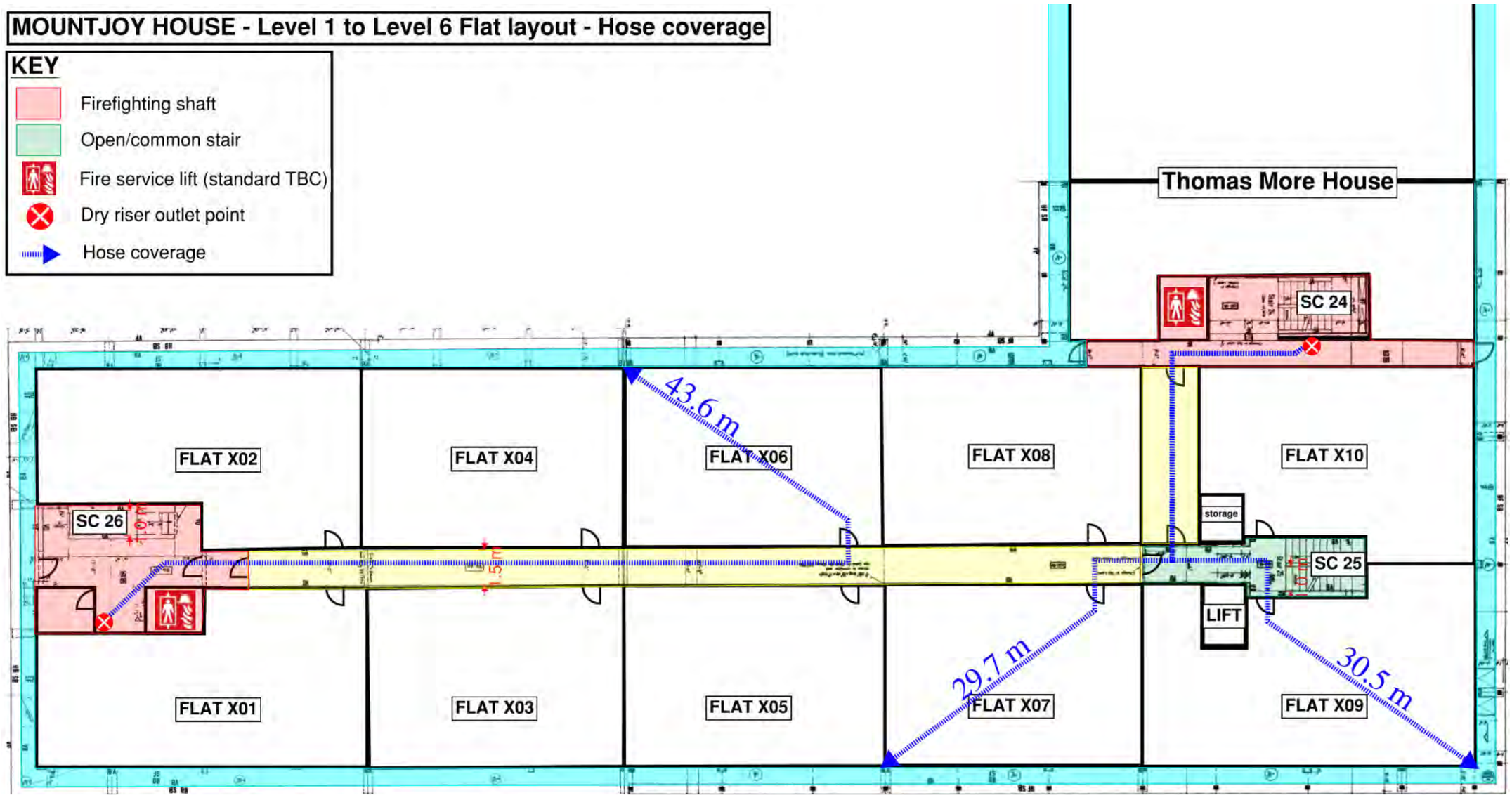


Figure 22: Firefighting facilities and access for Mountjoy House for typical residential level (L1 - L6)

A3 Compartmentation

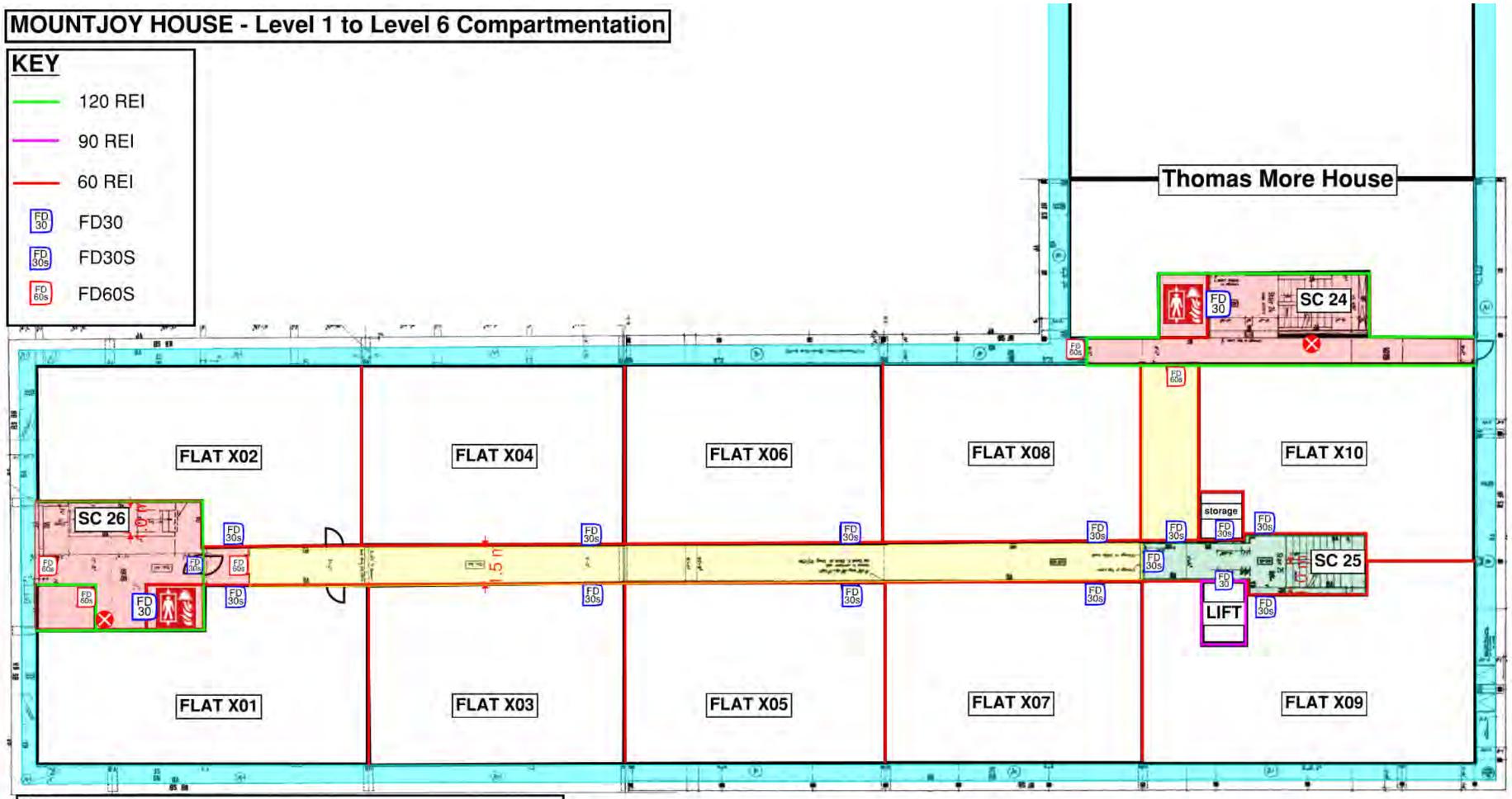
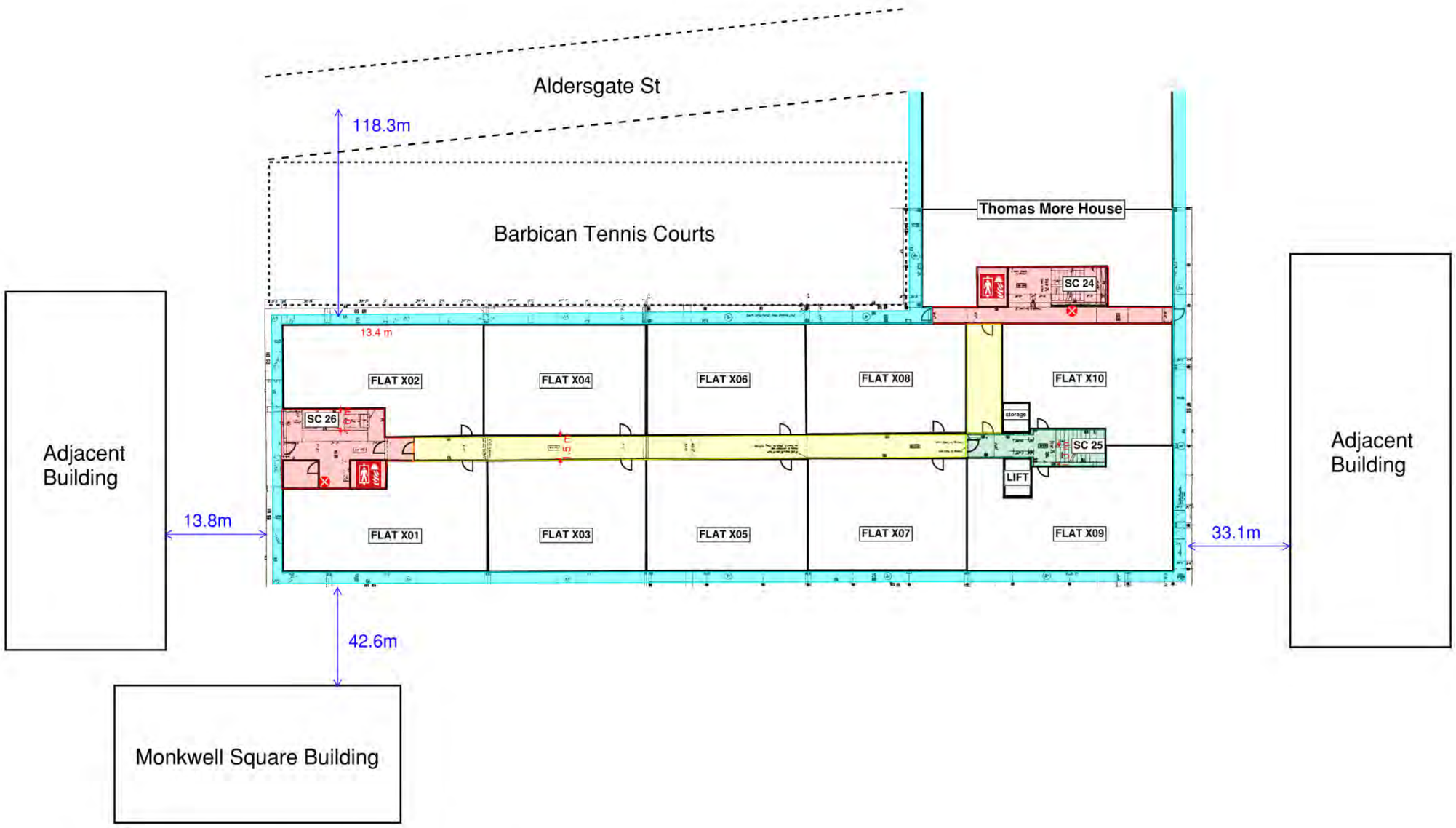


Figure 23: Mountjoy House compartmentation

Appendix B

External Fire Spread Assessment



External Fire Spread Calculation - All within the required minimum separation distance

Case ID	Group ID	Purpose Group	Method ID	Calculation Method	Height (m)	Width (m)	Boundary (m)	Unprotected (%)
Flat X01_S	1	Residential (Dwellings)	2	Minimum Separation Distance	2.70	13.40	3.53	100.0
Flat X01_W	1	Residential (Dwellings)	2	Minimum Separation Distance	2.70	5.40	2.50	100.0
Flat X09_E	1	Residential (Dwellings)	2	Minimum Separation Distance	2.70	8.30	2.99	100.0
Flat X02_N	1	Residential (Dwellings)	2	Minimum Separation Distance	2.70	13.40	3.53	100.0

Figure 24: EFS assessment calculation for Mountjoy House

Appendix C

PlanRadar Report

BARBICAN RESI - MOUNTJOY HOUSE

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Project end:

Country:
Client Name: Barbican Estate
All tickets: 17

Created by: Arup Fire Plan Radar 9
Street:

Zip code:
City:
Project description: Barbican Residential Retrospective fire strategy
Project website:

Open tickets: 17

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Non compliant with the Fire Strategy: No

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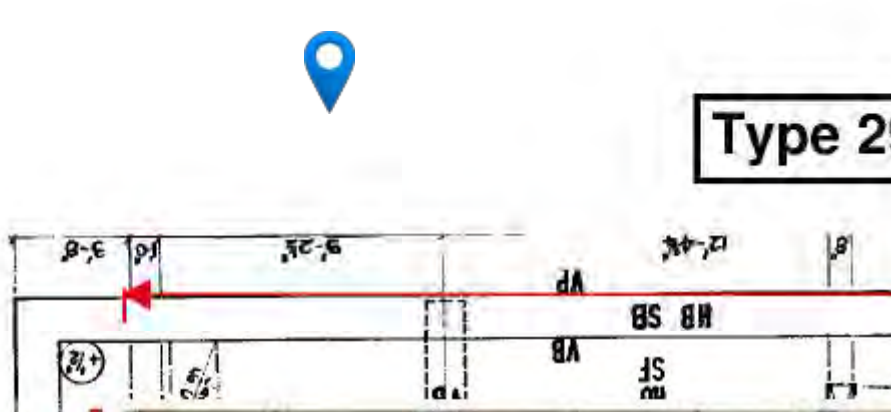
Updated: 07/03/2022 02:11 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



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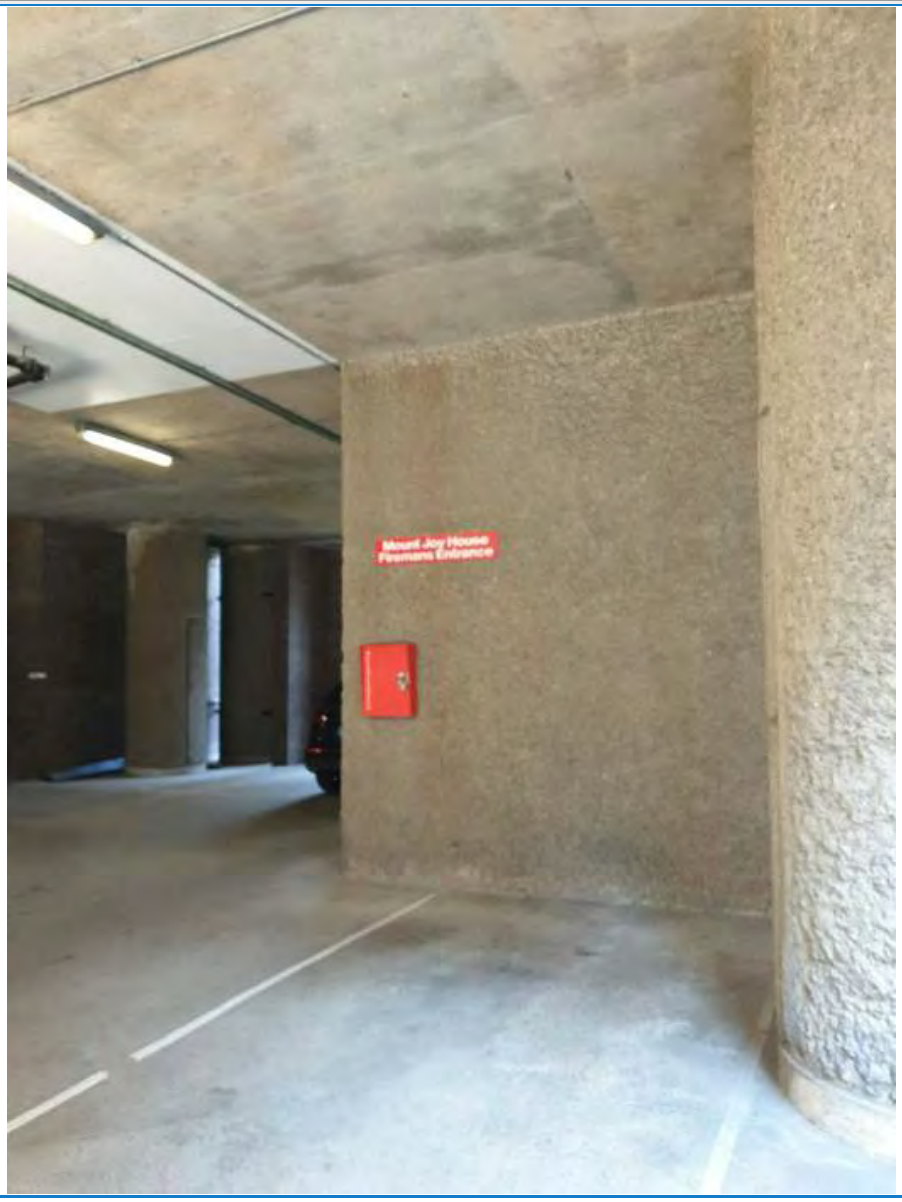

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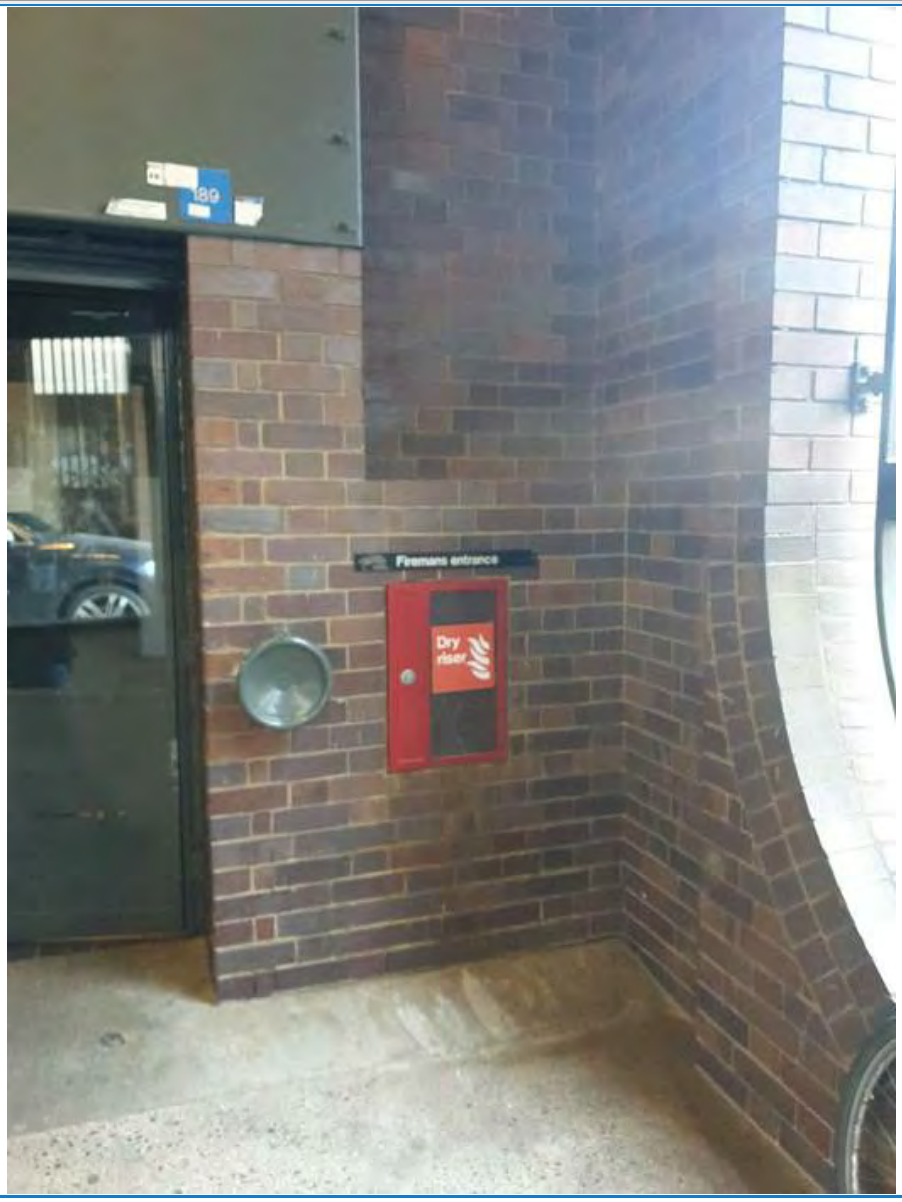

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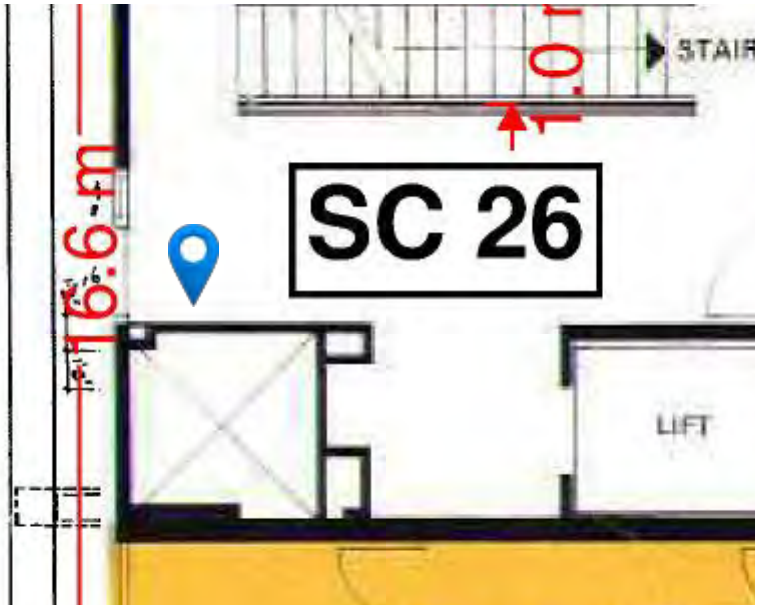
Details:

Plan:



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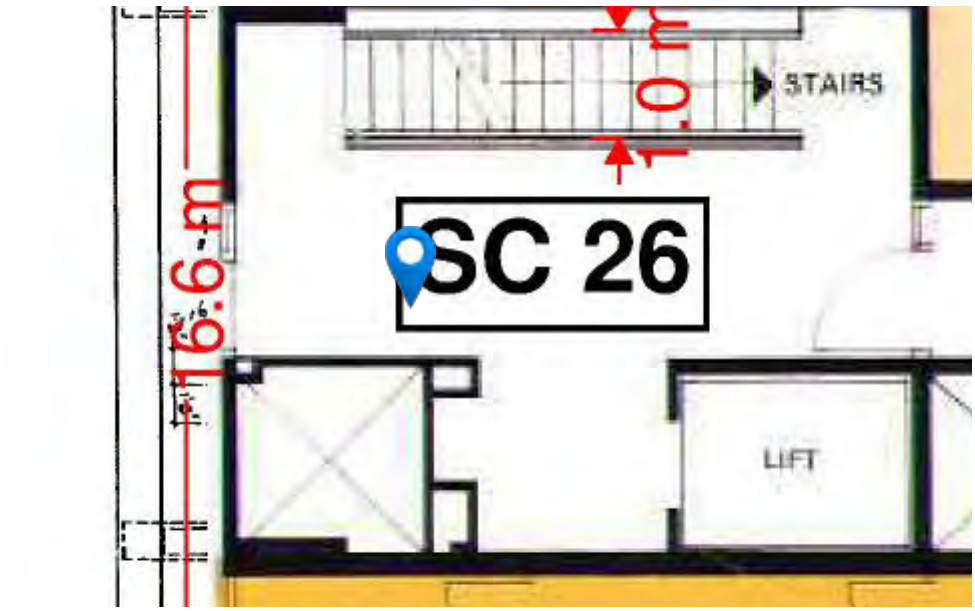
Plan:



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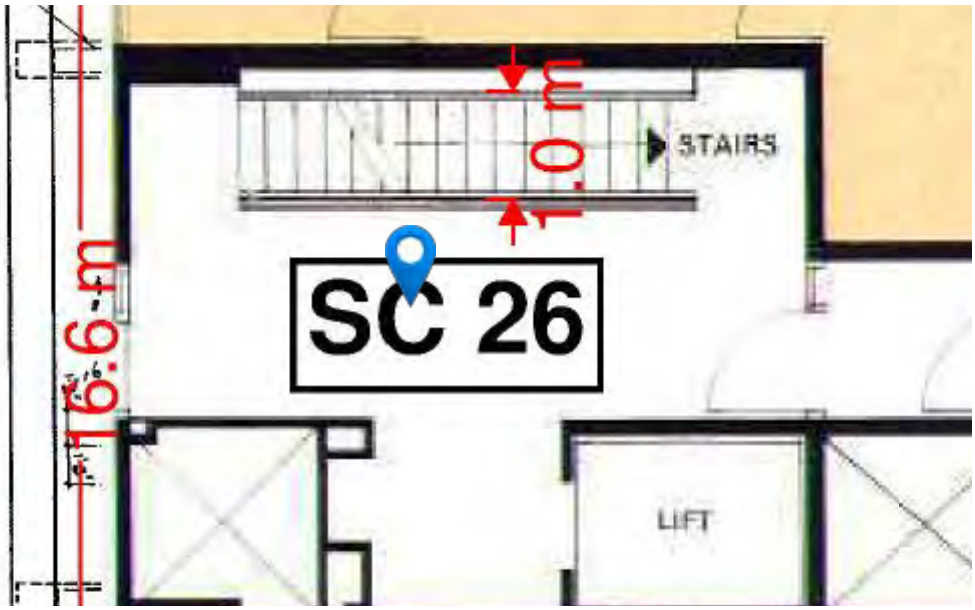

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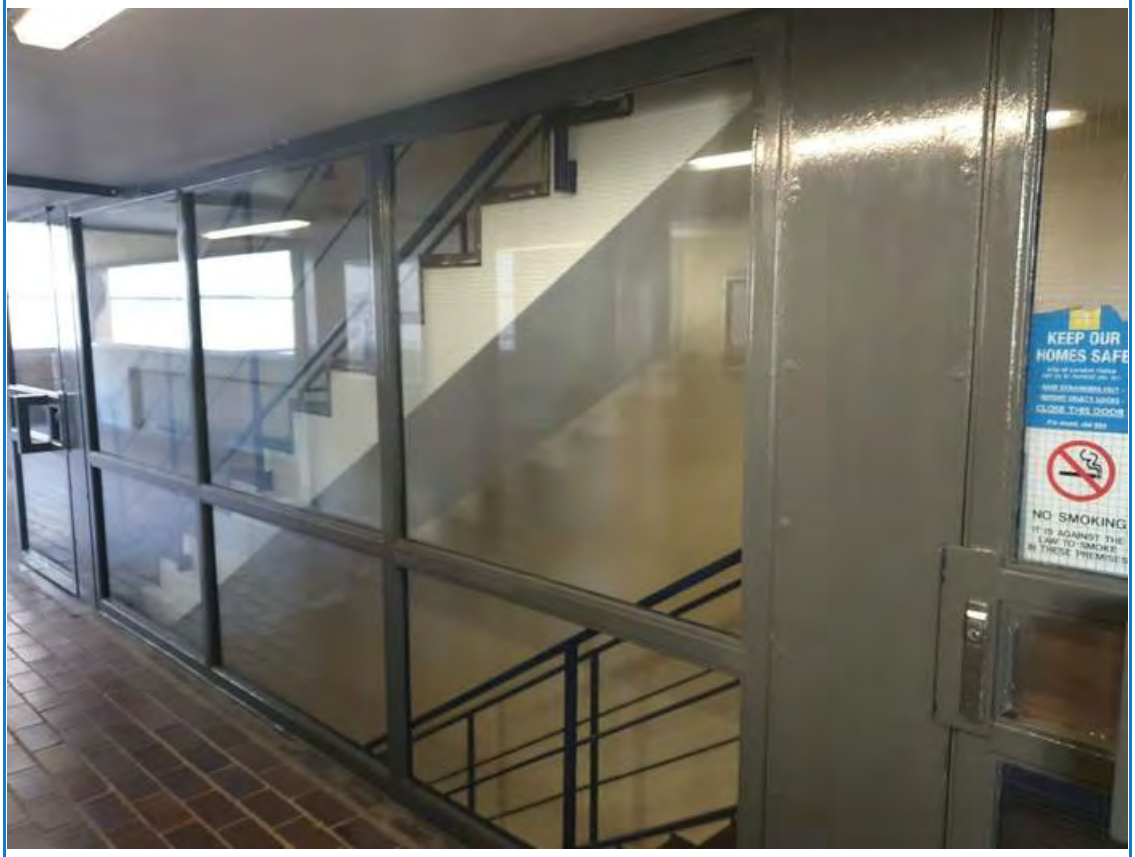

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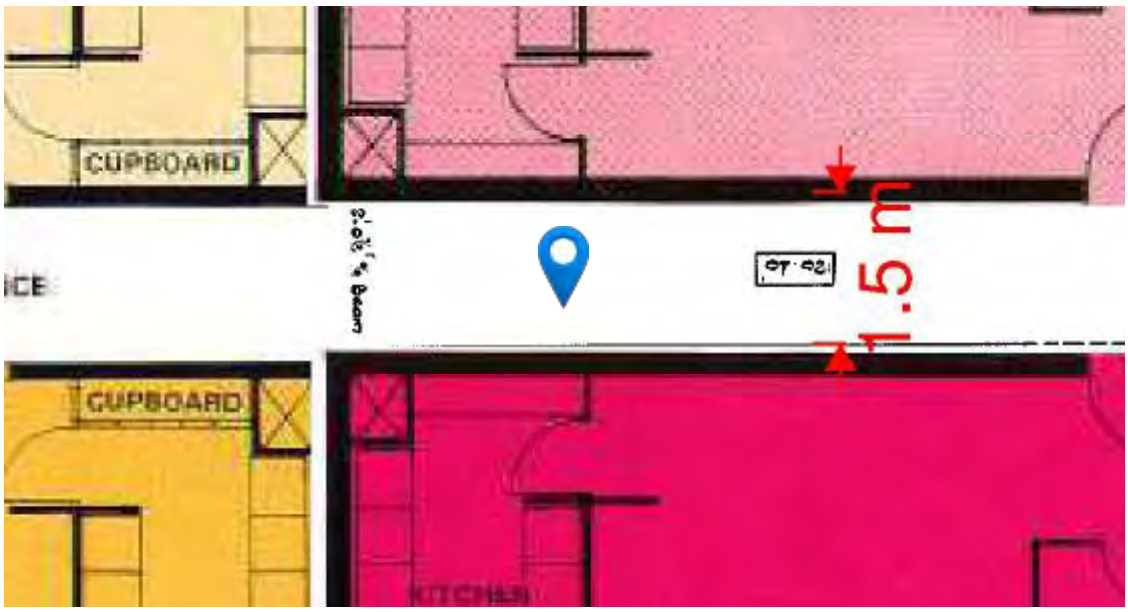
Details:

Plan:



Images:

1. 07/03/2022 02:19 PM

Form: General

Layer: GF
Number of extensions: 0
Created on: 07/03/2022 02:21 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: thomas more and mountjoy share the balcony and stairs
ID: 8
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:21 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

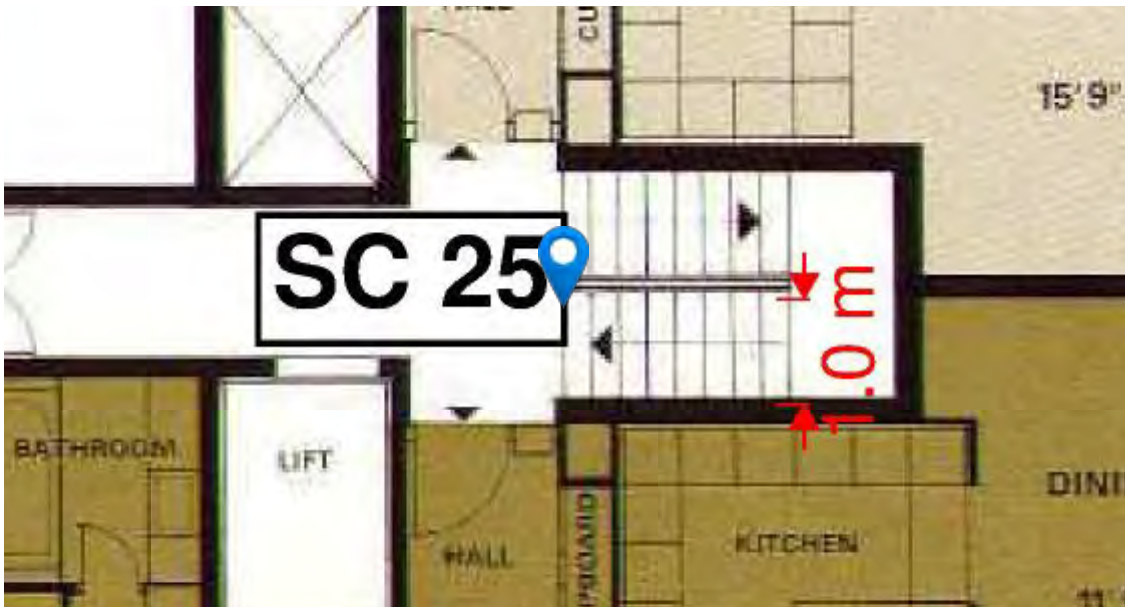
1. 07/03/2022 02:20 PM

Form: General

Layer: GF
Number of extensions: 0
Created on: 07/03/2022 02:24 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Title: open stair with no doors for the next to flats
ID: 9
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:24 PM
Time:
Non compliant with the Fire Strategy: No

Plan:



Form: General

Layer: GF
Number of extensions: 0
Created on: 07/03/2022 02:29 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Title: infirmation on lift 24 25 26 will be sent through
ID: 10
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:29 PM
Time:
Non compliant with the Fire Strategy: No

Plan:

Form: General

Layer: GF
Number of extensions: 0
Created on: 07/03/2022 02:31 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Title: l7 to use ladder to go up the roof level with all plant rooms
ID: 11
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:31 PM
Time:
Non compliant with the Fire Strategy: No

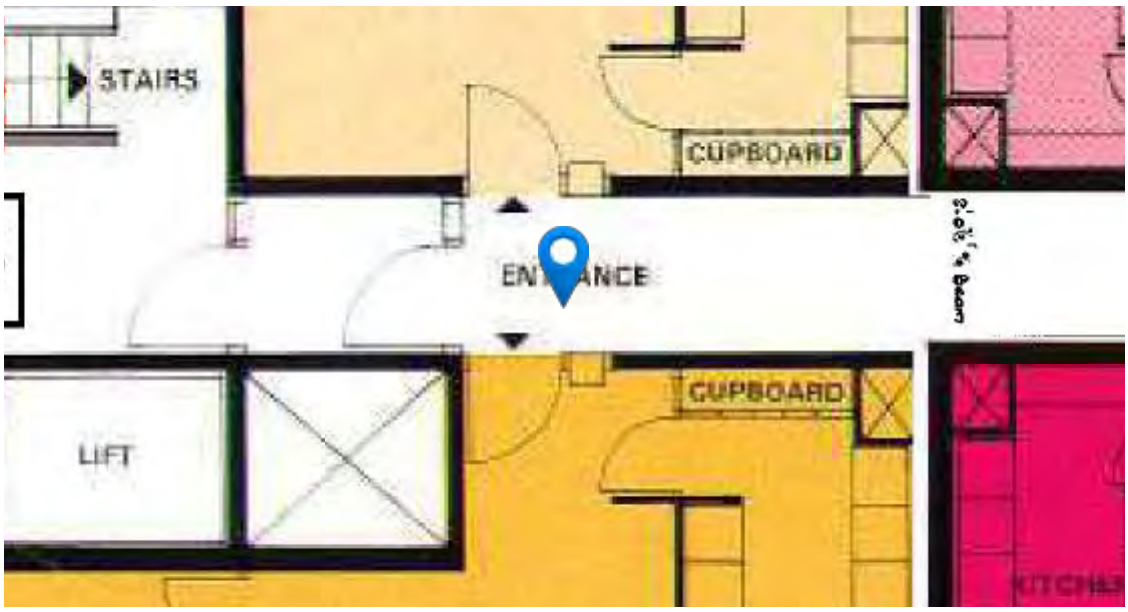
Plan:

Form: General

Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:13 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Title: sign to be provided to show access level
ID: 44
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:13 PM
Time:
Non compliant with the Fire Strategy: No

Plan:



Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:14 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l03 lift sc 25 doesnt have fire control
ID: 45
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:14 PM
Date:
Compliant with the Fire Strategy?: No
Details:

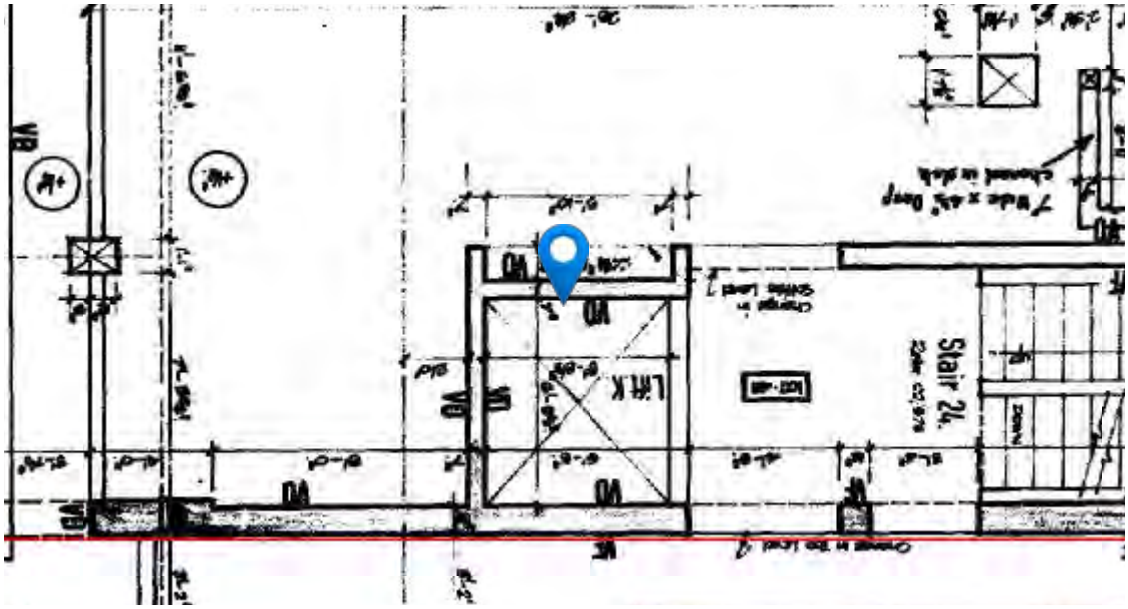
Plan:

Images:

1. 07/03/2022 04:14 PM

Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:16 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No
Title: l03 sc 24 smoke vent and ff lift
ID: 46
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:16 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

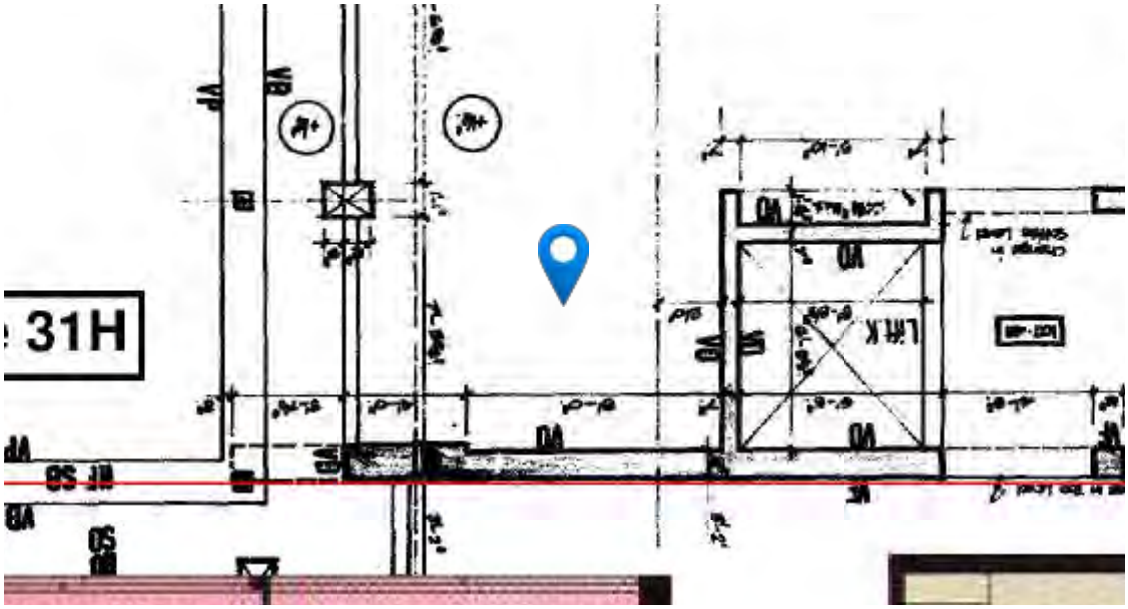


Images:

1. 07/03/2022 04:16 PM

Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:17 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No
Title: sc 24 l03 entrance
ID: 47
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:17 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



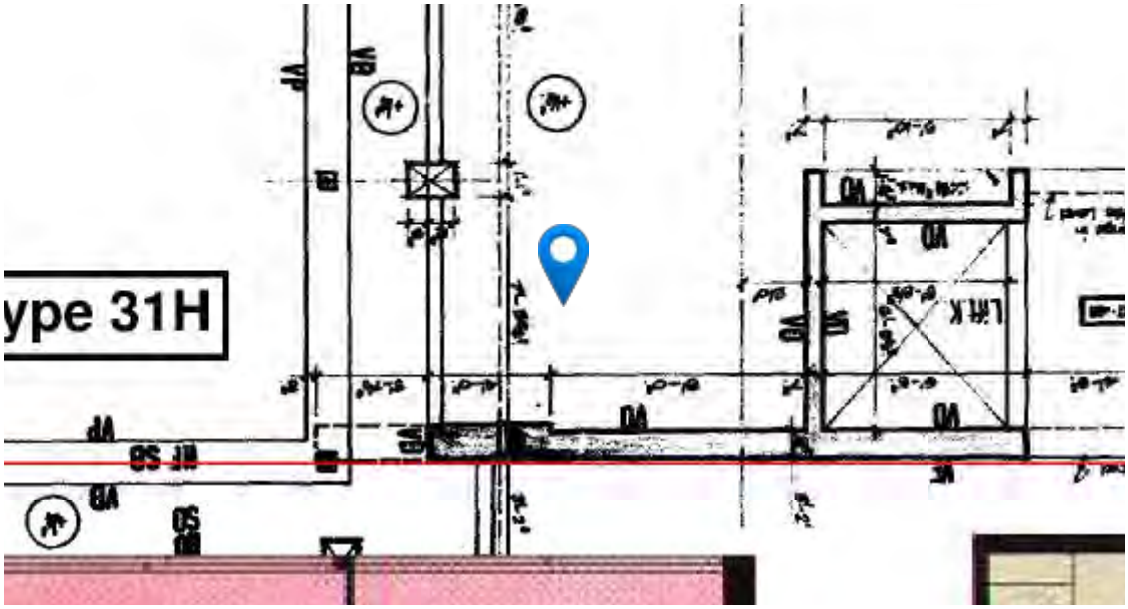
Images:

1. 07/03/2022 04:16 PM

Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:18 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: dry riser inlet point for fireman in sc24
ID: 48
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:18 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



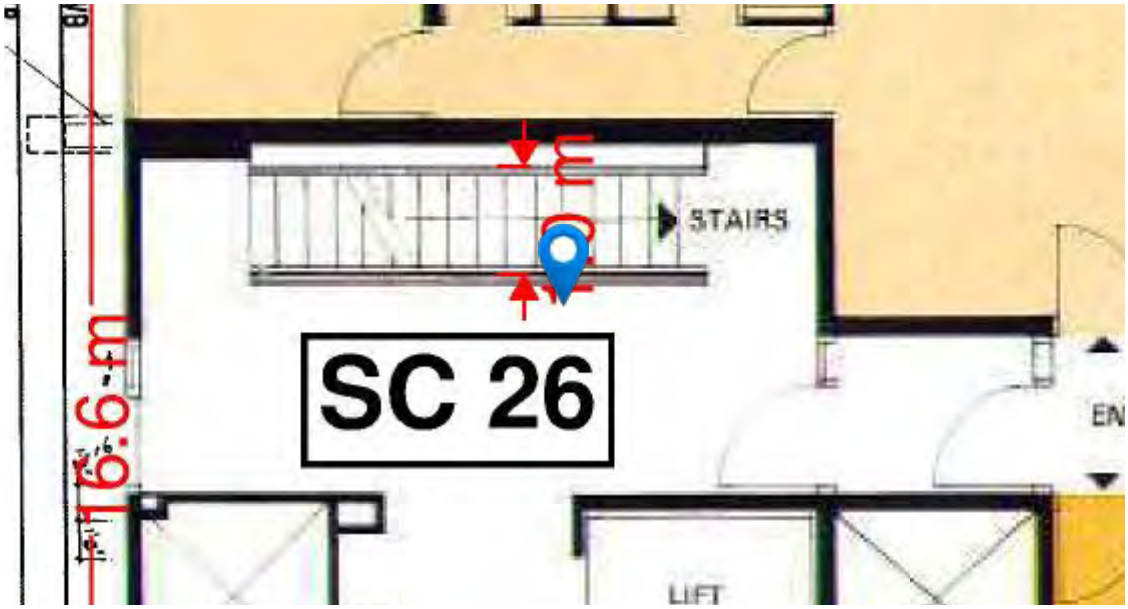
Images:

1. 07/03/2022 04:18 PM

Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:20 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l03 sc 26 width 1m
ID: 49
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:20 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

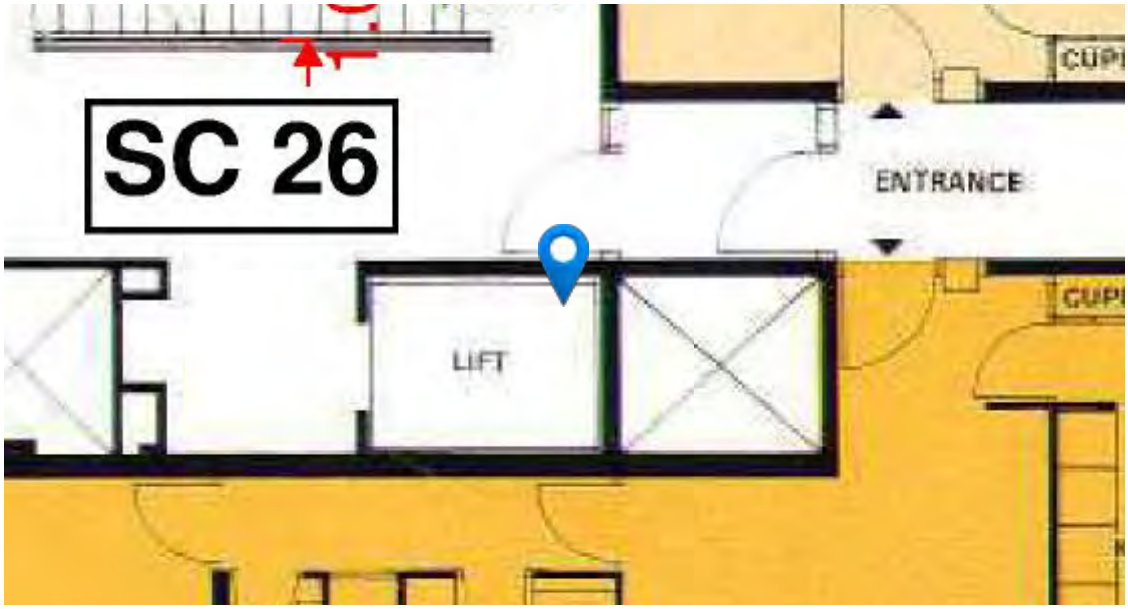
2. 07/03/2022 04:19 PM

1. 07/03/2022 04:19 PM

Form: General
Layer: GF
Number of extensions: 0
Created on: 07/03/2022 04:20 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: sc26 down to l04
ID: 50
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:20 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 04:20 PM

BARBICAN RESI - MOUNTJOY HOUSE

Created on: 08/03/2022 10:33 AM
Project name: Barbican Resi - Mountjoy House
Project code: 279095-00
Project start: 07/03/2022
Project end:

Country:
Client Name: Barbican Estate
All tickets: 18

Created by: Arup Fire Plan Radar 9
Street:

Zip code:
City:
Project description: Barbican Residential Retrospective fire strategy
Project website:

Open tickets: 18

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:10 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: lift 24 in l6
ID: 24
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:10 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

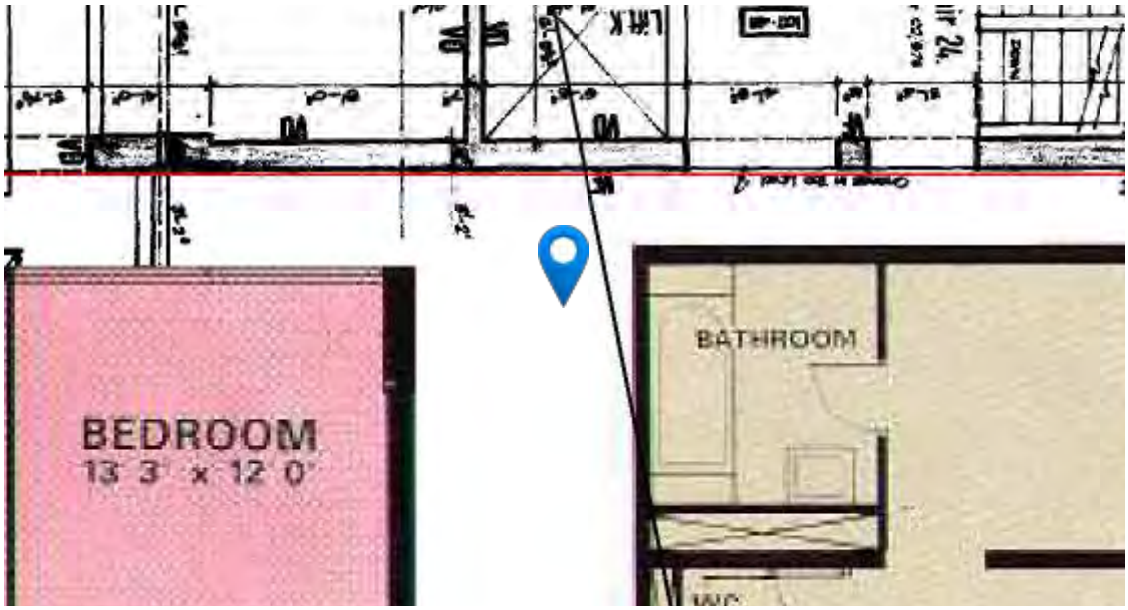
1. 07/03/2022 03:10 PM

Form: General

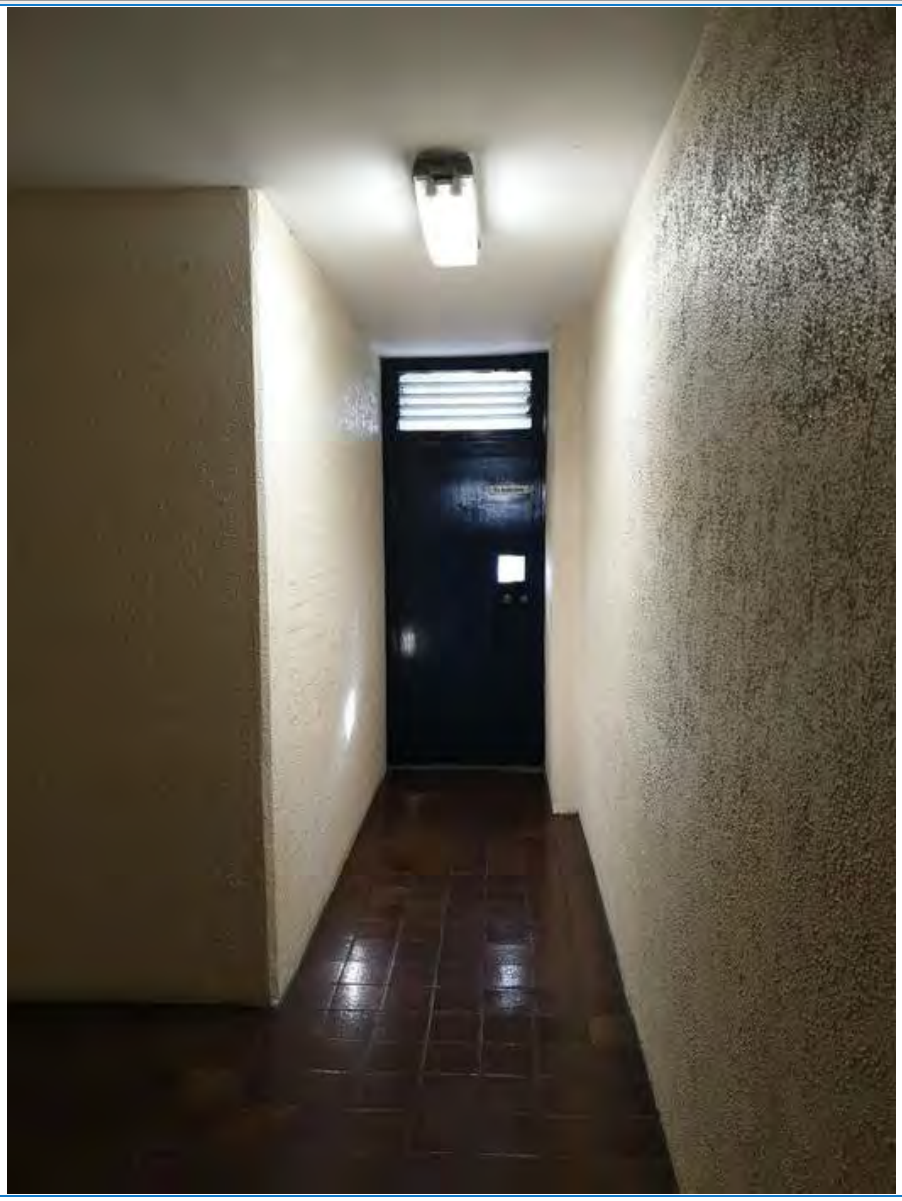
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:12 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: L6 1. door to mountjoy balcony 2. corridor from sc24 to sc25 3. lift to sc24 4. door to behind the mountjoy balcony
ID: 25
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:12 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

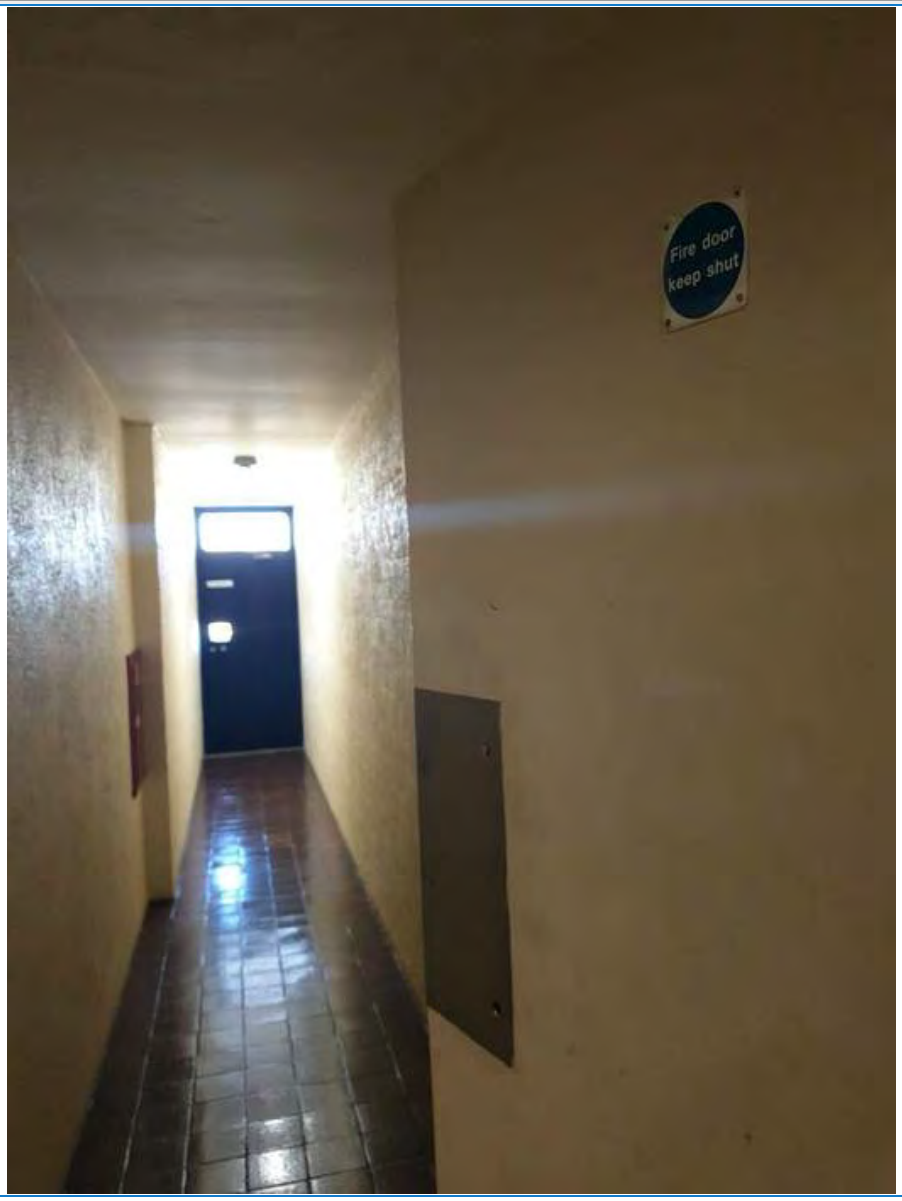


Images:



4. 07/03/2022 03:11 PM

1. 07/03/2022 03:12 PM



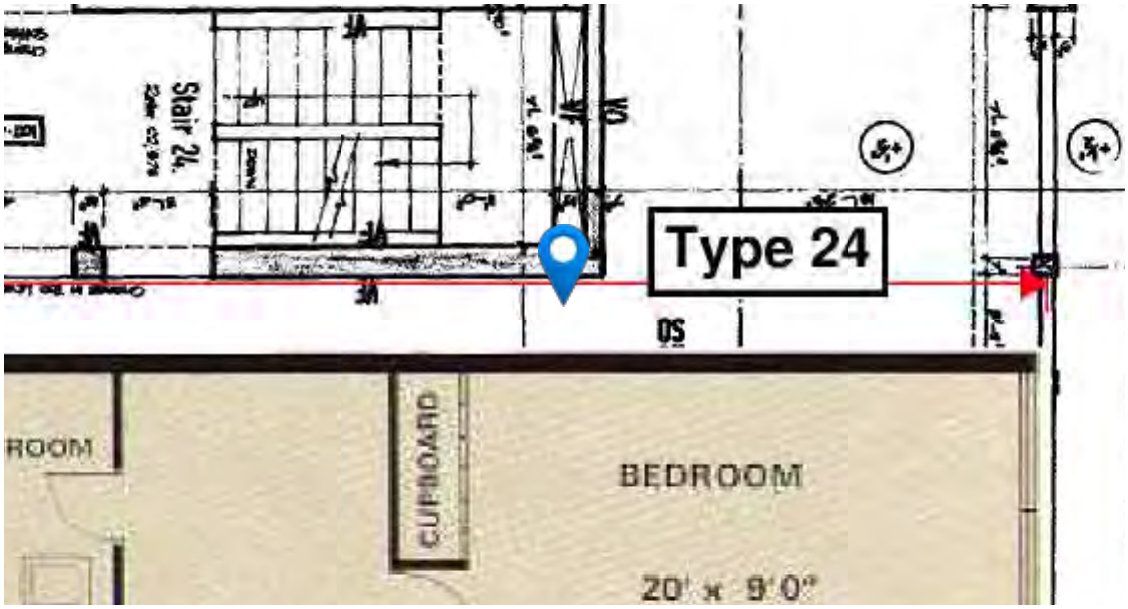
2. 07/03/2022 03:12 PM

3. 07/03/2022 03:12 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:13 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l6 dry riser outlet for sc24
ID: 26
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:13 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



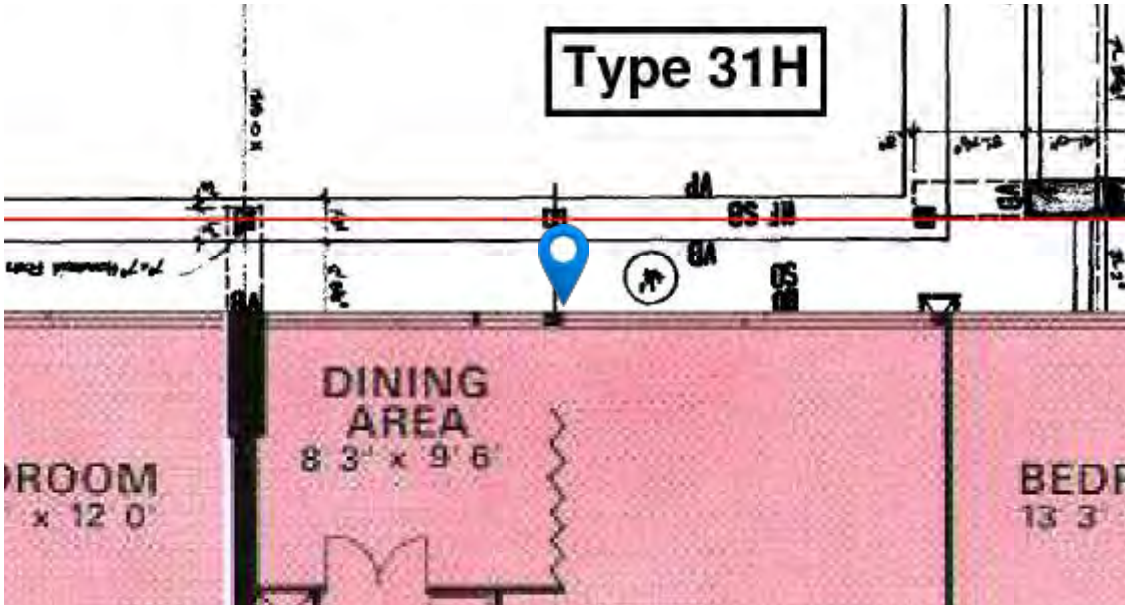
Images:

1. 07/03/2022 03:13 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:15 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: balcomy widths 560 privacy screen
ID: 27
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:15 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

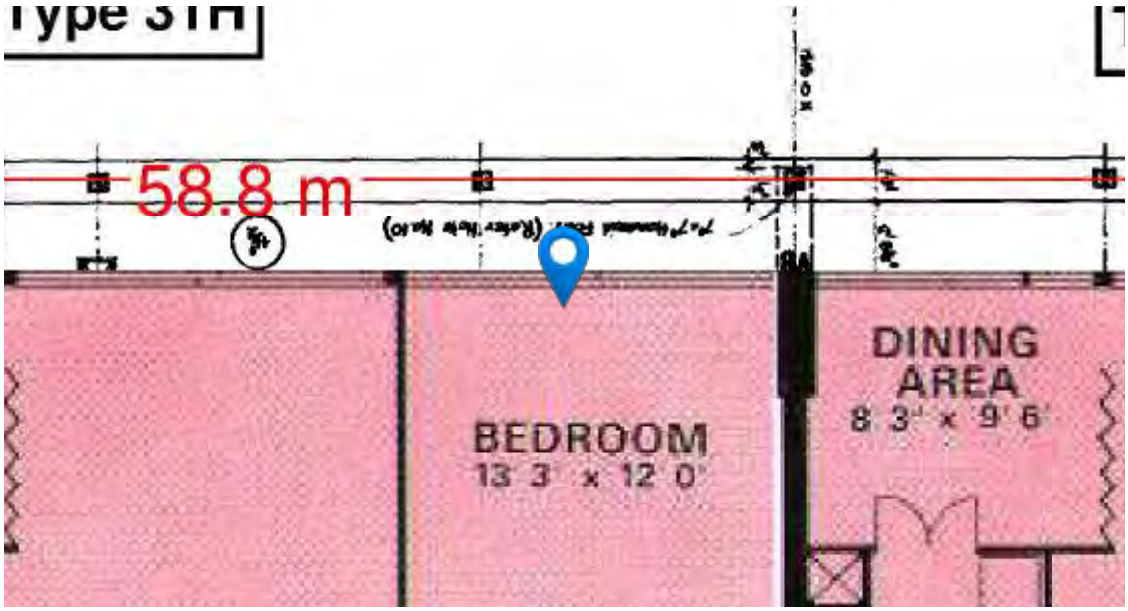
1. 07/03/2022 03:14 PM

2. 07/03/2022 03:15 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:16 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: level change between balcony and flat
ID: 28
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:16 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 03:16 PM

Form: General

Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:21 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

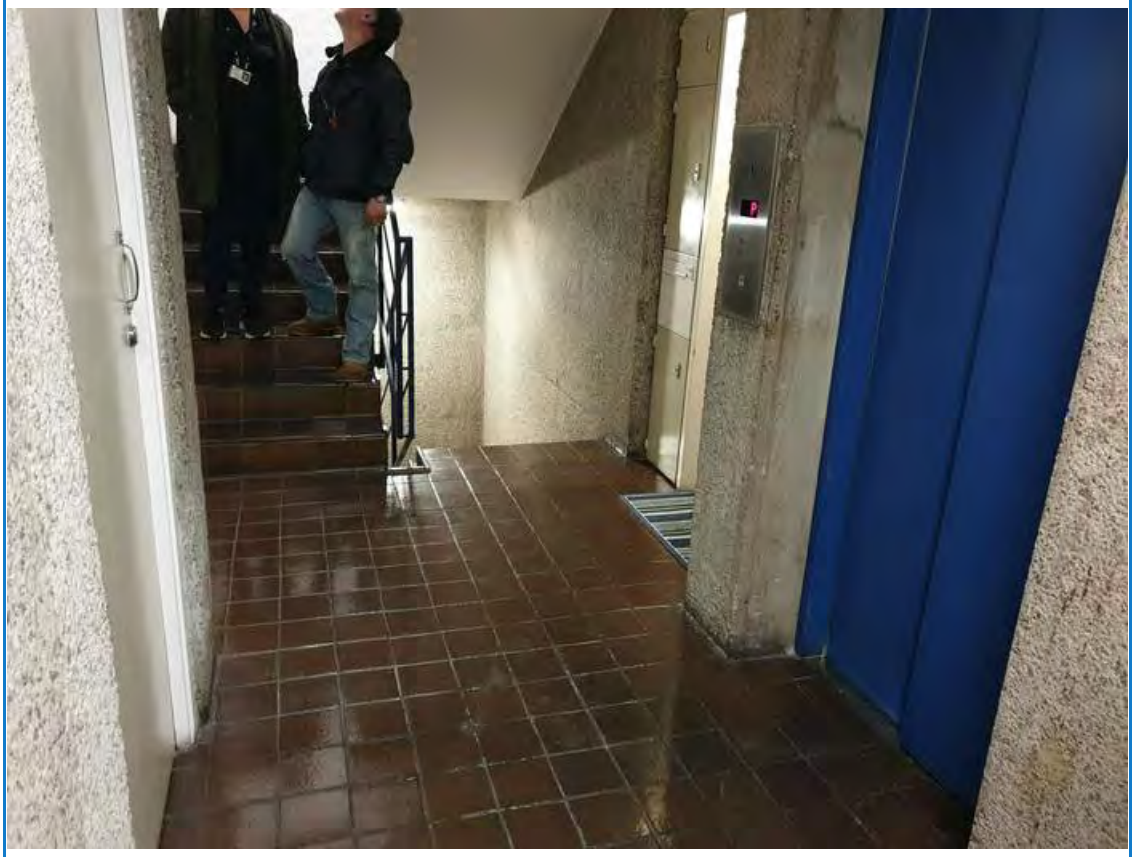
Title: l6 1. lobby from sc24 to sc25 2. fire door to central corridor 3. lift and sc 25
ID: 29
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:21 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

1. 07/03/2022 03:20 PM

2. 07/03/2022 03:20 PM



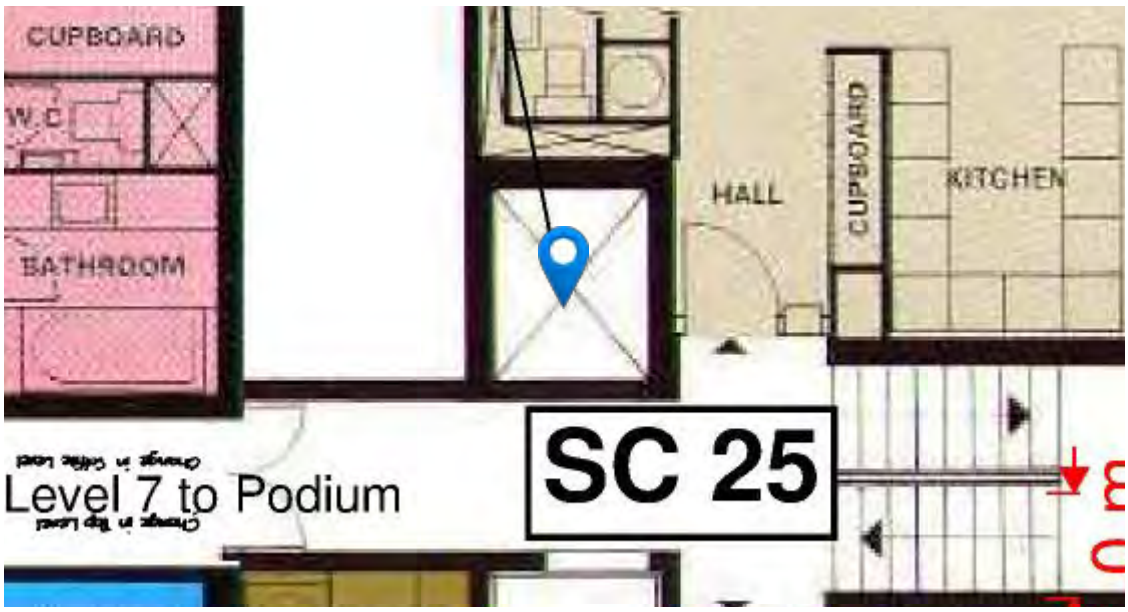
3. 07/03/2022 03:20 PM

Form: General

Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:22 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: residential store room from l1 to l6 in sc 25
ID: 30
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:22 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

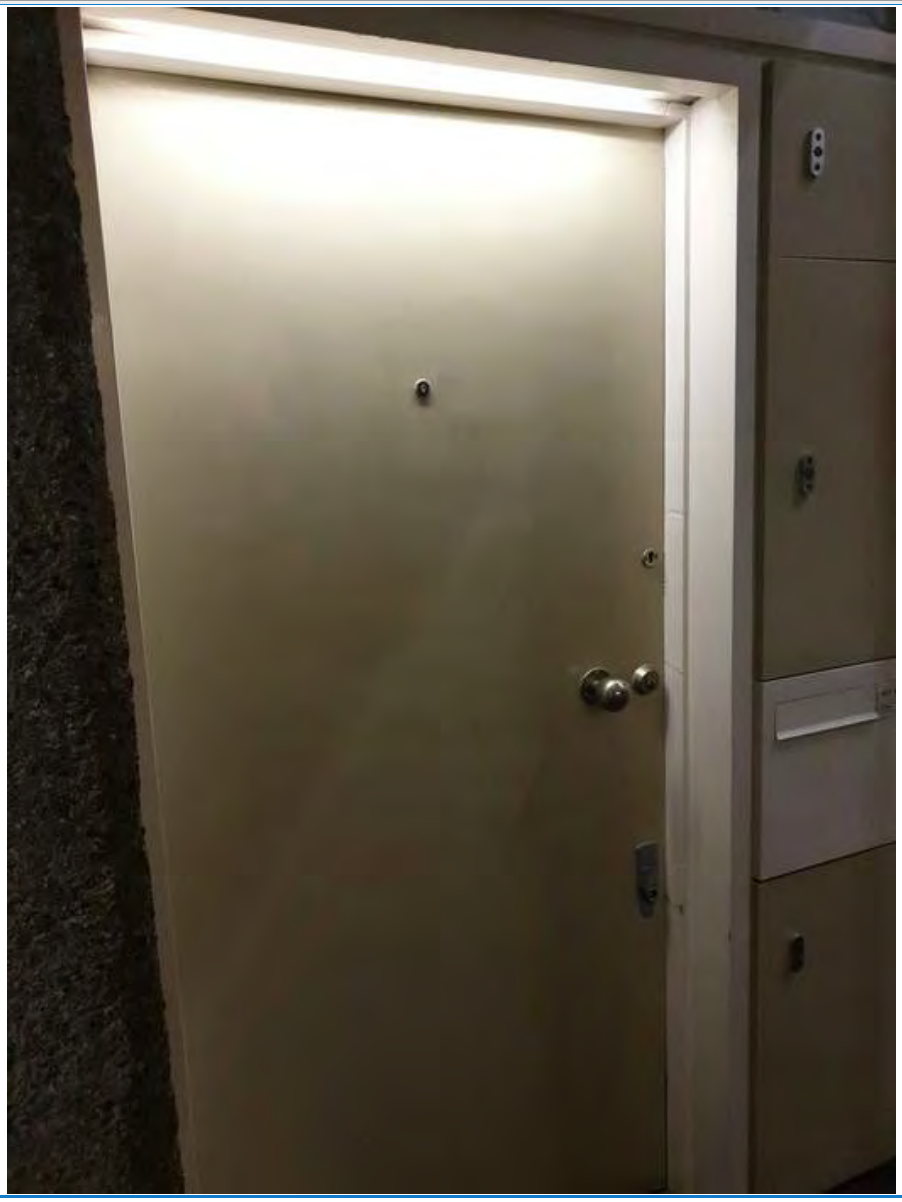
1. 07/03/2022 03:22 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:23 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: flats open on to sc25
ID: 31
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:23 PM
Date:
Compliant with the Fire Strategy?: No
Details:

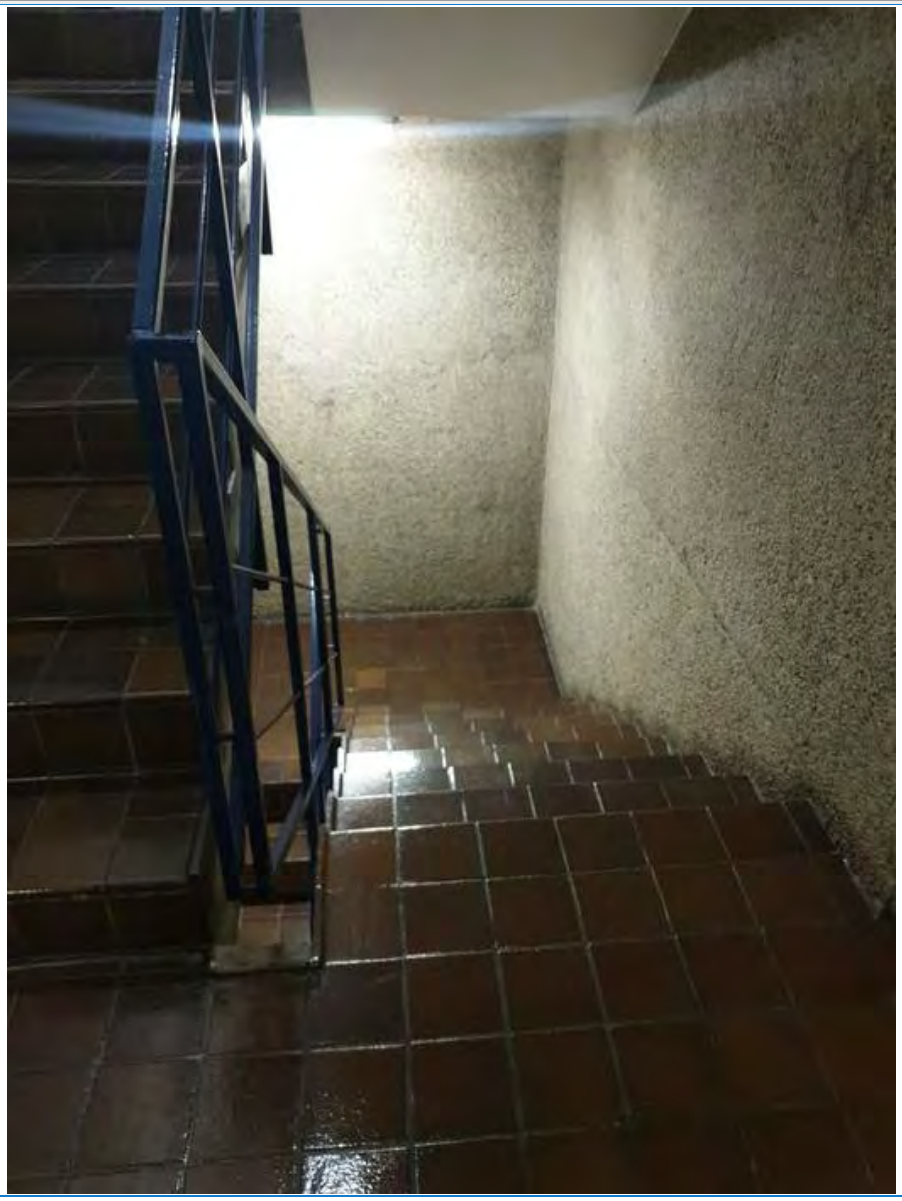
Plan:

Images:



1. 07/03/2022 03:23 PM

2. 07/03/2022 03:23 PM



3. 07/03/2022 03:23 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:24 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: sc 25 lift
ID: 32
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:24 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

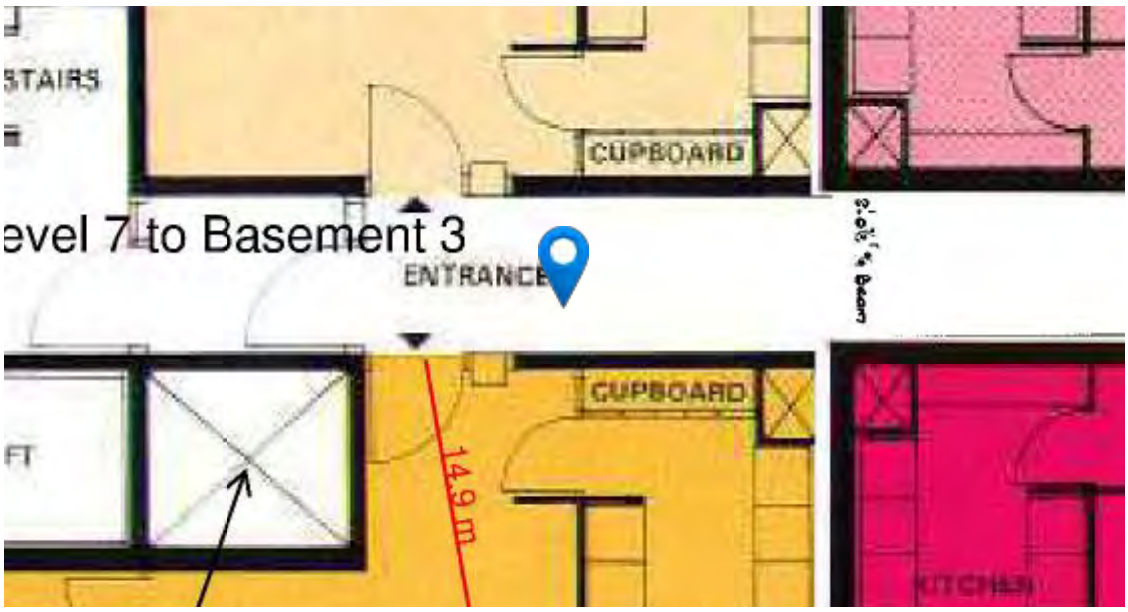
1. 07/03/2022 03:24 PM

Form: General

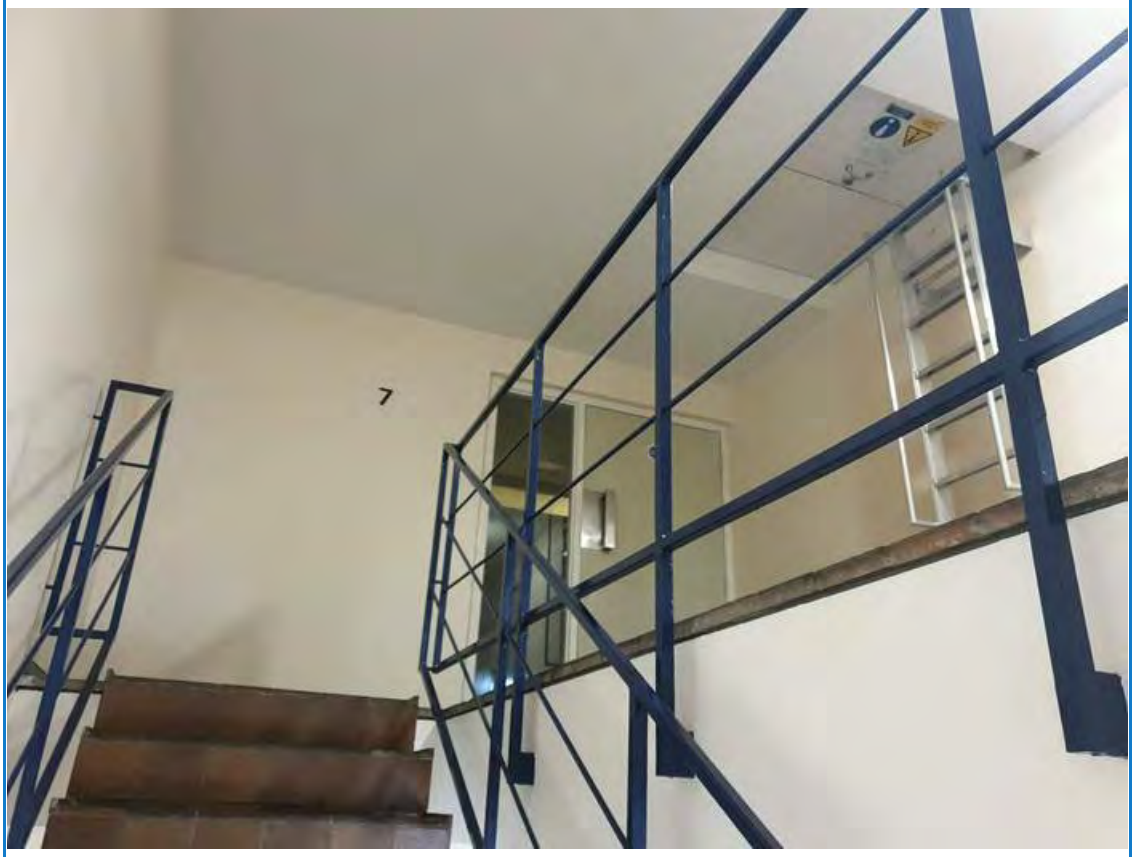
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:29 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: from l6 to l7 it is separated by the door as it is a ff stair
ID: 35
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:29 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:



1. 07/03/2022 03:29 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:36 PM
Date:
Compliant with the Fire Strategy?: No
Details:

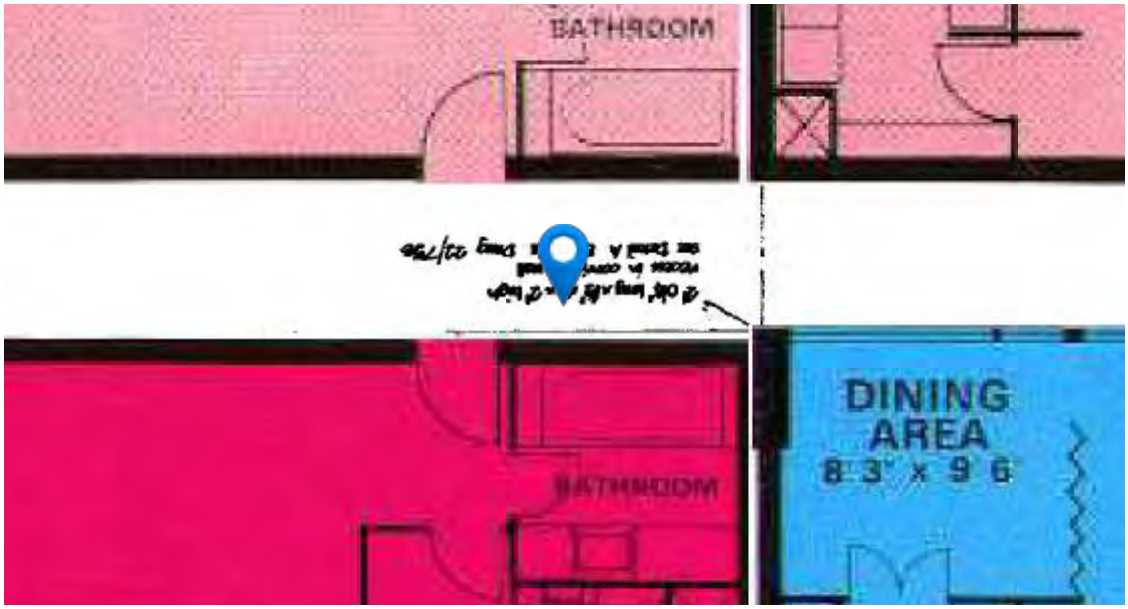
Title: sc 24 25 26 lifts do not ground
ID: 36
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:36 PM
Time:
Non compliant with the Fire Strategy: No

Plan:

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:44 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: corridor width 1480
ID: 37
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:44 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



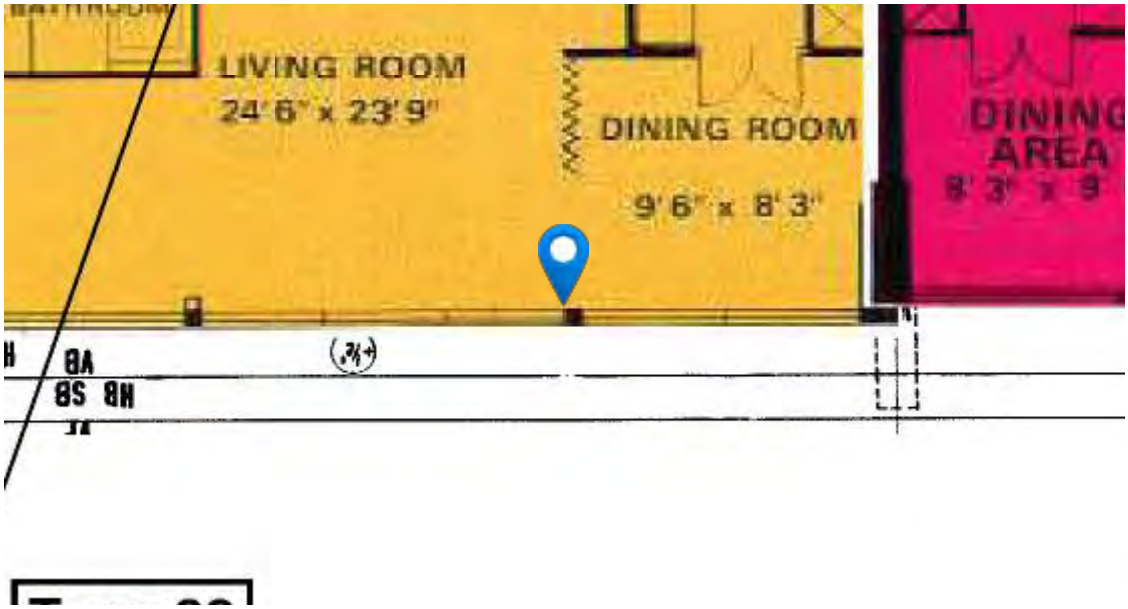
Images:

1. 07/03/2022 03:43 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 03:57 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: level change in flat 210
ID: 39
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:57 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 03:57 PM

Form: General

Title: corner flats have issues with comparmentation in the kitchen areas with risers going through the entire building, no vertical separation 1, 2 9, and 10 flats

Layer: 220218 Mountjoy_Site drawings (1)
ID: 40
Number of extensions: 0
Created by: Arup Fire Plan Radar 9
Created on: 07/03/2022 04:02 PM
Updated: 07/03/2022 04:02 PM
Updated by: Arup Fire Plan Radar 9
Date:
Time:
Compliant with the Fire Strategy?: No
Non compliant with the Fire Strategy: No
Details:

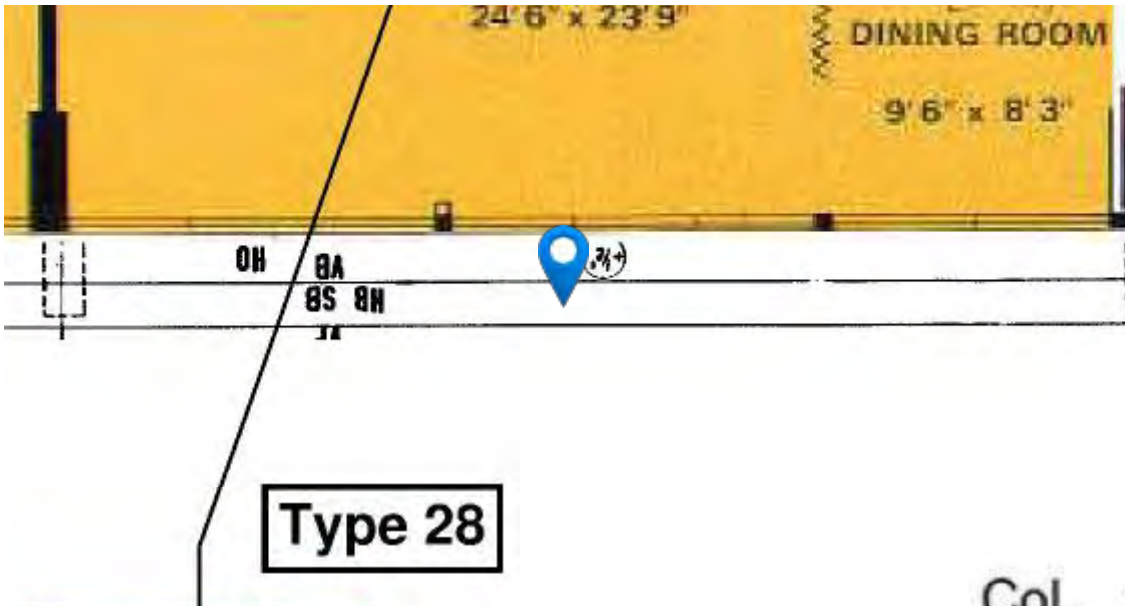
Plan:

Form: General

Title: flat 210 access to balcomy from the bedroom available through a window. the different flats are windows and doors mixture access

Layer: 220218 Mountjoy_Site drawings (1)
ID: 41
Number of extensions: 0
Created by: Arup Fire Plan Radar 9
Created on: 07/03/2022 04:03 PM
Updated: 07/03/2022 04:04 PM
Updated by: Arup Fire Plan Radar 9
Date:
Time:
Compliant with the Fire Strategy?: No
Non compliant with the Fire Strategy: No
Details:

Plan:



Images:

1. 07/03/2022 04:03 PM

Form: General
Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 04:07 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: flat 210 kitchen duct to shunt duct
ID: 42
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:08 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

1. 07/03/2022 04:07 PM

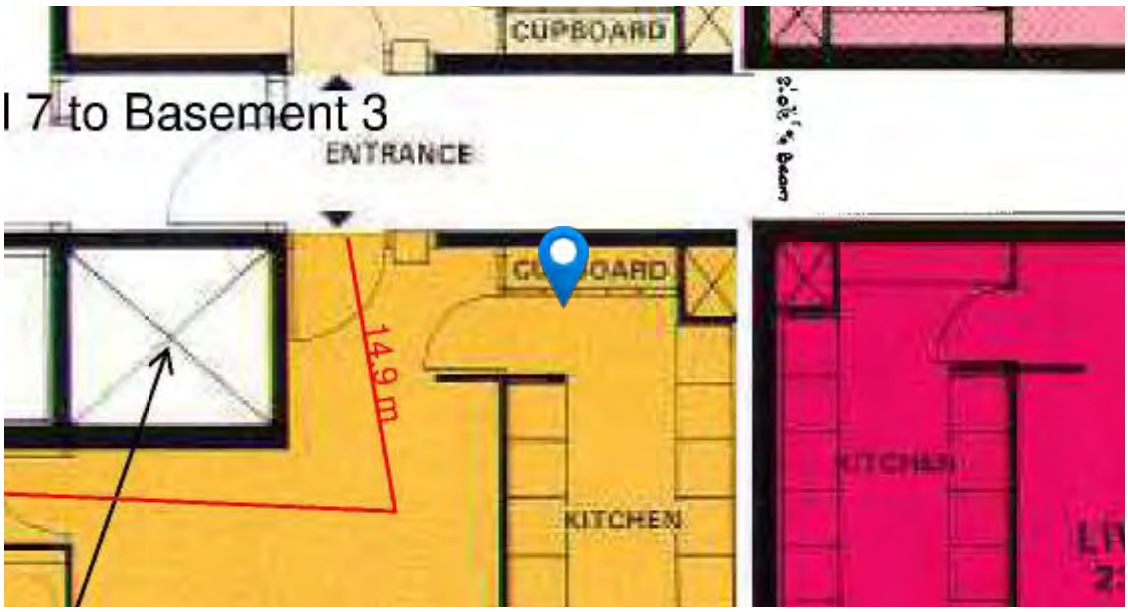
2. 07/03/2022 04:07 PM

Form: General

Layer: 220218 Mountjoy_Site drawings (1)
Number of extensions: 0
Created on: 07/03/2022 04:10 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: main entrance with louvred cent on top
ID: 43
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 04:10 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 04:10 PM

BARBICAN RESI - MOUNTJOY HOUSE

Created on: 08/03/2022 10:20 AM
Project name: Barbican Resi - Mountjoy House
Project code: 279095-00
Project start: 07/03/2022
Project end:

Country:
Client Name: Barbican Estate
All tickets: 15

Created by: Arup Fire Plan Radar 9
Street:

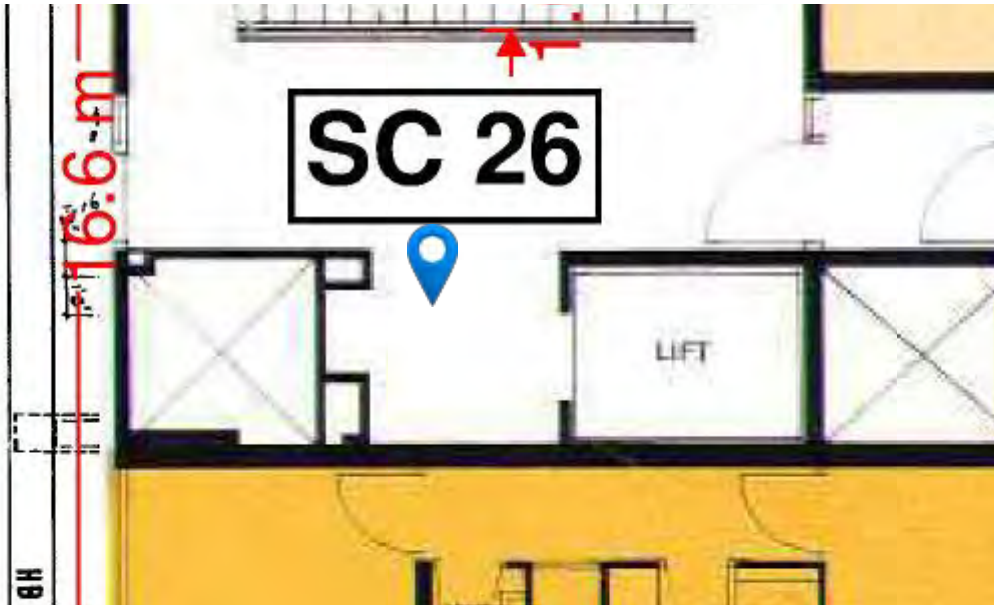
Zip code:
City:
Project description: Barbican Residential Retrospective fire strategy
Project website:

Open tickets: 15

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:42 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: L6 lift sign for sc26
ID: 12
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:49 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 02:41 PM

Form: General

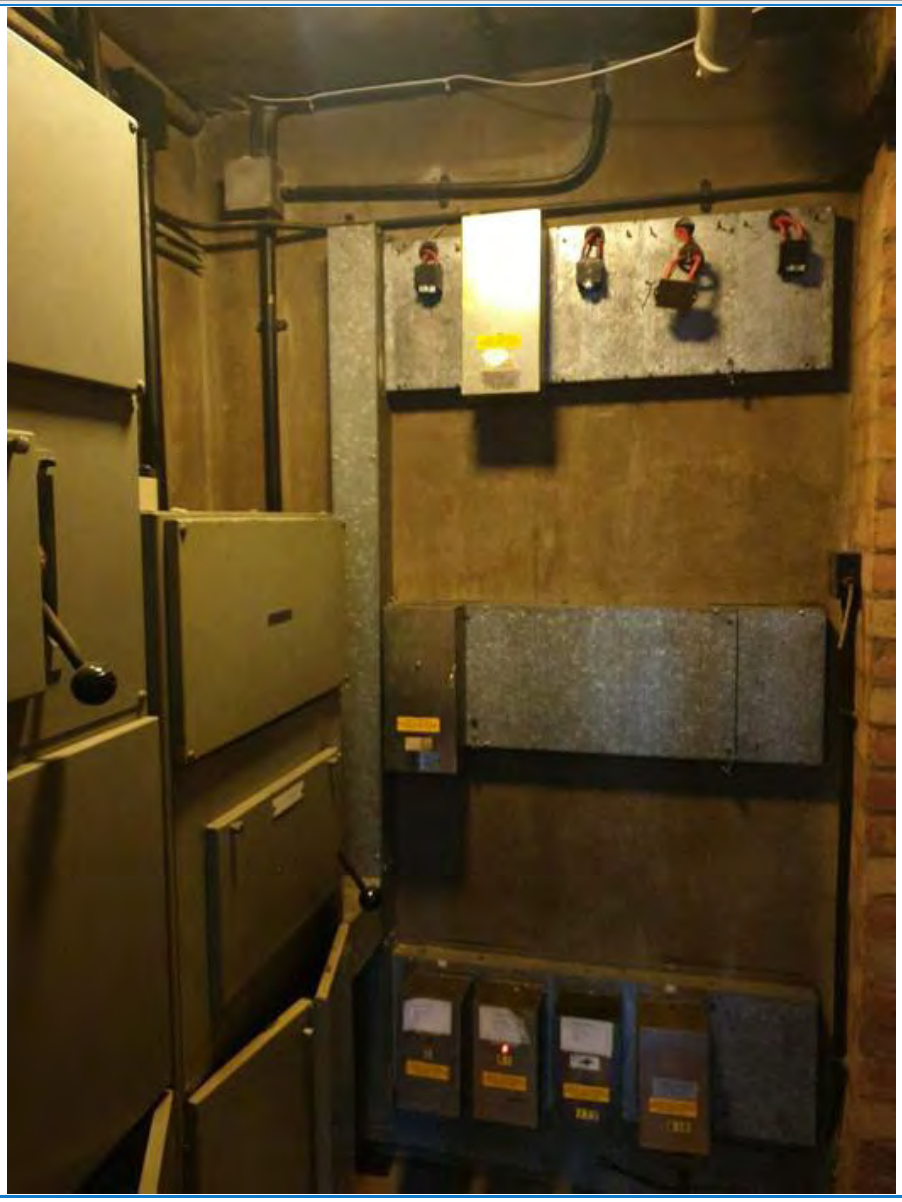
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:43 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l6 dry riser outlet in front of the lift with EDB electric distribution board plant room
ID: 13
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:49 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

1. 07/03/2022 02:42 PM



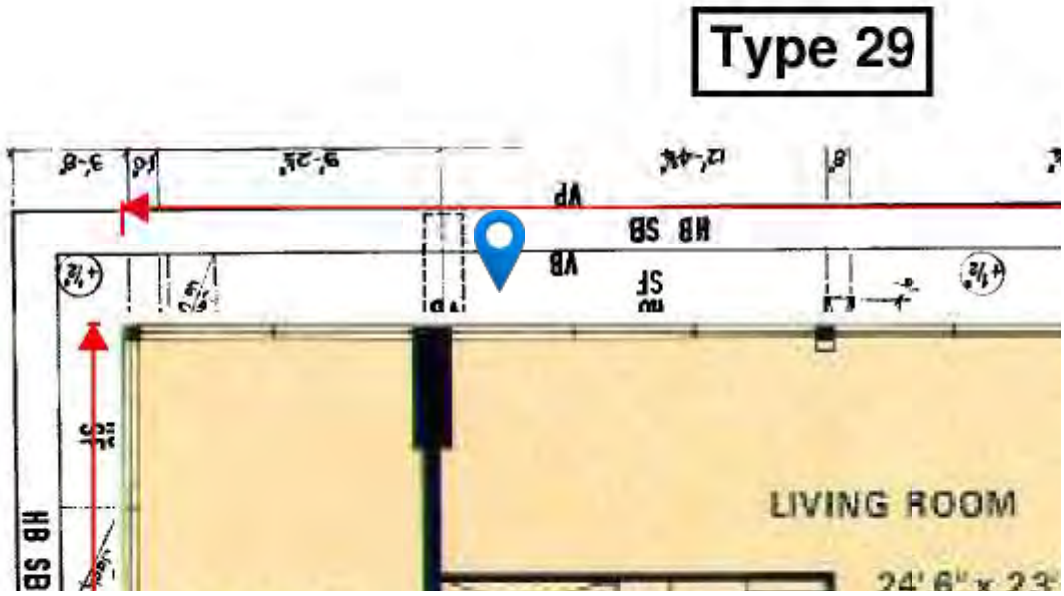
2. 07/03/2022 02:43 PM

Form: General

Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:46 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

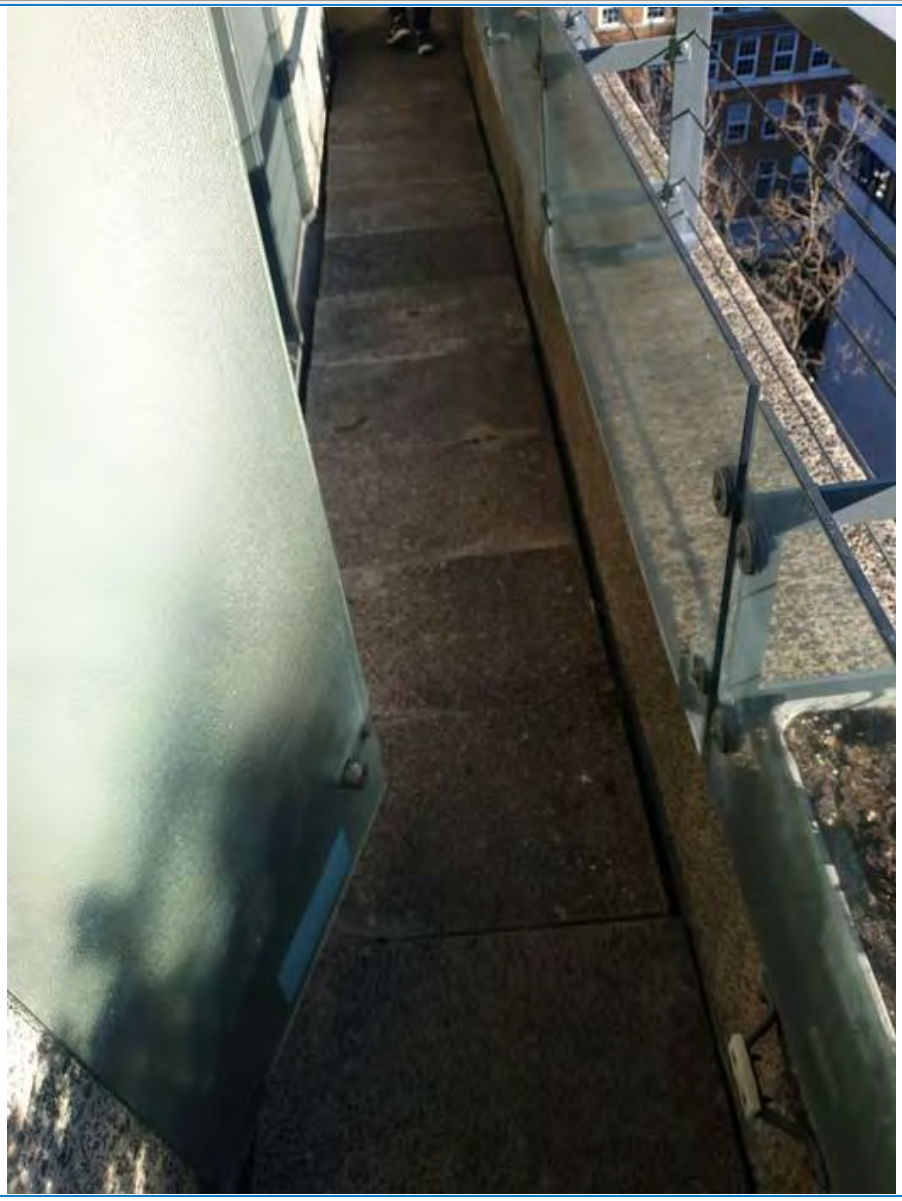
Title: L6 balconies around the buildong perimeter like andrewes with panels
ID: 14
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:47 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

2. 07/03/2022 02:45 PM



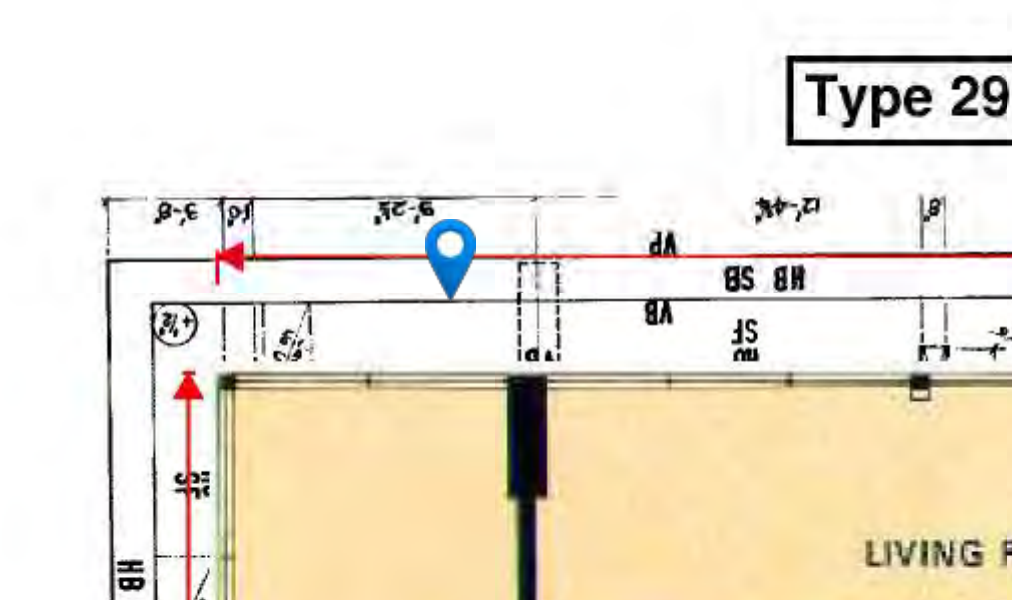
1. 07/03/2022 02:45 PM

Form: General

Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:48 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l7 fire door from stair 26 to outside balcony
ID: 15
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:48 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

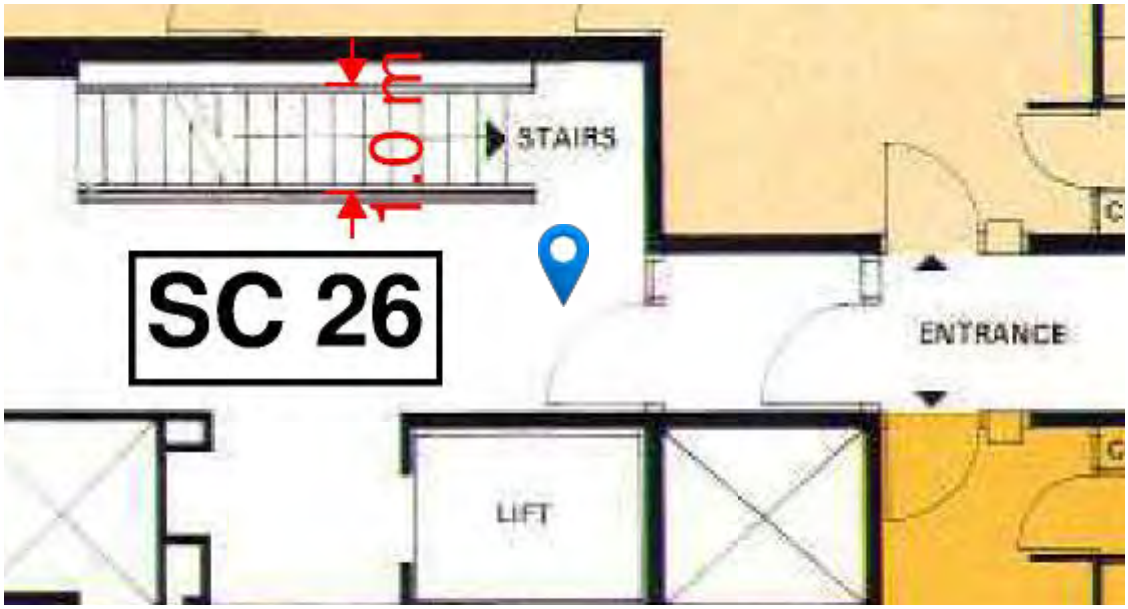


Images:

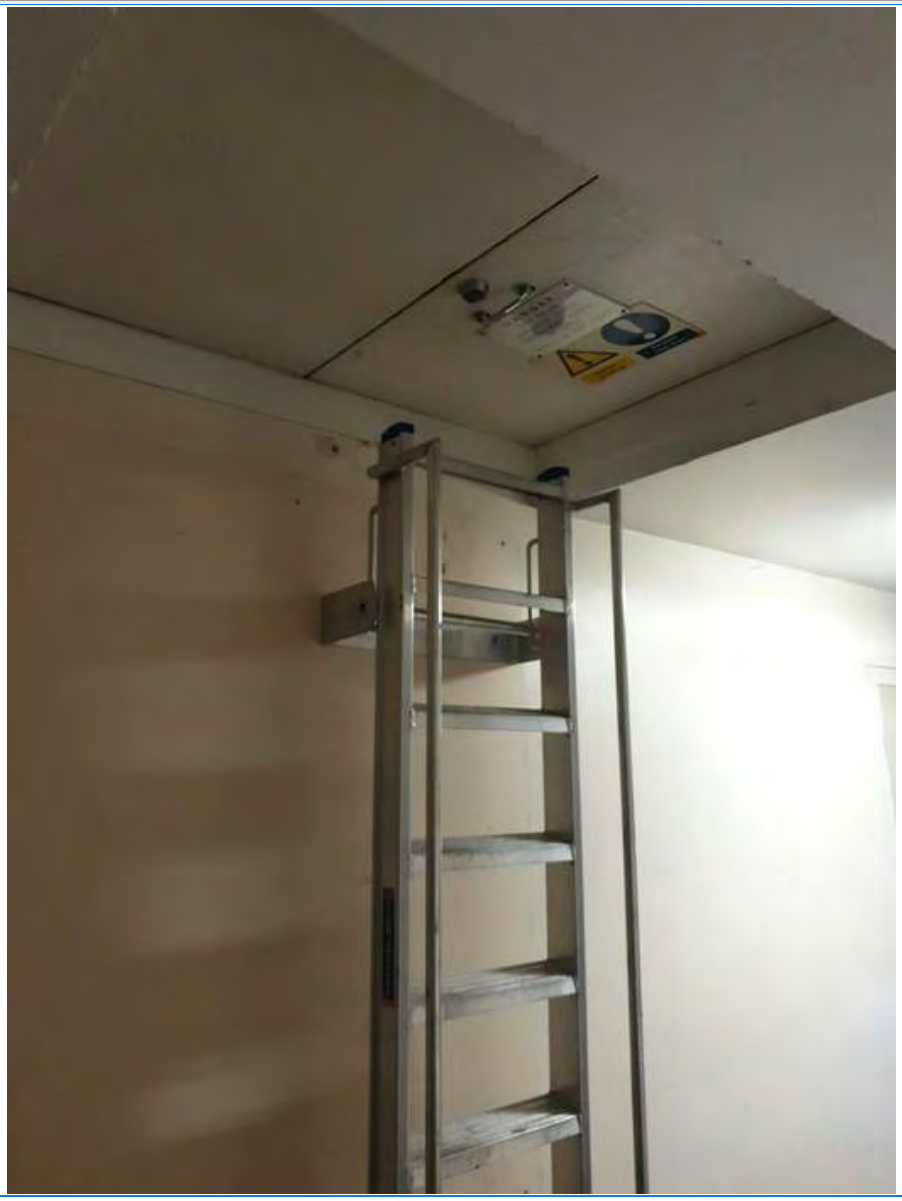
1. 07/03/2022 02:48 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:50 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No
Title: l7 access to roof plant area
ID: 16
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:50 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:



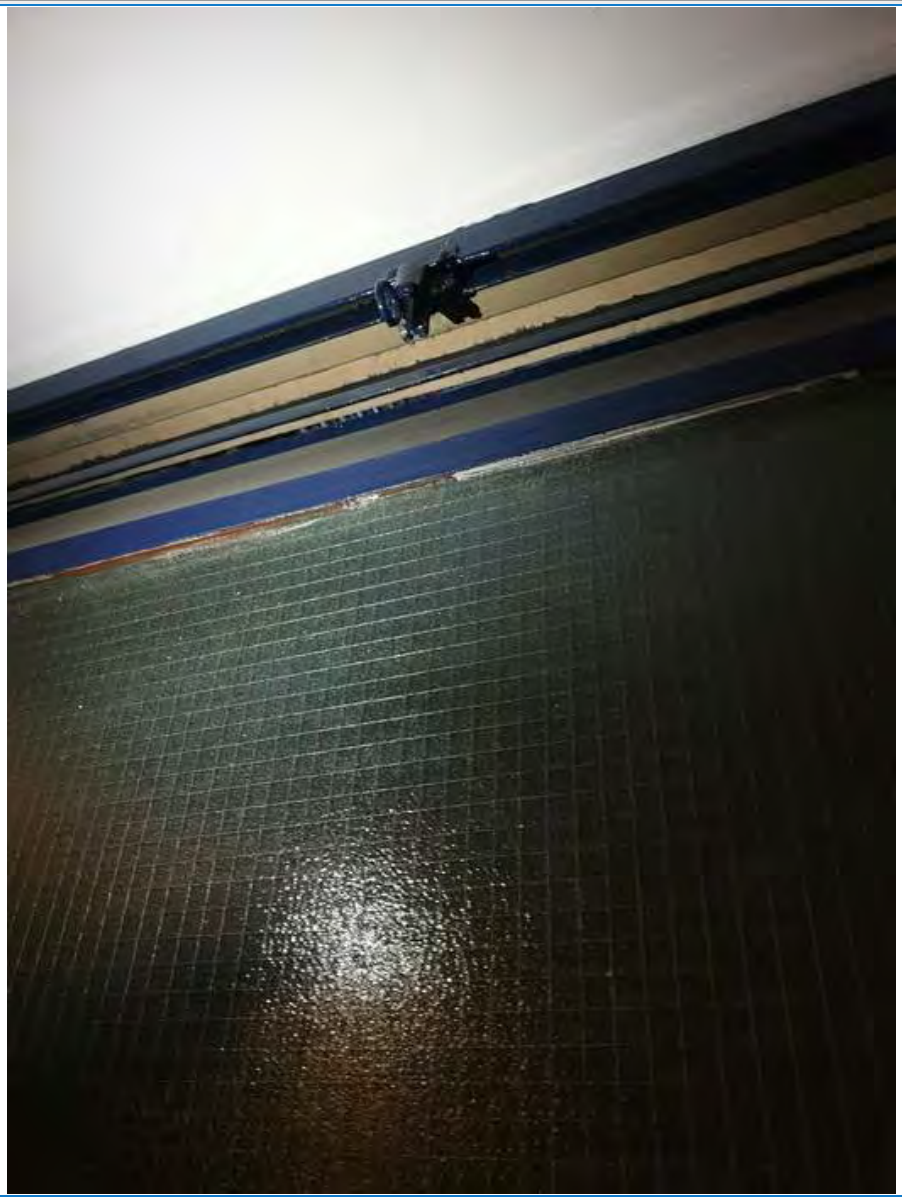
1. 07/03/2022 02:49 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:52 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l7 vent shaft for the stair lobby
ID: 17
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:52 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:



2. 07/03/2022 02:50 PM

1. 07/03/2022 02:52 PM

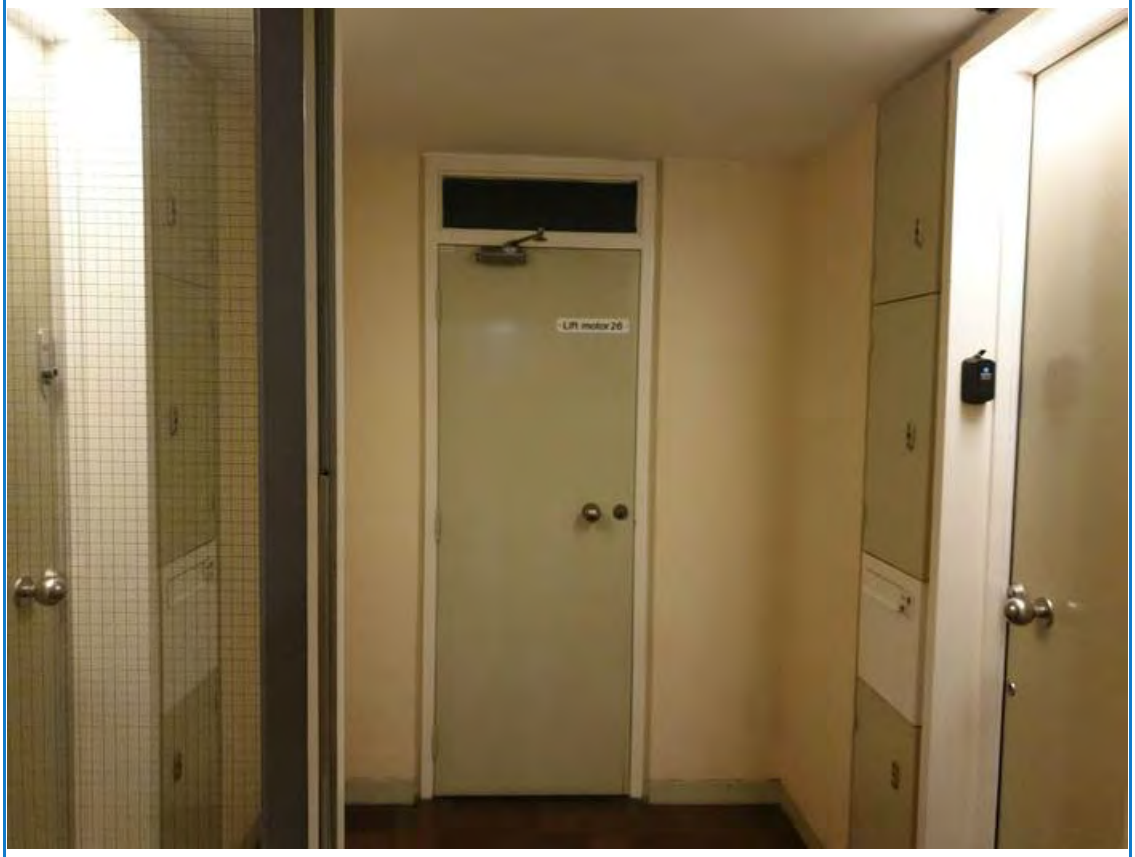
Form: General

Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:53 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: L7 access doors to two flats and no central corridor
ID: 18
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:53 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:



1. 07/03/2022 02:52 PM

2. 07/03/2022 02:53 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:56 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: plant lift motor room for lift 26
ID: 19
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:56 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

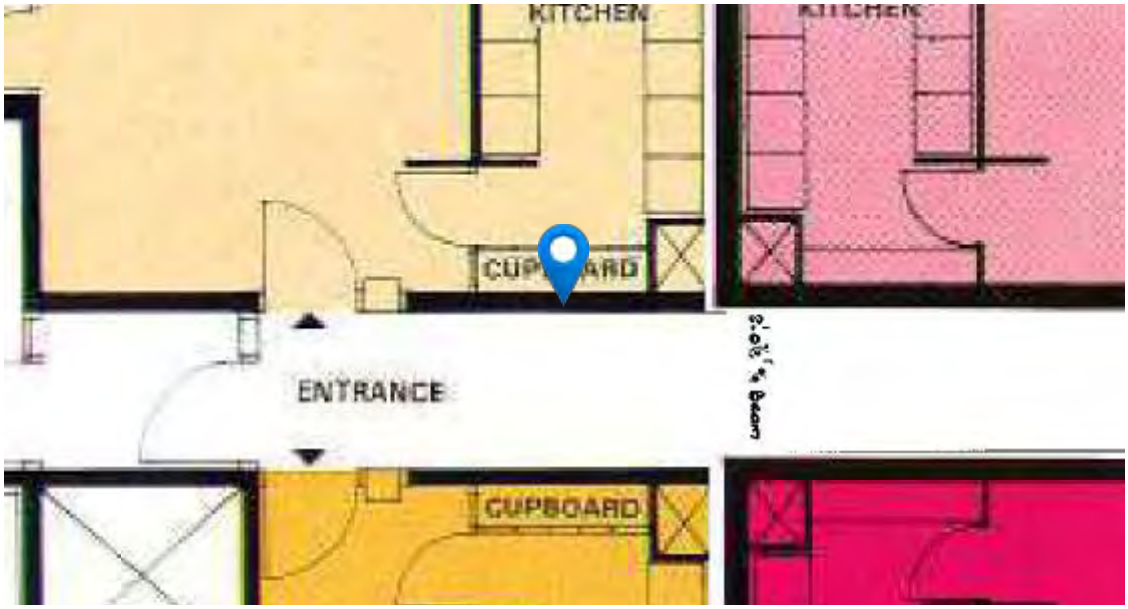
Images:

1. 07/03/2022 02:56 PM

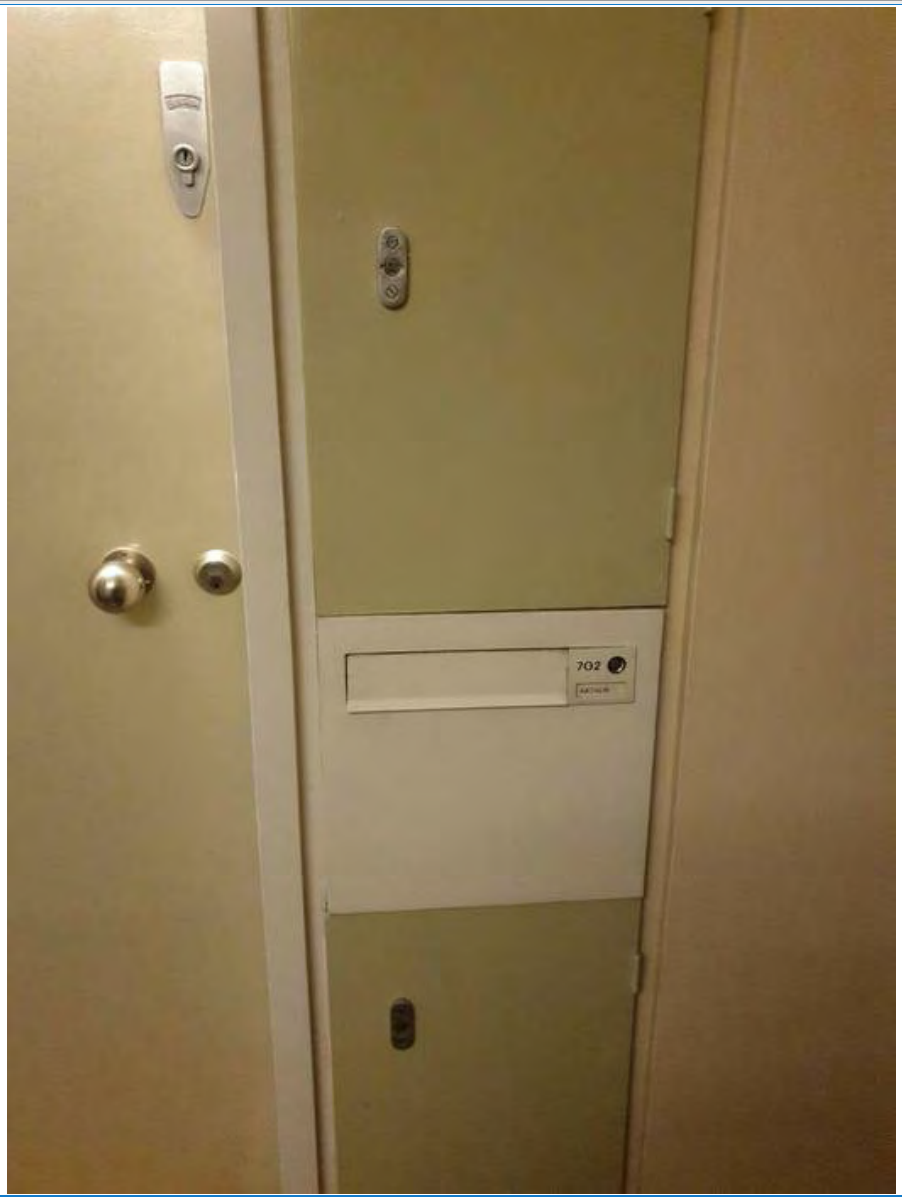
Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:57 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: l7 rubbish lockers
ID: 20
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 02:57 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:



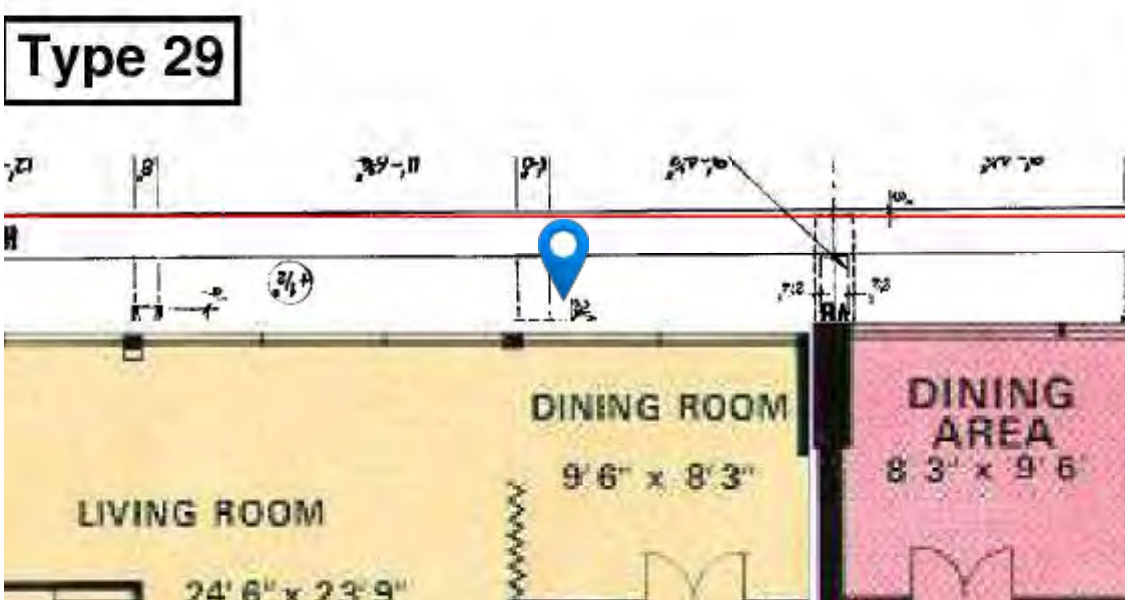
1. 07/03/2022 02:57 PM

Form: General

Layer: L7
Number of extensions: 0
Created on: 07/03/2022 02:59 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: L7 balcony width 830mm and at pinch point 500mm
ID: 21
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:00 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 02:59 PM

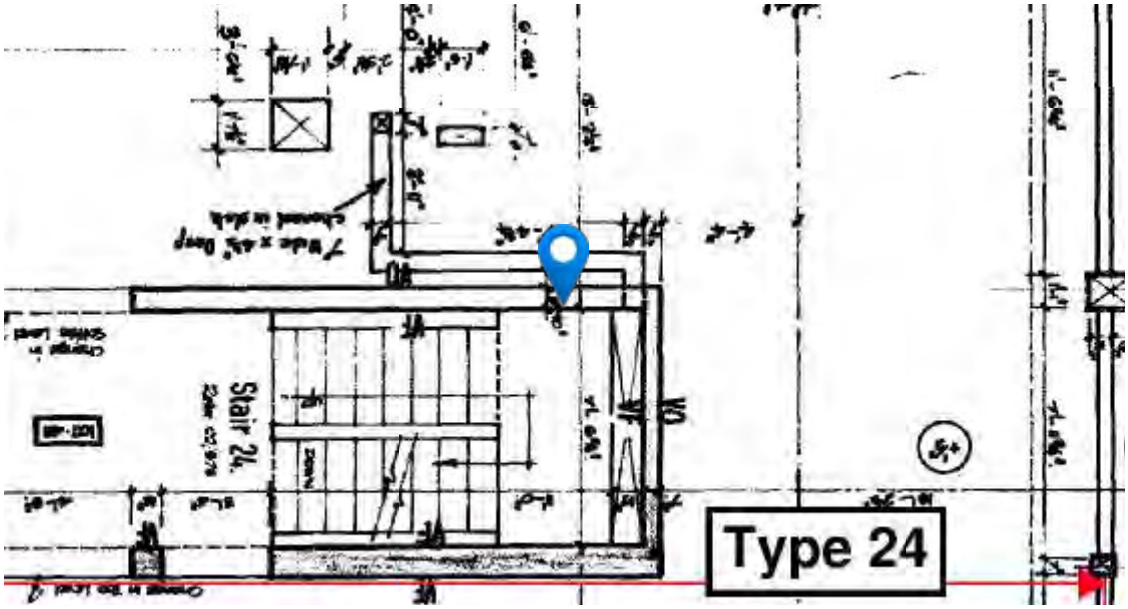
2. 07/03/2022 02:59 PM

3. 07/03/2022 02:59 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 03:05 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: L7 sc24 dry riser inlet
ID: 22
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:05 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:

1. 07/03/2022 03:04 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 03:08 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No
Title: sc24 width 1100mm
ID: 23
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:08 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:

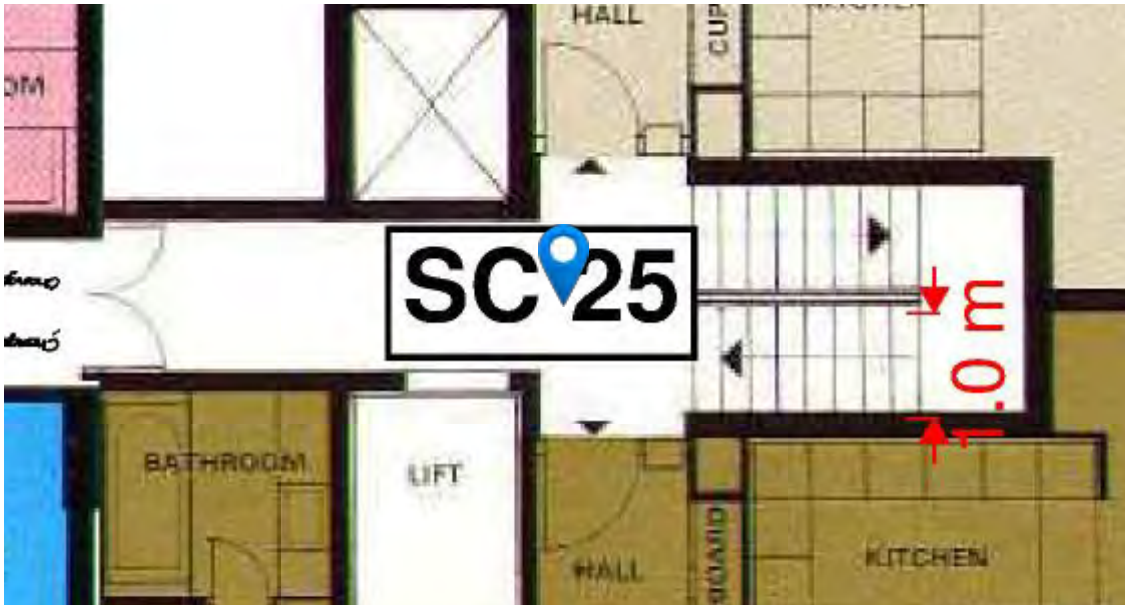
1. 07/03/2022 03:08 PM

2. 07/03/2022 03:08 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 03:26 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: open 2 flats on l7 and on l6
ID: 33
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:26 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



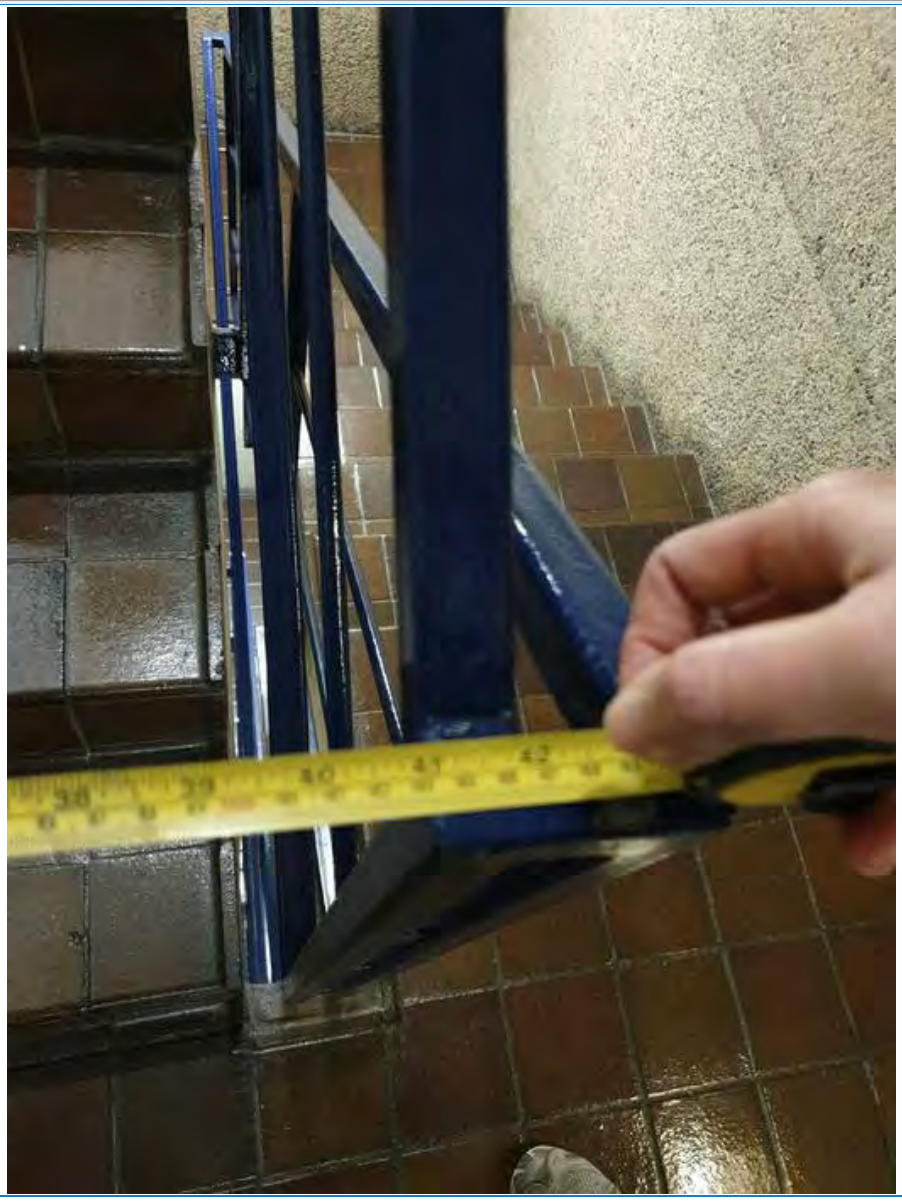
Images:

1. 07/03/2022 03:26 PM

Form: General
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 03:27 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No
Title: 1.03m staor 25
ID: 34
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:27 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:

Images:



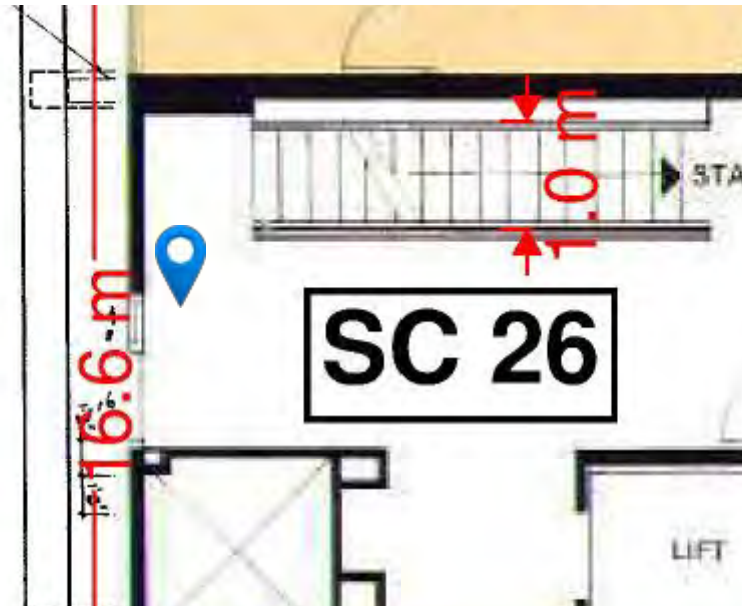
1. 07/03/2022 03:27 PM

Form: General

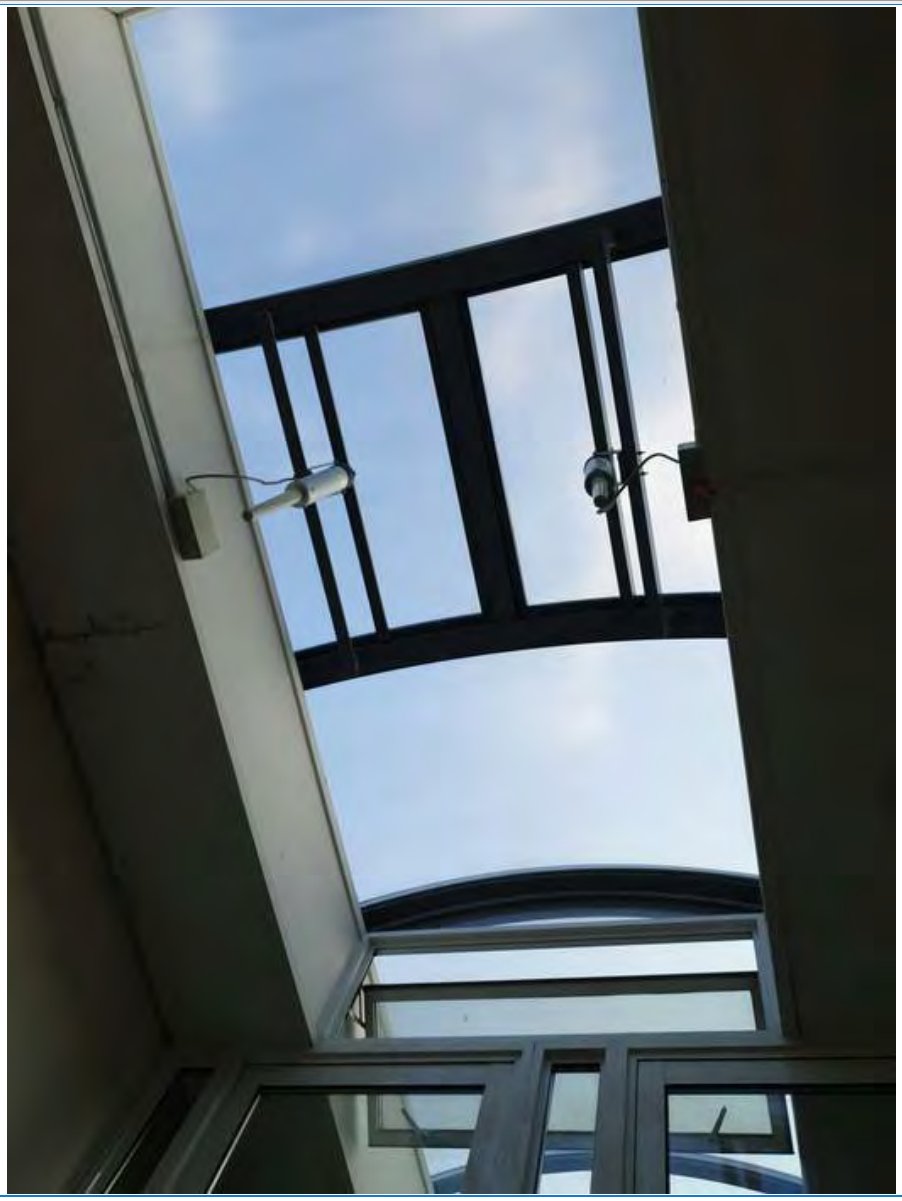
Layer: L7
Number of extensions: 0
Created on: 07/03/2022 03:48 PM
Updated by: Arup Fire Plan Radar 9
Time:
Non compliant with the Fire Strategy: No

Title: Thomas More staircase 24 1. 2. top of the stair above l7 3. l7 permanently open vent door 1.5m by 0.55m
ID: 38
Created by: Arup Fire Plan Radar 9
Updated: 07/03/2022 03:48 PM
Date:
Compliant with the Fire Strategy?: No
Details:

Plan:



Images:



1. 07/03/2022 03:47 PM

2. 07/03/2022 03:47 PM

3. 07/03/2022 03:48 PM