Fire safety strategy

Vinegar Yard

65200352/MD/211027
Revision 5

SWECO

Issue	Date	Reason for Issue	Prepared		Checked		Approved	
1	Oct 2018	For comment	ZT	30.11.18	MD	30.11.18	MD	30.11.18
2	Dec 2020	Draft planning issue	ZT	01.10.20	MD	02.10.20	MD	02.10.20
3	Dec 2020	Planning issue	ZT	11.12.20	MD	11.12.20	MD	11.12.20
4	Oct 2021	For design changes	ZT	14.10.21	MD	15.10.21	MD	15.10.21
5	Oct 2021	Planning issue	ZT	27.10.21	MD	27.10.21	MD	27.10.21

Fire safety strategy
65200352/MD/211027
Revision 5

Sweco
1 Bath Road
Maidenhead
Berkshire
SL6 4AQ

+44 (0)1628 623 423
building.services@sweco.co.uk
www.sweco.co.uk

Contents

1. Scope 4
2. Outline Site description 5
2.1 Risk profiles 6
2.2 Summary of fire protection measures 6
3. Package of fire protection measures 7
3.1 Fire detection and alarm system (AFD) 7
3.2 Automatic sprinkler installation 7
3.3 Alternative suppression 7
3.4 Artificial and emergency escape lighting 7
3.5 Signage 7
3.6 First aid fire fighting 7
3.7 Emergency power supplies 7
3.8 Smoke control 7
3.9 Evacuation lift 7
4. Means of escape 8
4.1 Escape strategy 8
4.2 Number of exits 8
4.3 Means of escape for the disabled 8
4.4 Travel distance 8
4.5 Horizontal Means of Escape 8
4.6 Terraces 8
4.7 Escape stairs 8
4.8 Basement escape 8
4.9 Final exits 8
4.10 Stairs serving above and below ground 9
4.11 Roof plant escape 9
4.12 Escape past void 9
4.13 Inner rooms 9
5. Internal fire spread – structure 10
5.1 Load bearing elements of structure 10
5.2 Compartmentation 10
5.3 Protected lobbies 10
5.4 Fire stopping and cavity barriers 10
6. Internal fire spread – linings 11
6.1 Linings 11
6.2 Examples of materials 11
7. External fire spread 12
7.1 External cladding 12
7.2 External wall insulation 12
7.3 Roof and terraces 12
8. Access and facilities for fire fighting 13
8.1 Vehicle access 13
8.2 Fire hydrants 13
8.3 Fire fighting shafts 13
8.4 Fire fighting shaft construction 13
8.5 Fire control centre 13
8.6 Fire mains 13
8.7 Fire fighting lobbies 13
8.8 Firefighters lifts 13
8.9 Evacuation lift 13
9. Conclusion and References 14
9.1 Conclusion 14
9.2 References 14
10. Appendix A – Fire Statement 15

1. Scope

Introduction

This report outlines the RIBA Stage 2 fire safety strategy (FSS) for Vinegar Yard. The redevelopment of the site will include the demolition of existing buildings, retention and refurbishment of the warehouse and the erection of a ground, mezzanine and 18 storey building (with plant at roof) and three basement levels, comprising of café and community space within the warehouse and within the new building office, flexible medical and research and development, and flexible retail and affordable workspace, alongside cycle and disabled car parking, servicing, refuse and plant areas, public garden, highway improvements and all other associated works.

This FSS provides design guidance for the Proposed Development and has been developed in conjunction with the Proposed Development stakeholders (client, advisors and professional design team) to satisfy the aims of the brief, which is to comply with the Building Regulations 2010.

The figures/drawings included within this strategy are for illustrative purposes only, intended to convey the key features and objectives of the fire strategy. Reference is to be made to the detailed architectural, structural and services layouts provided by the wider design team.

The Building Regulations

The information contained in this document provides a series of principle recommendations intended to help focus the design in achieving the functional requirements of Parts B1 – B5 of the Building Regulations 2010 only, as outlined below:

B1 – Means of escape and warning
B2 – Internal fire spread (linings)
B3 – Internal fire spread (structure)
B4 – External fire spread
B5 – Access and facilities for fire fighting

Consultation

Preliminary consultation has yet to be carried out with the Building Control Authority. Consultation with the relevant authorities, including the Fire Service, and all Proposed Development stakeholders will commence through the next stages of design and construction.

Basis of design

With respect to addressing the functional objectives of Parts B1-B5, the FSS draws on the British Standards Fire Safety Engineering framework in BS 7974 (1) to establish a disciplined approach to the fire safety design.

The FSS accounts for the total fire safety package within the Proposed Development to provide a functional and practical solution to fire safety. The FSS draws on prescriptive standard BS 9999 “Fire safety in the design, management and use of buildings – Code of practice” (2) and HTM 05- [Health Technical Memorandum 05-02: Firecode. Guidance in support of functional provisions (Fire safety in the design of healthcare premises). 2015] (3) as a basis of design.

This approach is supported by a Qualitative Design Review (QDR). However, it is only through utilising a combination of established guidance and, fire engineering that a satisfactory standard of fire safety can be achieved given the complexity and scale of the Proposed Development from a Buildings Regulations standpoint.

Fire engineering

Where a feature, arrangement or area of the Proposed Development lies outside the recommendations of guidance, a fire-engineered solution will be developed. This solution will be based upon the Fire Safety Engineering framework in BS 7974 (1), current guidance, good engineering practice and information available at the time of writing. It should be noted that any fire-engineered solution may not be valid if the design criteria etc. on which it is based are altered.

Exclusions

The FSS does not:

- Set out to specifically address insurance requirements, risks to business continuity or property protection. Recommendations or guidance provided for life safety purposes may or may not be beneficial with respect to these issues.
- Address fire precautions during the construction works for which the risk and hazard from fire are often greater. It is recommended that the guidance issued by the Health and Safety Executive (HSE) be consulted accordingly.
- Represent a design or specification; it is a series of principle recommendations that others may consider and relate to the design of the building as appropriate.
- Constitute a fire safety management strategy.
- Satisfy the duties of the ‘responsible person’ to carry out a fire risk assessment under the Regulatory Reform (Fire Safety) Order.
- Satisfy duties under Regulation 38 of the Building Regulations to provide the building management team / owner / responsible person with a package of as built information. This duty is handled by the principal contractor, albeit this document shall be updated throughout construction to reflect design development and should be included into the package of as built information.

2. Outline Site description

The land is bounded by St Thomas Street, Fenning Street, Vinegar Yard and Snowfields including Nos. 1-7 Fenning Street and No.9 Fenning Street as illustrated below.

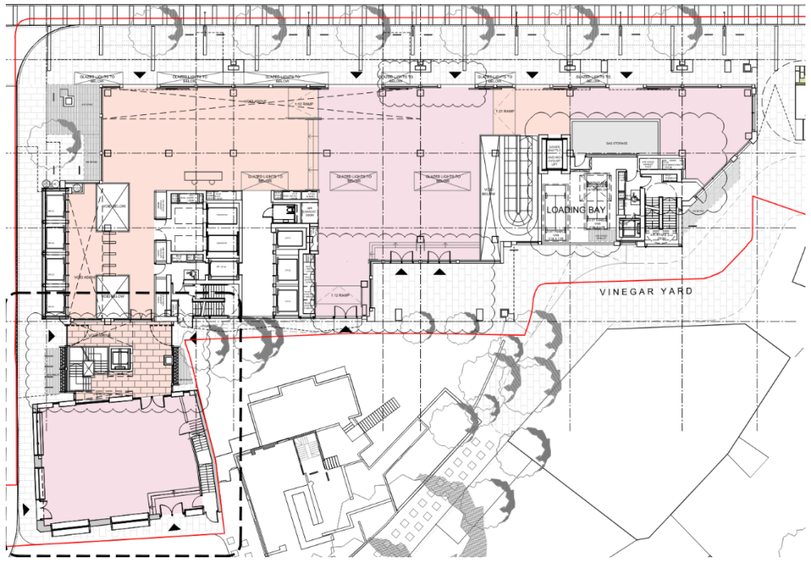

Figure 1 – Site location.

The updated scheme seeks to provide flexible medical and research & development floorspace (Use Classes D1 or B1(b)) designed to allow for occupation by Guys and St Thomas' NHS Foundation Trust, but flexible to ensure long term resilience. Levels one to ten of the building will first be offered to Guys and St Thomas' for use as either D1 medical space or B1(b) research & development. The remainder of the upper floors, levels 11 to 18, comprise a B1(a) office use. This configuration reflects Guys and St Thomas's Adaptable Estates Strategy, where buildings can accommodate a range of possible functions both physically and by virtue of permitted uses in the long term.

If Guys and St Thomas' do not wish to occupy levels 1 to 10 of the proposed building, it will default to a B1(b) research and development use and will be made available to R&D occupiers whose work can support the SC1 Life Science & Innovation District. Minor changes to the plant configuration at levels 3 and 8 of the building and the retail floorspace at ground floor level would also change because of a research and development use. The remainder of the proposed floorspace within the scheme would not change in the event of a research and development occupier taking the building.

The development measures 97.14 (Above Ordnance Datum).

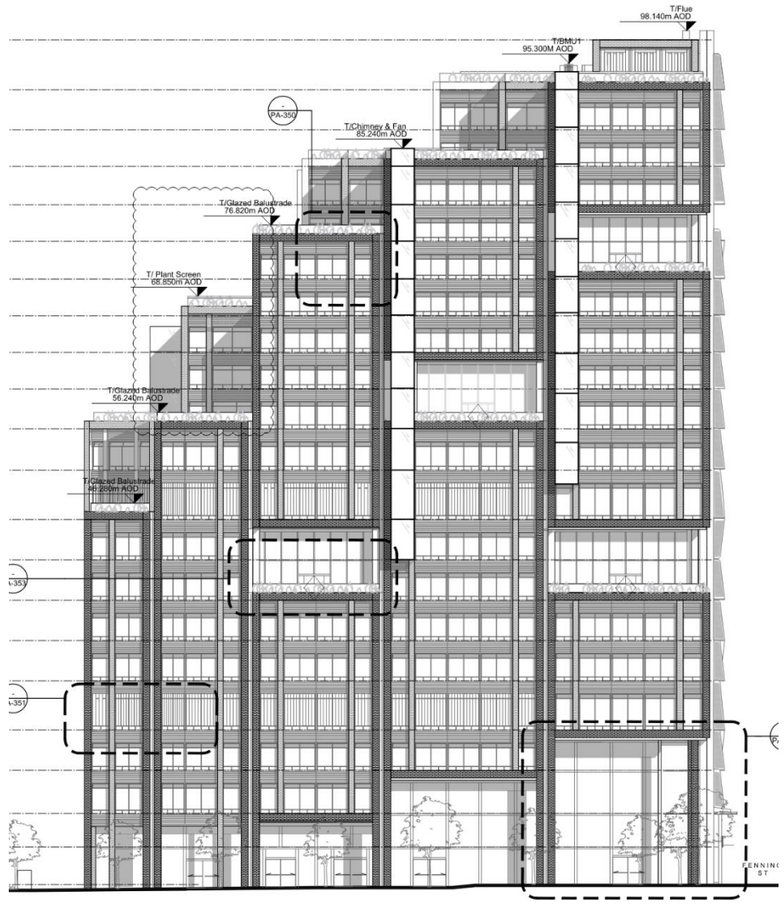

Figure 2 –Proposed North elevation.

2.1 Risk profiles

Risk Profiles, as defined by BS 9999 (2), are given as a combination of occupancy characteristics and fire growth rate. By analysing the characteristics of a given occupancy for areas within the building and combining this information with the Fire Growth Rate of the area, it is possible to assign an appropriate risk profile on which the fire safety strategy is based on.

The following table outlines the various risk profiles as given in BS 9999 (2):

Occupancy characteristic	Fire growth rate	Risk profile
A (Occupants who are awake and familiar with the building)	1 Slow	A1
	2 Medium	A2
	3 Fast	A3
	4 Ultra-fast	A4
B (Occupants who are awake and unfamiliar with the building)	1 Slow	B1
	2 Medium	B2
	3 Fast	B3
	4 Ultra-fast	B4
C (Occupants who are likely to be asleep)	1 Slow	C1
	2 Medium	C2
	3 Fast	C3
	4 Ultra-fast	C4

By consulting this table and supplementary information regarding occupancy characteristics and the classification of fire growth rate found in BS 9999, the following table identifies the appropriate risk profiles for the various key areas of the Proposed Development, in accordance with BS 9999 (2).

Occupancy	Risk profile [1]
Plant	A2
Office/Affordable Workspace/Research	A1
Community Hall, Reception	B1
Retail	B2
Outpatients - Clinical / healthcare	B1 / C1

[1]: Incorporating a reduction of the fire growth rate by 1 due to sprinkler protection provision.

2.2 Summary of fire protection measures

The following table includes a summary of the proposed fire protection measures to be incorporated within the Proposed Development. Further detail is provided for each of these measures in the subsequent sections.

Item	Description
Escape strategy	Office/Research – Phased evacuation (fire floor and one above) Outpatients – Progressive evacuation Basement & Ground – Simultaneous
Minimum escape widths	Storey exits = 1050mm Escape / fire fighting stairs = 1200mm / 1200mm
Fire detection and alarm	BS 5839-1 (4) Category L1 system with BS 5839-8 (5) PA/VA system
Emergency voice communication	BS 5839-9 (6) Type A/B combined outstations
Sprinkler protection	LPC rules inc. BS EN 12845 (7) – Ordinary Hazard Group 3
Emergency lighting	In accordance with BS 9999 (2) and BS 5266-1 (8)
Fire escape signage	In accordance with BS 5499-4 (10) and BS ISO 3864 (11)
Emergency power supply	Separate life safety supply
Structural fire protection	120 min
Compartmentation	Every level is generally designed as a compartment floor
Access & provisions for the fire service	Two fire fighting shafts serve the, complete with: - fire fighting stair - firefighters lifts - wet riser accessed from the fire fighting lobby. Fire control centre
Smoke ventilation	Mechanical extract from basement based on 10 ac/hr Mechanical extract serving the fire fighting shafts
Management	Level 2 as defined by BS 9999

3. Package of fire protection measures

The following package of fire protection measures will be provided in the Proposed Development. The following references to various standards are cited in BS 9999 (2) prescriptive guidance, which forms the basis of the fire safety strategy design.

3.1 Fire detection and alarm system (AFD)

A BS 5839-1 (4) Category L1 system will be installed throughout the building, incorporating voice alarm (PA/VA - BS 5839-8 (5)) and an emergency voice communication (EVC) system (BS 5839-9 (6)).

The main fire alarm panel will be in the fire control room.

3.2 Automatic sprinkler installation

An Ordinary Hazard Group 3 life safety sprinkler system will be installed generally in accordance with the LPC Rules incorporating BS EN 12845 (7).

Fire and rescue service breeching inlets should be provided for emergency water infill, in accordance with BS 5041-3 (12). The connection should be in a location that is easily accessible to the fire service vehicle and adjacent to the fire fighting shaft entrance.

Coverage will extend throughout the building, except for the UKPN substation and permitted exceptions such as lifts, enclosed stairs (and stair lobbies), WCs, and service risers containing no combustible materials.

3.3 Alternative suppression

Pre-action sprinkler protection will be provided where accidental water discharge may cause damage to electrical equipment. These include the LV switch rooms, the Life Safety LV room and comms rooms.

3.4 Artificial and emergency escape lighting

Emergency escape lighting will be designed in accordance with BS 9999 Table 8 (2), BS 5266-1 (8) and BS EN 1838 (9).

3.5 Signage

Fire escape signage and fire protection indication and warning signage shall be provided in accordance with BS 5499-4 (10) and ISO 3864 (11).

3.6 First aid fire fighting

Fire extinguishers will be provided in accordance with BS 5306-8 (13). Secrecy

3.7 Emergency power supplies

Secondary emergency power supplies to critical life safety plant will be provided from a separate life safety supply, with the ability to maintain operation for a minimum of three hours, and within 15 seconds of primary power failure. The changeover shall be automatic, and the cabling shall comply with BS 8519 (14).

3.8 Smoke control

3.8.1 Fire fighting shafts

Smoke control for the fire fighting shafts will be provided by mechanical extract. The performance will replicate that outlined under EN 12101-6 for a Class B pressurisation system (i.e. to maintain the stair free from smoke).

3.8.2 Basement

Mechanical smoke control based on 10 air changes an hour from the largest compartment, under a zoned extract arrangement. The system will be fire rated (integrity and insulation) in accordance with BS 9999 (2).

3.9 Evacuation lift

A combined passenger / evacuation lift (LR01) will be used to augment the evacuation strategy. This is in addition to the normal escape stairs provided and is primarily to assist with disabled evacuation as part of a managed strategy. The lift will generally comply with the recommendations of BS 9999 (2), BS EN 81-73 (17) and BS EN 81-72 (16).

The new London Plan recommends that a minimum of one evacuation lift should be provided per core. Currently, there is only one firefighting stair provided to the secondary core. This arrangement remains subject to review with the relevant authorities.

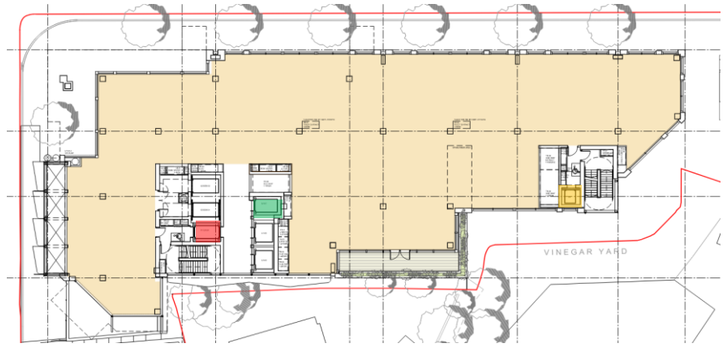

Figure 3 – Illustration of typical outpatient floor. Dual entry fire fighters lift in **red**, single entry fire fighters lift in **orange** and evacuation lift in **green**.

4. Means of escape

4.1 Escape strategy

All office/research levels will evacuate under a phased evacuation strategy, whereby the fire floor and floor directly above will evacuate.

All outpatient levels will evacuate under a progressive evacuation strategy, where patients are moved to neighbouring compartments.

All basements, ground, mezzanine and all roof levels will evacuate on confirmed fire detection anywhere in the building.

4.2 Number of exits

BS 9999 (2) notes that where the occupancy is expected to exceed 60, a minimum of two exits should be provided. Where only a single exit is available, the occupancy should not exceed 60 persons.

4.3 Means of escape for the disabled

Disabled refuges will be provided within each stair or lobby (excluding ground where level access is available), including the escape stair core. The minimum refuge size will be 900 x 1400 mm and refuges will be clear of the minimum escape width. Two-way emergency voice communication will be provided to all refuge areas.

4.4 Travel distance

Travel distances across the Proposed Development should conform to the following limitations, as stated within BS 9999 guidance.

Risk profile	One direction (m)	Two directions (m)
A1 (Office/Research)	26	65
A2 (Plant / Ancillary)	22	55
B1 (Amenity / Community)	24	60
B2 (Retail)	20	50
B1 / C1 (Healthcare) [1]	15	60

[1] Guidance from HTM 05-02.

4.5 Horizontal Means of Escape

BS 9999 (2) notes that the width of an escape route should be not less 1200mm. The width may be reduced to 1000mm if the route is not accessible to wheelchair users. The width of the door should be not less than 850mm where unassisted wheelchair access is necessary.

The largest office/research floor is 1207m^2 (NIA), which equates to an occupancy of 201 people. Based on an exit width of 3.3 mm/person, the two 960mm storey exits are sufficient, albeit 1050mm will be adopted

The horizontal means of escape within the healthcare area will be further developed in line with HTM 05-02 (3) when the use of the area is confirmed.

4.6 Terraces

Several terrace areas are included in the Proposed Development. Each will be associated with the neighbouring accommodation and each will be provided with exit provisions in line with the recommendations of this section. Terraces should be provided with level or ramped thresholds. Audible and visual warning devices should also be provided.

4.7 Escape stairs

4.7.1 Office/Research

The largest office/research floor is 1207m^2 (NIA), which equates to an occupancy of 201 people. As a phased evacuation strategy is adopted, the stair exit capacity should allow simultaneous evacuation of two storeys. Based on a stair width of 3.4mm/person, the two 1200mm stairs are sufficient.

4.7.2 Healthcare

Two escape stairs can accommodate up to 100 patient beds on the clinical floors. Stair width is not determined by the number of people expected to use the stairs in a fire emergency, but principally by the requirements of assisted patient evacuation. 1200mm stairs allows for assisted patient evacuation only.

4.8 Basement escape

Evacuation from the basement will occur simultaneously for all basement levels. Areas with a high occupancy (>60 people) or where the travel distances exceed the recommendations of Section 4.4 will be provided with a minimum of two exits.

4.9 Final exits

The final exit from the fire fighting stair on ground floor and associated route leading to it should be 500mm wider than the fire fighting stair, in order to allow for the reverse flow of the fire fighters against the escaping occupants.

The fire fighting stair should discharge via a protected route direct to a place of safety.

Final exit doors should not be provided with a step and should open onto an area which is level for a distance of at least 1 metre.

4.10 Stairs serving above and below ground

The fire fighting stair should serve all levels. Both stairs should be separated however between basement and ground via fire resisting construction and FD30S fire door.

4.11 Roof plant escape

Staircases should be extended to the roof or fixed ladder should be provided in accordance with BS EN ISO 14122-4. Travel distances limited to 60m single direction and 200m where alternatives are available.

4.12 Escape past void

BS 9999 (2) notes that escape should be away from the void and the subsequent escape route should not pass within 4.5m of the opening. Alternatively, the void can be enclosed with fire resisting and smoke-retarding construction.

4.13 Inner rooms

An inner room arrangement should therefore not be provided unless the following conditions are met:

- The inner room is entered directly from the access room
- The escape route from the inner room does not pass through more than one access room
- The travel distance from any point in the inner room to the exit(s) from the access room does not exceed the allowable one-way travel distance
- The access room is not a place of special fire hazard and is in the control of the same occupier as the inner room
- One of the following arrangements is made:

1) the enclosures (walls or partitions) of the inner room stop at least 500 mm below the ceiling; or
2) a suitably sited vision panel not less than 0.1 m^2 is located in the door or walls of the inner room, to enable occupants of the inner room to see if a fire has started in the outer room; or

3) the access room is protected by an automatic smoke detector that either operates an alarm that is immediately audible in the inner room, to a sound pressure level in accordance with the minimum recommended in BS 5839-1:2013, or gives an immediate visual alarm conforming to BS EN 54-23 in the inner room if the ambient noise levels are so great as to make an alarm inaudible.

5. Internal fire spread – structure

5.1 Load bearing elements of structure

The term ‘elements of structure’ is applied to the main load bearing elements of structure. Structure includes, but is not limited to:

- Structural frame
- Beams
- Columns
- Load bearing walls (internal and external)
- Floor structures (e.g. galleries)
- Party Wall

BS 9999s outline the minimum period of fire resistance for elements of structure based on the risk profile and height of the building.

The proposed building has multiple risk profiles and has a height of c. 97m above ground level, which corresponds to 120 minutes standard of structural fire protection. There is an opportunity to rationalise this in the next stage of design.

5.2 Compartmentation

The following outlines the compartmentation recommendations, based on prescriptive guidance outlines in BS 9999 (2) and refers to fire ratings in terms of both insulation and integrity.

Where the standards of compartmentation overlap, the higher value should be adopted:

Description	Minutes
Fire fighting shaft	120
Escape stair	120 [1]
Service risers	120 [1]
Floors	120 [1]
Basement	120
Outpatient level sub-compartmentation	120

[1]: Subject to detailed analysis

Every level over 12 m above ground that contains patient-access areas should be divided into a minimum of four compartments. Where no hospital street is provided, each compartment should have a minimum floor area of 350m^2.

5.3 Protected lobbies

Protected lobbies will be provided in the following locations, in accordance with BS 9999 guidance (2):

- Protected / fire fighting stairs (at every storey);
- Communication between the escape / fire fighting stairs and basement levels;
- Communication with refuse areas, which should be provided with 0.2sqm natural ventilation or equivalent.
- Passenger and goods lifts serving office/research levels

5.4 Fire stopping and cavity barriers

Fire stopping and cavity barriers will be provided as follows:

- Fire stops to be provided where a compartment wall or floor abuts other construction, including external wall construction, maintaining the relevant standard of compartmentation;
- Cavity barriers (30 min integrity, 15 min insulation) to be provided within any cavities of external wall construction, where compartment walls and floors abut the external wall construction, around any openings and at external wall edges;
- Any extensive cavity, such as floor or ceiling voids, should be provided with cavity barriers such that the maximum dimension does not exceed 20m in any direction.

Cavity barriers should be rated for 30 minutes integrity and 15 minutes insulation when tested in accordance with the relevant national or European standards.

6. Internal fire spread – linings

6.1 Linings

6.1.1 Healthcare

The classification of the surfaces of walls and ceilings will comply with the following, in accordance with HTM 05-02 (3) guidance:

Location	National Class	European Class
Small rooms not more than 4m^2	1	C-s3, d2
Other rooms, not used as circulation space	0	B-s3, d2
Circulation spaces	0	B-s3, d2

6.1.2 Other area

The classification of the surfaces of walls and ceilings will comply with the following, in accordance with BS 9999 (2) guidance:

Location	National Class	European Class
Small rooms not more than 30m^2	3	D-s3, d2
Other rooms, not used as circulation space	1	C-s3, d2
Circulation spaces	0	B-s3, d2

6.2 Examples of materials

Typical examples of lining materials that can achieve the various classifications are outlined below:

Rating [1] [2] [3]	Typical performance ratings of some generic materials and products
Class 0	Any non-combustible material or material of limited combustibility
	Brickwork, blockwork, concrete and ceramic tiles
	Plasterboard (painted or not with a PVC facing not more than 0.5 mm thick) with or without an air gap or fibrous or cellular insulating behind
	Wood wool cement slabs
	Mineral fibre tiles or sheets with cement or resin binding
Class 3	Timber or plywood with a density more than 400 kg/m^3, painted or unpainted
	Wood particle board or hardboard, either untreated or painted
	Standard glass reinforced polyesters

[1] For details of European class ratings consult BS 9999.

[2] Materials and products listed under the above class 0 and meet class 1.

[3] Timber products listed under class 3

7. External fire spread

Any external wall/party wall within 1.0m of a relevant boundary will be 120-minute fire rated (integrity and insulation from both sides separately – subject to detailed analysis as required by BS 9999 (2).

Any external walls greater than 1m separation from the relevant boundary are assessed in accordance with BR 187 (18) to evaluate whether any portions of the external wall should be fire rated.

A worst-case radiating façade (i.e. largest un-compartmented façade area) will be considered in relation to each relevant boundary and the minimum boundary distance required to mitigate the external fire spread risk associated with that façade is evaluated. This may then be compared with the proposed distance to the relevant boundary to determine whether the arrangement is reasonable.

Given that the building is bounded by public roads the relevant boundary is taken at the centerline of each street, which would achieve the minimum separation distances.

7.1 External cladding

The external wall and any specified attachments should be constructed throughout of materials classified as Class B1 or better, as tested and certified under BS EN 13501.

The following external wall construction components may be excluded from the above regulation:

- Seals, gaskets, fixings, sealants, backer rods
- Thermal breaks (shall be limited in size and not span across compartments), these do not include the main insulation layer
- Door and door frames
- Window frames and glass (but not window spandrel panels or infill panels)
- Electrical installations
- Cavity trays between masonry leaves
- Any part of the roof

7.2 External wall insulation

As stated in BS 9999 (2), any insulation products used in the external wall construction shall be of Class A2-s1, d0 or better, in accordance with BS EN 13501-1 (19).

7.3 Roof and terraces

As stated in BS 9999 (2), the main roof and terraces will be designed to achieve a B_{ROOF}(t4) classification under BS EN 13501-5 (20).

8. Access and facilities for fire fighting

8.1 Vehicle access

Access will be provided for a pumping appliance or a high reach appliance within 18m of the entrance to the fire fighting shafts.

Vehicle access may be by road or any route that is a minimum of 3.7m wide, with a maximum carrying capacity of 12.5 tonnes for a pump appliance and 17 tonnes for a high reach appliance. Current provision is for fire service vehicle access to be provided via Vinegar Yards on the South of the Proposed Development.

Turning facilities should be provided in any dead-end access route that is more than 20 m long. This can be by a hammer-head or turning circle. The minimum turning circle between kerbs should be no less than 26m.

8.2 Fire hydrants

A working fire hydrant should be located within 90m of the wet riser emergency infill location.

8.3 Fire fighting shafts

The height of the top storey served exceeds 18m above fire service access level and the floor area is greater than 900m^2. As such, in accordance with BS 9999 (2), two fire fighting shafts will be provided containing:

- Fire fighting stairs (1200mm wide)
- Firefighters lifts (in accordance with EN 81-72 (16))
- Fire fighting lobby (minimum 5m^2, with minimum linear dimension of 1500mm)
- Wet rising main
- Smoke control (via mechanical smoke extract commensurate in performance to EN 12101-6 Class B)

From Level 15 upwards, where the floor plate reduces to less than 900m^2, only one fire fighting shaft is provided.

8.4 Fire fighting shaft construction

The construction separating the fire fighting shaft from the rest of the building will need to be sufficiently robust to withstand mechanical damage, i.e. concrete, and be constructed to provide 120-minute fire resistance.

8.5 Fire control centre

A fire control centre will be provided. The contents will reflect that outlined in BS 9999.

8.6 Fire mains

The building will be provided with wet rising fire mains serving all levels in accordance with BS 9990 (21).

8.7 Fire fighting lobbies

Fire-fighting stairs will be approached through a protected lobby. Each lobby will be a minimum of 5m^2, with a minimum linear dimension of 1.5m.

8.8 Firefighters lifts

The building will be provided with two firefighters lifts. The firefighters lifts will be designed and installed generally in accordance with BS EN 81-72 (16).

8.9 Evacuation lift

The building will be provided with one evacuation lift (LR01) in accordance with BS 9999 (2), BS EN 81-70 (22)and BS EN 81-73 (17). The requirement for an additional evacuation lift is subject to consultation with the relevant authorities. See Section 3.9.

9. Conclusion and References

9.1 Conclusion

This report provides fire safety advice for the Proposed Development based on the guidance of BS 9999 (2) and HTM05 (3) covering the main topics of The Building Regulations, namely, means of warning and escape, internal fire spread (linings and structure), external fire spread and fire-fighting access.

It is considered that the proposed fire safety strategy meets the functional requirements of the Building Regulations 2010, although it is subject to consultation and approval from the relevant authorities.

9.2 References

(1) British Standards Institution (BSI), BS 7974: Application of fire safety engineering principles to the design of buildings. Code of practice. BSI Global, 2019.

(2) British Standards Institution (BSI), BS 9999: Fire Safety in the Design, Management and use of Buildings - Code of Practice. BSI Global, 2017.

(3) Department of Health, Health Technical Memorandum 05-02: Firecode. Guidance in support of functional provisions (Fire safety in the design of healthcare premises. 2015.

(4) British Standards Institution (BSI), BS 5839 - 1: Code of practice for system design, installation, commissioning and maintenance of systems in non-domestic premises. BSI Global, 2013.

(5) British Standards Institution (BSI), BS 5839 - 9: Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems. BSI Global, 2011.

(6) British Standards Institution (BSI), BS 5839 - 8: Code of practice for the design, installation, commissioning and maintenance of voice alarm systems. BSI Global, 2013.

(7) British Standards Institution (BSI), BS EN 12845: Fixed firefighting system - Automatic sprinkler systems - Design, installation and maintenance. BSI Global, 2015.

(8) British Standards Institution (BSI), BS 5266 - 1: Emergency lighting. Code of practice for the emergency lighting of premises. BSI, 2016.

(9) British Standards Institution (BSI), BS EN 1838: Lighting applications. Emergency lighting. BSI Global, 2013.

(10) British Standards Institution (BSI), BS 5499 - 4: Safety signs - Code of practice for escape route signing. BSI Global, 2013.

(11) British Standards Institution (BSI), BS ISO 3864 - 1: Graphical symbols - Part1: Safety colours and safety signs Design principles for safety signs and safety markings. BSI Global, 2011.

(12) British Standards Institution (BSI), BS 5041-3:1975. Fire hydrant systems equipment. Specification for inlet breechings for dry riser inlets. BSI Global, 1975.

(13) British Standards Institution (BSI), BS 5306-8: 2012. Fire extinguishing installations and equipment on premises. Selection and positioning of portable fire extinguishers. Code of practice. BSI Global, 2012.

(14) British Standards Institution (BSI), BS 8519: 2020. Selection and installation of fire-resistant power and control cable systems for life safety, fire-fighting and other critical applications. Code of practice. BSI Global, 2020.

(15) British Standards Institution (BSI), BS EN 12101-6:2005. Smoke and heat control systems. Specification for pressure differential systems. Kits. BSI Global, 2005.

(16) British Standards Institution (BSI), BS EN 81-72:2020. Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Firefighters lifts. BSI Global, 2020.

(17) British Standards Institution (BSI), BS EN 81-73:2020. Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Behaviour of lifts in the event of fire. BSI Global, 2020.

(18) R. Chitty, BR 187: External fire spread: building separation and boundary distances, 2nd ed. Bracknell: IHS BRE, 2014.

(19) British Standards Institution (BSI), BS EN 13501-1:2018. Fire classification of construction products and building elements. Classification using data from reaction to fire tests. BSI Global, 2018.

(20) British Standards Institution (BSI), BS EN 13501-5:2016. Fire classification of construction products and building elements. Classification using data from external fire exposure to roofs tests. BSI Global, 2016.

(21) British Standards Institution (BSI), BS 9990:2015. Non automatic fire-fighting systems in buildings. Code of practice. BSI Global, 2015.

(22) British Standards Institution (BSI), BS EN 81-70:2018. Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lift. Accessibility to lifts for persons including persons with disability. BSI Global, 2018.

10. Appendix A – Fire Statement

10.1 Introduction

The following outlines the fire safety design intent to address the requirements of the new London Plan 2021.

The London Plan 2021 is the statutory spatial development strategy for the Greater London area in the United Kingdom that is written by the Mayor of London and published by the Greater London Authority. The regional planning document was first published in final form on 10 February 2004. On 13 August 2018 the Mayor published a version of the draft Plan that includes his suggested changes. These suggested changes have been prepared following a review of consultation responses, and consist of clarifications, corrections, and factual updates to the draft Plan.

Policy D12 (Fire Safety) notes that the building should achieve the highest standards of fire safety and ensure that Part B of Building Regulations (Part B1-B5) is satisfied.

Policy D5 (Inclusive Design) notes that the building should be designed to allow a safe emergency evacuation for all building users. In developments where lifts are provided at least one lift per core should be designed as an evacuation lift conforming BS EN 81-70:2018 to be used by people who require level access.

At its core therefore, the London Plan aims to ensure the highest levels of fire safety are provided to new and refurbished buildings and to maximise building resilience in line with best practice.

The following demonstrates that the building has been designed to incorporate appropriate features which reduce the risk to life and serious injury in the event of a fire. The building will include appropriate passive and active fire safety measures, together with suitable means of escape and access and facilities for firefighting.

10.2 Building description

The development will include the demolition of existing buildings, retention and refurbishment of the warehouse and the erection of a ground, mezzanine and 18 storey building (with plant at roof level and 3 basement levels) comprising of café and community space within the warehouse and flexible retail, affordable workspace and flexible office and medical floorspace within the new building, cycle and disabled car parking, servicing, refuse and plant areas, public garden. The development measures 97.14 AOD.

10.3 Basis of design

The design will be established from a Qualitative Design Review (QDR) in accordance with BS 7974. The QDR is a structured and systematic technique to establish ways in which possible fire hazards might arise and to set down a range of strategies to maintain the risk at an acceptable level.

The design has been reviewed and appropriate measures have been introduced to mitigate the risks from fire where practicable. The design will draw on prescriptive standards, best practice, and engineering judgement to deliver a safe and functional solution in accordance with Part B of the Building Regulations and Section D5 & D12 of the London Plan.

10.4 Competency

The fire strategy for the building has been prepared by Sweco, one of Europe's largest engineering consultancies with an extensive track record of providing fire safety consultancy services for large-scale commercial developments across the UK and internationally.

The individuals involved in the development of the strategy hold relevant Masters and Honours degrees and are Members and Associates of the Institute of Fire Engineers. The work is overseen by a Technical Director and is subject to internal review as part of Sweco's quality assurance procedures. In addition, the fire strategy has been reviewed with the Building Control Authority prior to the application.

10.5 Building construction methods / materials

The superstructure will be steel. Floor options are under development. Steel and metal deck, in-situ RC and PT slabs are all being considered. In all cases, the floors will be designed as 90-minute compartment floors.

Concrete cores will be jump or slip form construction, cores will incorporate cast in continuity reinforcement to tie into the floor diaphragm.

10.6 Package of fire protection measures

The following fire protection will be provided:

- Automatic fire detection and voice alarm (BS 5839)
- Emergency voice communication (BS 5839)
- Automatic sprinkler protection (EN 12845)
- Emergency lighting (BS 5266)
- Mechanical smoke control measures (BS 9999)
- Emergency power supplies to critical life safety plant (BS 8519)
- A robust level of fire safety management will be adopted once the building is occupied.

10.7 **Means of escape**

The building is provided with two escape/fire fighting stairs designed to facilitate a phased evacuation.

The building is provided with two escape/fire fighting stairs designed to facilitate a phased evacuation.

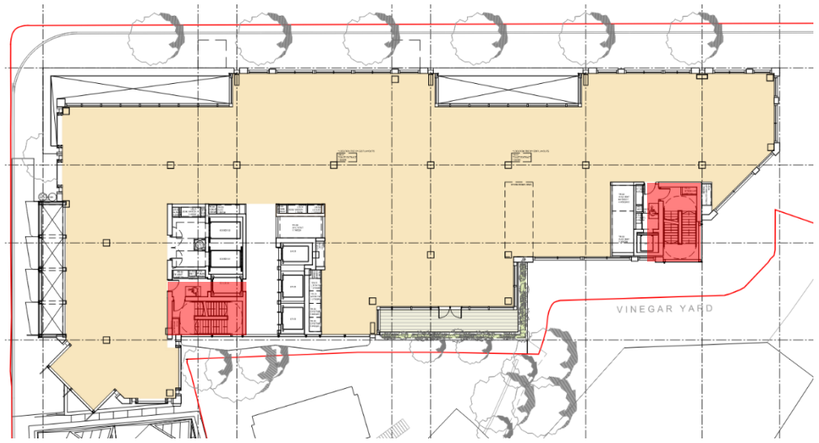

Figure A1 – Illustrating two fire fighting shafts facilitating escape

The building steps back at the upper levels and an external transfer is included as illustrated below:

Figure A2 – Illustrating one fire fighting shaft and escape stair that transfers via the roof terrace

10.8 **Means of escape**

A combined passenger / evacuation lift (LR01) will be used to augment the evacuation strategy. This is in addition to the normal escape stairs provided and is primarily to assist with disabled evacuation as part of a managed strategy. The lift will generally comply with the recommendations of BS 9999, BS EN 70, and BS EN 81-73.

The new London Plan recommends that a minimum at least one evacuation lift should be provided to each stair core. Currently, there is only one firefighting stair provided to the Secondary stair core. This arrangement needs to be discussed and agreed with Fire and Rescue Service. An evacuation stair may be required to meet recommendations of the new London Plan in the next design stage.

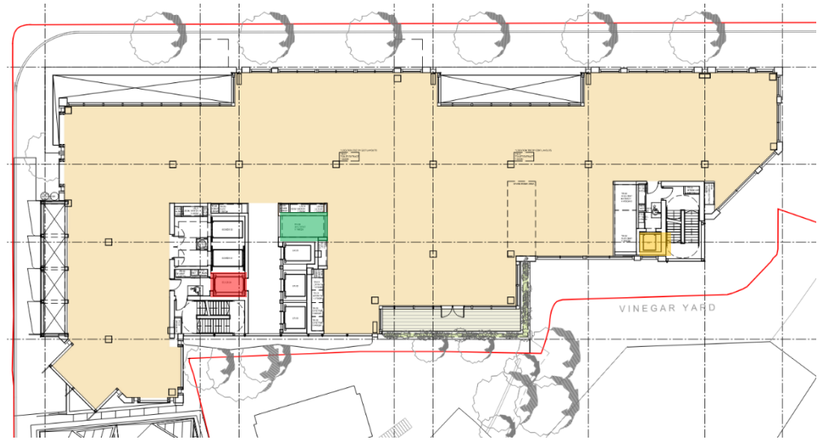

Figure A3 – Illustration of typical outpatient floor. Dual entry fire fighters lift in **red**, single entry fire fighters lift in **orange** and evacuation lift in **green**.

10.9 **Internal fire spread**

The superstructure will be 120-minute fire rated, in accordance with BS 9999.The sub-structure will be 120-minute fire rated, which constitutes an enhancement over prescriptive recommendations in BS 9999.

Every level will be a compartment floor and escape/fire fighting stairs, lift shafts and risers will be designed as protected shafts in accordance with BS 9999 guidance.

10.10 **External fire spread**

The external wall and any specified attachments will be constructed throughout of materials classified as Class B1 or better, as tested and certified under BS EN 13501.

Any insulation products used in the external wall construction shall be of Class A2-s1, d0 or better.

The main roof and terraces will be designed to achieve a B_{ROOF}(t4) classification under EN 13501-5.

10.11 Access and facilities for fire fighting

The building will be provided with two fire fighting shafts, each housing a fire fighting stair, a ventilated fire fighting lobby (via mechanical smoke extract commensurate in performance to EN 12101-6 Class B) and a firefighters lift (in accordance with BS EN 81-72). A wet rising fire main is fitted within each firefighting shaft in accordance with BS 9990.

Fire hydrants will be available 90m from the wet riser emergency inlet location.

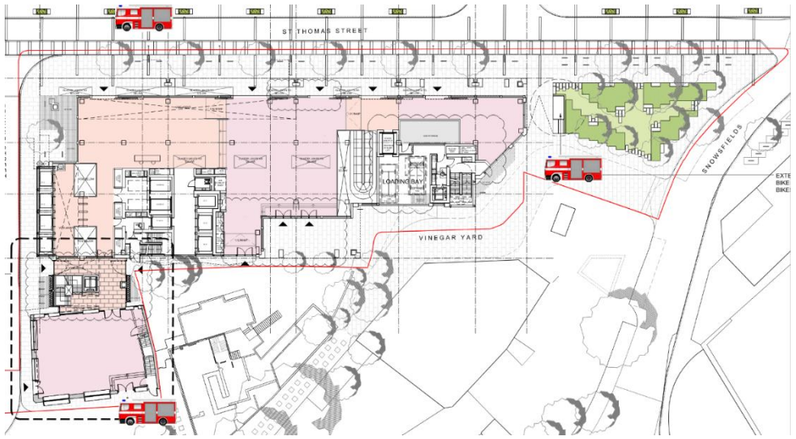

Figure A4 – Illustrating fire service vehicle access and fire fighting entry points

Access will be provided for a pumping / high reach appliance directly outside the entrance to each fire fighting shaft at ground level.

Final exits widths are designed to account for firefighting access during evacuation. An assembly position is located on the corner of St Thomas Street and Snowfields.

10.12 Future development of the asset

Any future development should consider the complete package of fire protection measures. The fire strategy needs to be considered holistically and alterations to any aspect of the design requires careful validation by a suitably qualified fire engineer.