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Fire Risk Appraisal of the External Walls Report (FRAEW)

Building Name: 20:20 House
Address: Skinner Lane, Leeds, LS7 1BE

Date: 07/10/2022

Document Control

Client Details:	Castle Special Projects LLP The client needs to be the building freeholder or signed on behalf of the freeholder. It cannot be the Managing Agent, unless they sign on behalf of the freeholder. It cannot be a resident/leaseholder.
Project reference:	

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Prepared by:		**Checked by:**		**Approved by:**	
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Description of revision:					
1.0 - Initial issue for client comment. 2.0 – Initial version with client requested amendments.					

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1. Report Scope and Objectives

Building Envelope Fire Surveys (BEFS) Ltd. were appointed by Castle Special Projects LLP to prepare a Fire Risk Appraisal of External Walls report (FRAEW) for 20:20 House.

This report assesses the risk of external fire spread and considers the adequacy of the external wall systems of the building and, where required, the report sets out next steps, including remedial actions and interim measures where there is a risk to the health and safety of residents.

FRAEW's are designed to address the life safety risk from fire spread over the external walls, and specified attachments, of multistorey blocks of flats of any height and not just those over 18m.

An external wall[1] can be:

- anything located within any space forming part of the wall
- any decoration or other finish applied to any external (but not internal) surface forming part of the wall
- any windows and doors in the wall; and
- any part of a roof pitched at an angle of more than 70 degrees to the horizontal if that part of the roof adjoins a space within the building to which persons have access, but not access only for the purpose of carrying out repairs or maintenance

A specified attachment[2] includes:

- a balcony attached to an external wall
- a device for reducing heat gain within a building by deflecting sunlight which is attached to an external wall
- a solar panel attached to an external wall

The fundamental requirement for external walls to adequately resist fire spread applies irrespective of building height. This FRAEW aims to position the fire risk posed by the external wall construction and cladding on a scale of relative risk from low to high, with high risk generally regarded as unacceptable.

The nature and extent of combustible components within the external walls of this building have been deemed not to be inconsequential, in terms of their contribution to the heat that would be released and the potential for fire development and spread. As such, the external walls of this building are within the scope of an FRAEW and such a report has been deemed necessary to provide recommendations and guidance with regard to the risk posed by fire spread over the external walls of the building.

It is intended that this fire risk appraisal of external walls report inform the building's fire risk assessment (FRA) as required by the Regulatory Reform (Fire Safety) Order, 2005 (RRO). The report's findings are to be interpreted in the context of the ongoing legislative control over the building under the Fire Safety Order, including legal responsibilities conferred on the Responsible Person. The Fire Safety Act 2021 has specifically placed external walls within the scope of the RRO.

This report may also serve to support or inform an EWS1 form.

This FRAEW included the following:

- Discussions with on-site staff regarding building construction and fire safety systems
- Review of drawings, operation, and maintenance (O&M) manuals, and other documents held on-site
- Desktop review of technical drawings provided by the client
- Non-invasive survey of exterior walls and cladding
- Selective invasive inspection of exterior walls
- Walkthrough survey of the buildings active fire safety systems
- Walkthrough survey of the buildings passive fire safety systems

[1] Definition extracted from P115, Approved Document B Volume 1 Dwelling houses 219 edition incorporating 2020 amendments

[2] Definition extracted from P118, Approved Document B Volume 1 Dwelling houses 219 edition incorporating 2020 amendments

- Assessment of exterior wall and cladding flammability using available product data
- Classification of overall risk of excessive external fire spread
- Development of recommendations for remediation

2. Executive Summary

This fire risk appraisal of external walls report (FRAEW) has been undertaken by a competent assessor and has established that the external walls comprise of the following:

- Fibre cement cladding
- Brickwork
- Aluminium cladding
- Render
- Glazed curtain wall spandrel system
- Rock panel cladding

It is necessary to take into account all of the factors that influence the likelihood of fire spread, the rate of spread, the ultimate extent of spread and their consequences. This enables the relative risk posed by external fire spread to be identified. The fire risk posed by the external wall construction and cladding is considered to be influenced most by factors relating to:

- fire performance
- façade configuration
- fire strategy/fire hazards

A risk rating has been determined using the methodology outlined in PAS 9980, with 3 levels of risks considered: high, medium, and low. The terms “high risk” and “low risk” are largely defined by the consequences that follow, i.e. whether there is a need for remedial action or not (or, in some cases, whether further investigations and in-depth analysis is needed).

The fire risk posed by the external wall construction and cladding is considered to be influenced most by factors relating to fire performance, façade configuration and fire strategy/fire hazards. These factors have been considered within this report and the overall risk rating for the building in relation to fire risk associated with the external walls is deemed to be Choose an item..

In coming to this conclusion, the following aspects were considered to be particularly relevant:

- The external surfaces of the building have A1 or A2 European fire classifications.
- The façade cladding panels are mechanically fixed
- Large areas of the building external facings are typically brick
- Masonry brickwork is at least 75 mm thick
- Glazing and glazed curtain walling is present
- No gaps between cladding panels
- Facings into the cavity at least Class A2
- The fibre cement cladding system cavity is closed by barriers/fire stopping located in line with all of the following: compartment floors, around openings, e.g. windows, doors
- Insulation is A1 in all systems with the exception of the brickwork
- Substrate is Masonry, >75 mm thick
- Sheathing boards in the aluminium cladding system is Class A1
- Spandrel/infill panels are Glazed (excluding vision glazing), with Class A1/A2 core
- Continuous vertically running cavity with cavity barriers or fire stops as appropriate
- Isolated areas of panels that do not cross compartment boundaries or cause a fire to cross a compartment boundary
- There are non-combustible open balconies (Where these extend along a facade, they have the potential both to interrupt a cavity; and deflect flames away from the building and away from the facade)
- There is fire detection and a fire alarm system that can currently support escalation from a stay put evacuation strategy to a simultaneous evacuation strategy
- There is access to more than one staircase for escape, where it is not possible for the same fire to affect all escape routes.

- Good access for firefighting vehicles
- The building is served by two fire-fighting shafts
- Residential apartments are provided with an internal protected entrance hallway with a travel distance less than 9m to the common corridor
- The building internal areas and external risk areas such as the carpark and bin storage area are secured by lockable doors/gates
- The building management have policies in place regarding the use of balconies by residents.

The conclusion from this FRAEW is that improvements or alterations to the fire safety design and fire strategy in the building are not necessary.

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3. Statement of Competence

Building Envelope Fire Surveys Ltd. is a specialist consultancy of fire safety professionals including Fire Engineers, Building Surveyors and third-party accredited Tier 3 fire risk assessors that undertake to complete intrusive surveys for building envelopes (external wall systems) for the purpose of reporting on the fire integrity, suitability, and quality of the relevant parts of the subject properties.

Building Envelope Fire Surveys Ltd. holds specialist insurance cover (Attached at Appendix 1 below) to undertake this specific survey type and to issue EWS1 certificates categorising the survey findings in accordance with the EWS1 certification scheme.

I, Richard Coggon, have prepared this report. I confirm that I consider myself to be suitably qualified and competent to write this fire risk appraisal of external walls report (FRAEW).

My qualifications are recognised as satisfying those recommended in Note 2 of the EWS1 certificate by the company's insurers based on witnessed inspection of survey and reporting process undertaken by Building Envelope Fire Surveys Ltd. and duration of active involvement in fire engineering projects relevant to the scheme issues.

I have read and understood the commentary and provisions relating to the competence of external wall assessors set out in Section 8 and Annex H of PAS 9980:2022 and have adequate and relevant competence with sufficient knowledge, skills, and experience in relation to fire safety of external walls to be able to complete an assessment at the level required to undertake this FRAEW.

I hold the relevant skill, knowledge, and experience to manage and interpret the results of intrusive inspections, the competence to appraise and assess the nature of external wall construction in terms of fire performance and provide an opinion on the risk.

I am a Member of the Institution of Fire Engineers as well as being a registered Fire Risk Assessor (Life Safety) with the Institution of Fire Engineers. I hold a bachelor degree in Fire Science from the University of Leeds and have 16 years' experience of fire safety engineering and consultancy associated with the built environment in the United Kingdom and United States of America.

Qualifications and Registrations:

- Member of the Institution of Fire Engineers (IFE Membership number: 00036460)
- Institution of Fire Engineers registered Fire Risk Assessor (Life Safety)
- Bachelor of Science Honours degree in Fire Science from the University of Leeds

There are no conflicts of interest of any kind, other than any which are disclosed in the report.

The conclusions of the report are the author's independent assessment of the risks and any remedial actions made have not been influenced in any way by the opinions or actions of others except where stated.

Richard Coggon BSc (Hons) MIFireE

4. Methodology

The methodology used to write this FRAEW report is documented within PAS 9980 and is aimed at providing a pragmatic basis for addressing situations in which, in the absence of evidence from large-scale fire testing, the exact fire performance of the particular external wall construction and cladding on an existing building cannot be proven. The report is risk-based, not compliance-based. It cannot establish absolute safety but can only categorise risk on a relative basis.

Accordingly, the benchmark criteria used in this report refer to first principles, based on an analysis of the problem of external wall fires. This takes into account not only whether the rate at which fire might spread is likely to be unduly rapid, but also the consequences in terms of secondary fires, and the implications for escape by occupants, given the likely mitigation resulting from the fire safety features in the building and the ability of the fire and rescue service to intervene effectively in time. This means the criteria are inevitably subjective and reliant on the use of professional judgement by competent persons.

Whilst fire spread is relative to the known performance of external wall construction in real fires, and in the various fire test methods (small, intermediate and large-scale) applied to materials, components and systems with which external walls are constructed, it is also relative to the context in which the combustible material is present. This report therefore takes account of the scale and extent to which such combustible cladding panels and other components are present on the building, e.g. whether there is full or only partial coverage of combustible cladding. It also takes into account the consequences of a fire and the fire strategy that underpins the fire safety design of the building.

This philosophy fits with the approach to risk assessment in the context of the legislative regime for ongoing control of existing buildings under the Fire Safety Order. The FRAEW is intended to complement the fire risk assessment (FRA), as, ultimately, it is within the scope of the FRA produced under the Fire Safety Order that the fire risk posed by external wall construction and cladding is to be considered.

The findings of an FRAEW are specifically intended to assist the building's fire risk assessor with that consideration. The rationale used stipulates that the building's fire strategy and various aspects of the fire safety design are taken into account, in conjunction with fire hazards that could result in facade fires. Accordingly, to assist in the building's FRA or its review, it is imperative that the external wall assessor's understanding of these matters and any assumptions made are explicitly stated in the FRAEW report. This is so that an FRAEW serves to inform the building's fire risk assessment and aids decision-making with regard to any necessary action to mitigate the risk, including interim measures that need to be implemented within defined timescales.

The ultimate aim of the FRAEW is, therefore, to position the fire risk posed by the external wall construction and cladding on a scale of relative risk from "low" to "high". From this, it is determined whether action is necessary to address a level of risk that is considered unacceptable. The terms "high risk" and "low risk" are largely defined by the consequences that follow, i.e. whether there is a need for remedial action or not (or, in some cases, where further investigations and in-depth analysis is needed).

5. Reference Information

PAS 9980 is used as a methodology for writing this fire risk appraisal of external wall report and to provide guidance on the subject. Additionally, the following guidance was used to inform this report:

- RICS Valuation of properties in multi-storey, multi-occupancy residential buildings with cladding (1st edition, issued March 2021, updated January 2022)
- Government statement on proportionality in building safety (issued July 2021)
- Independent expert statement in building safety in medium and lower-rise blocks of flats (issued July 2021)
- BRE's Fire safety issues with balconies (published 2016)
- Approved Document B, Vol 2, 2000 edition incorporating 2002 amendments
- Approved Document B, Vol 1, 2019 edition amended 2020

This FRAEW is based on the information provided to BEFS Ltd. by the Client as detailed below:

- A fire stopping survey report completed by Horbury Property Services Ltd on 28th June 2019
- A detailed intrusive investigation of the building ACM cladding completed by Wintech on 3rd August 2020
- A detailed intrusive investigation of the building external envelope completed by Wintech on 2nd November 2020
- A site monitoring report completed by Wintech on 11th October 2021
- A detailed intrusive investigation of the building external envelope completed by FirePrevent Ltd on 18th November 2021
- A detailed intrusive investigation of the building external envelope completed by International Fire Consultants Limited on 23rd November 2021
- Construction site inspection summary report by BB7 dated 18th July 2022
- Construction site inspection notes by FirePrevent Ltd dated 19th July 2022 and 26th July 2022
- Data sheets for the various replacement materials used during the remedial works to the building external cladding systems and attachment type balconies
- Existing and proposed elevation drawings by GWP Architects
- Cladding replacement detailed drawings including wall sections by GWP Architects
- The latest fire risk assessment by Instil Consulting dated 15th December 2021
- Photographic evidence of remedial works being completed during the removal and replacement of the original combustible cladding systems

Fire performance test results and classifications can be of use to establish what is known about the fire performance of individual materials, components and cladding systems forming part of the external walls. As part of this, the limits of applicability of test results and classifications are established.

Consideration was given to the extent to which such reports and information could be relied upon and steps were taken to establish the veracity of the information provided and how comprehensive it was. A visual inspection of the building was undertaken on 31st August 2022. This visit enabled the assessor to identify relevant risk factors to be considered in the assessment and also allowed verification of key information provided within the fire risk assessment and other documents made available.

None of the information listed below has yet been provided by the client.

- Building control sign off.
- O&M manuals.
- Fire strategy used for the development of the project (final version).

6. Assumptions and Limitations

All reasonably practicable efforts have been made to fully determine and take into account:

- the likely performance of the external walls in a fire;
- how the fire would start, develop and spread when taking into account all relevant factors relating to the configuration of the cladding, etc. on the facades; and
- how such a fire could directly, or indirectly, cause harm to the occupants and impact on their ability to escape in time.

The report is based on desktop assessments and intrusive survey reports from other professionals. The findings and opinions expressed in this report are based on the information provided. The FRAEW relates to this building alone and is not applicable to any other building in the UK or abroad.

This report in no way infers that BEFS Ltd. or the author of the report is acting in the capacity of the Responsible Person for the building, as defined within the Articles of the Fire Safety Order 2005.

This appraisal is intended primarily to inform the building's Fire Risk Assessment (FRA). Nothing in this report is intended to be used as a means to audit design or construction of buildings against any applicable regulations or guidelines (including current building regulations) nor to support litigation in relation to compliance with building regulations.

This FRAEW only considers risk in relation to the threat to building occupants; it is not specifically intended to address the safety of firefighters in the event of a fire spreading over the external walls. Neither is it specifically intended to address protection of property or the environment, or to address business continuity aspects.

The outcomes provided in this report do not convey certification of the design or installation of the External Wall System materials/products.

The methodology used is intended only to assist in making comparisons and in assessing the relative risk of different types of materials, components, systems and configurations of external wall construction. Definitive fire performance of an actual external wall build-up can only be determined by large-scale test.

This report provides a risk-based approach, which has been deemed acceptable to relevant interested parties, and cannot provide certainty, being reliant on professional judgement in its assessment and in the conclusions drawn.

Judgements on risk need to be made in the absence of evidence of compliance with the BR 135 benchmark. Fundamental to this is that the specific circumstances of the particular building being assessed need to be considered, holistically, when assessing risk. Even where there is evidence of compliance with the BR 135 benchmark, there might be other factors that influence the risk, such as significant combustible material present on features such as balconies.

Recommendations made in this report are considered to be proportionate in terms of the cost, time and effort required to remove and replace cladding systems and otherwise remediate the external walls. This report assumes that remediation of the inner leaf/backing walls of a building is, in the majority of cases, unlikely to be risk-proportionate.

Where fire protection systems or equipment, e.g. rising mains, have been taken into account in the FRAEW, it is assumed that they are working correctly; it is further assumed the building's FRA would have checked the records of testing and maintenance of such systems.

Unless specified, typical values for the fire properties of construction elements are used.

The appraisal is based on available industry knowledge at the time of writing the FRAEW. It is inevitable that more, and greater, knowledge relating to the fire performance of materials, components and systems and how they are configured in external wall construction is likely to come to light beyond the date of this report. Where

more definitive information on fire performance data relied upon in this FRAEW becomes available, e.g. results from relevant BS 8414 tests completed subsequent to the FRAEW, it is expected that such information ought to take precedence. This might, in some cases, prompt the need for a review of the findings of an FRAEW. New or further information which comes to light could change the outcome of the appraisal of fire risk.

The FRAEW is to be reviewed:

- if significant changes/repairs have been made to the external wall; and/or
- in the event of a fire incident, if the fire involved the external wall construction; and/or
- if there are any circumstances, depending upon the nature of the construction, the extent of available knowledge in relation to the particular materials, components and systems used on the building or the degree of uncertainty over the findings, that suggest review is appropriate.

NOTE *It is not expected that every FRAEW will need a periodic review where the above criteria have not been met, especially in cases where the risk rating is deemed to be "low".*

The client accepts that a potential conclusion of this FRAEW may be that a further inspection or in-depth technical assessment is needed.

7. Building Description

The 20:20 House building is a general needs block of apartments, purpose-built c.2008 and containing 264 apartments over seven floors. There is no basement level present.

The building's footprint is approximately 115m by 30m. The building height is approximately 23m to the roof, therefore calculated to be appropriately 20m to the top occupied floor above ground or access level. The building is more than 1m from all relevant boundaries.

The building appears to be of steel-framed construction with concrete floors. The external walls are a variety of type and make up including aluminium cladding, brickwork, fibre cement cladding, render and glazed curtain wall spandrel panels. Inner leaf of external walls is blockwork with the exception of the 6th floor, which is a Siniat Weather Defence sheathing board. The windows and doors and windows are aluminium double glazed units. Compartmentation between flats was confirmed as being 60 minutes fire-resisting.

There are two types of attachment type balcony. Inset attachment balconies are surrounded on three sides by brickwork façade and openings. The balconies are steel framed with an aluminium decking floor and a metal balustrade with glazed infill. Cantilever attachment balconies have a steel frame and aluminium decking floor. The balcony balustrades are metal with glass infill panels, however they are also fitted with a fibre cement board cladding partial enclosure to the outlooking face. The attachment balconies are in a vertically stacked configuration.

The terrace type balconies on the 6th floor only are set back from the building external elevations and form part of the building structure. The balconies have a stone flag finished floor.

The roof of the building is flat in all areas and therefore roof cladding has not been considered within this report - where the pitch of the roof is less than 70 degrees to the horizontal, it is not considered to be an external wall.

Figure 1 - Ground floor general layout plan

Analysis of fire safety systems

The building features four separate staircases, all of which are single core stair means of escape for different parts of the building. The common area arrangement in the cores over the height of the building, is corridor access to the stair. Flats have a protected hallway layout and travel distances within protected entrance halls meet the 9m limit.

There is natural smoke ventilation using automatic opening windows in the designated common corridors connected to smoke detection. There is a $1m^2$ vent at the head of each of the four staircases. Fire-fighting lifts are present in two of the four stair cores. The evacuation strategy for the building appears to be stay put within the flats, with each flat having an LD3 standard of automatic detection.

Flats do not have a domestic sprinkler/water mist system. Dry risers are installed in two of the four stair cores, with access to all points of flats served being within 60m, fire appliances are able to park within 18m of the dry riser inlets. Fire Service access to the North and South elevations of the building is good but access to the East and West elevations is poor.

The specific hazards identified on site were as follows:

- The presence of an under croft residential carpark to the South of the building
- An elevated garden is provided at first floor level to the South of the building, which is fitted with timber decking and is positioned above residential carparking bays

No historical fires have been reported and the building management have a clear policy in place in relation to balcony management. .

Figure 2 - Location plan, with location of nearest public hydrant shown

8. Design & Regulatory Basis

In England and Wales, the current legal requirements for the construction of an external wall system for a multi-occupancy residential building are governed by the following legislation:

- The Building Act 1984
- The Building Regulations 2010

The Building Act 1984 consolidated all previous legislation concerning the construction of a building from design and specification for buildings and their component parts. Section 1 authorises the Secretary of State to make regulations with respect to the design and construction of buildings. And Section 6 authorises the Secretary of State to issue documents for the purposes of providing practical guidance on the requirements of any provision of those regulations. Pursuant to those sections, the Secretary of State has issued:

- The Building Regulations 2010
- Building (Amendment) Regulations 2018
- Approved Document B 2019 (amended May 2020)

In England, the requirements of the Building Regulations are supported by Approved Document B, the latest edition of which was published in 2019 together with further amendments made in May 2020.

The Building Regulations 2010 are the minimum standard for design, construction, and alterations in the United Kingdom. The Regulations are developed by the UK government and approved by Parliament. The regulatory systems in England and Wales differ from those in Scotland and Northern Ireland, but the underlying requirements are similar.

The purpose of the Building Regulations is to set out mandatory requirements for all aspects of the construction of buildings.

For residential buildings, they are intended to ensure that new, converted, or renovated buildings will be safe for occupants and those in the immediate vicinity.

For England (and Wales), the fundamental requirements for fire safety are set out in Schedule 1, Part B.

Building Regulations 2010 - Schedule 1, Part B4(1) states:

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

The Building Regulations can generally be adhered to by following any of the following documents or approaches:

- Approved document B:2019 (ADB) including 2020 amendments (or relevant ADB at time of original construction)
- BS 9991: 2015[3] for residential buildings (hybrid guidance between ADB and a fire engineered solution)
- A fire engineered performance-based solution

ADB is not mandatory but provides guidance to assist those constructing buildings to understand how they may meet the mandatory requirements set out in the Building Regulations. ADB provides specific guidance on how someone involved in the construction of a building may address the risk of fire spreading through the various components of the building.

Requirement 4 of ADB, known as B4, sets out the position in relation to external fire spread and is, therefore, the section relevant to the construction of an external wall.

[3] BS 9991: 2015: Code of Practice for Fire Safety Design, Management and use of Residential Buildings

B4 quotes section B4(1) of the Building Regulations and then provides further guidance as to how that standard can be met.

The provisions of B4 are not mandatory, but it gives guidance on the different ways in which a person who is designing or constructing a building may meet the mandatory requirement of the Building Regulations, Schedule 1 B4(1).

Section 7 of the Building Act 1984 provides that:

A failure on the part of a person to comply with an approved document does not of itself render him liable to any civil or criminal proceedings; but if, in any proceedings whether civil or criminal, it is alleged that a person has at any time contravened a provision of building regulations-
(a) a failure to comply with a document that at that time was approved for the purposes of that provision may be relied upon as tending to establish liability; and
(b) proof of compliance with such a document may be relied on as tending to negative liability.
Building Act 1984 - Section 7

If a person correctly follows the guidance set out in B4 (and B3), it will be presumed that they have complied with the requirements of the Building Regulations, but that presumption may be rebutted with evidence of non-compliance.

Section 10 of ADB provides specific guidance about the requirements for external walls to resist the spread of fire over their surface. (It should be read for completeness in conjunction with Section 9 Fire-stopping clauses 9.24-9.29 of Requirement B3.)

Paragraph 10.1 notes that:
the external wall of a building should not provide a medium for fire spread if that is likely to be a risk to health and safety.

B4 Section 10, Paragraph 10.1.
It warns that the use of combustible materials and the presence of cavities in an external wall system may present such a risk, particularly in tall buildings.

Paragraph 10.5 of B4 provides specific guidance on the nature of the materials that may be used on the external surface of an external wall system, according to the type of the building and its proximity to a boundary of a neighbouring building.

The external surface of the wall system on a residential building of any height should have a specified fire rating, which includes a requirement for the material to be non-combustible (Class A2 or better) for buildings over 18m.

Paragraph 10.6 of B4 deals with the insulation or filler material to be installed behind the external surface as part of the wall system. This provides that, in a building with a storey that is 18m or more in height, the insulation or filler used in the wall must be non-combustible. NOTE: Paragraph 10.6 is silent as to the requirements for any materials to be used in buildings where the top storey is under 18m. So long as the wall system meet these specific requirements, it will be presumed to comply with B4(1). In any case the functional requirements of Building Regulations 2010 - Schedule 1, Part B4(1) must be met. Regard should always be paid to the requirements for fire stopping.

Regulation 7 of the Building Regulations states that:

Materials and workmanship
7. Building work shall be carried out-
(a) with adequate and proper materials which-
(i) are appropriate for the circumstances in which they are used,
(ii) are adequately mixed or prepared, and
(iii) are applied, used or fixed so as adequately to perform the functions for which they are designed; and
(b) in a workmanlike manner.

Regulation 7 was amended as part of the Building (Amendment) Regulations 2018 to require most materials forming part of the external wall build-up of relevant buildings with a storey at least 18m above ground level to achieve European Class A2-s1, d0 or Class A1.

Relevant buildings are defined in Regulation 7(4).

A relevant building is essentially any building that includes sleeping accommodation. This includes institutional buildings such as:

- care homes
- hospitals
- student residential accommodation
- private residential accommodation

NOTE: Hotels are currently excluded although this is under consultation within MHCLG.

The requirements for relevant buildings are set out in Regulation 7(2). This states that materials which become part of an external wall, or specified attachment, of a relevant building, are of European Classification A2-s1, d0 or Class A1, classified in accordance with BS EN 13501-1:2018 (more on this later).

Regulation B3(4) of Schedule 1 of the Building Regulations states that:
(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.
(2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

As already detailed above, for buildings over 18m, Regulation 7 has been amended and require the external wall system to achieve Class A2 or better.

For buildings below 18m, there are two approaches to meet the requirement of B4, which are similar for ADB (see section 12.3 and BS9991 section 18.2) there are:

- Follow the provisions of ADB for external surfaces, materials, and cavity barriers, or
- Meet the performance criteria given in BRE135 using the 8414 test data

Regulation B3(4) of Schedule 1 of the Building Regulations states that "the building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited".

In most cases, (unless the wall system has undergone a BS 8414 test and been classified to BR 135 on that basis or has been designed using a fire engineered solution to BS 7974) cavity barriers should be provided to reduce the potential for fire spread. Within external walls, they should be provided:

- at the edges of cavities and around openings penetrating them;
- at the junctions between external cavity walls and compartment walls and floors;
- to subdivide any cavity (including roof spaces) so that the distance between cavity barriers does not exceed 20m (10m for any cavity other than a roof lightwell that has surfaces in the lightwell that do not meet at least Class 1 or Euro class C).

Cavity barriers, tested from each side separately, should provide a minimum of 30 minutes' integrity and 15 minutes' insulation (E30 and I15). For light weight timber construction cavity barriers should provide a minimum of E30 and I30 and cavity size should be more restricted. This is in line with guidance contained in Detail 10i (page 33) of the Structural Timber Association's Structural timber buildings fire safety in use guidance Volume 2 – Cavity barriers and fire stopping (Revision v1.1 March 2020).

The building's external wall systems have been considered in relation to the functional requirements and overall intent of the Building Regulations, 2010 (as amended) with respect to external fire spread.

The extent to which a building conformed to building regulations, guidance, and standards at the time of construction is important for context when considering the risk.

The measures set out in the relevant volume of Approved Document B (ADB) were deemed to achieve compliance with the Building Regulations at the time of construction and have been used as a benchmark against which the external wall systems have been assessed.

The building was constructed in approximately 2008.

Based on the type of building and the time of the construction works, the version of ADB used when compiling this report is:

Approved Document B - 2000 edition incorporating 2000 and 2002 amendments

Approved Document	Edition	Came into Force	Withdrawn / Suspended	Lifespan (days)
ADB - V1 - Dwellings 2019 edition incorporating 2020 amendments	2020	26/11/2020		653
ADB - V1 - Dwellinghouses 2019 edition	2019	16/04/2019	26/11/2020	591
ADB - V2 - Buildings other than Dwellinghouses 2006 edition incorporating 2007, 2010 and 2013 amendments	2013	01/10/2010	16/04/2019	3120
ADB - V2 - Buildings other than Dwellinghouses 2006 edition	2006	06/04/2007	01/10/2010	1275
ADB - 2000 edition incorporating 2000 and 2002 amendments	2002	01/03/2003	06/04/2007	1498
ADB - 2000 edition	2000	01/07/2000	01/03/2003	974
ADB - 1992 edition	1992	01/06/1992	01/07/2000	2953
ADB - 1985 edition (B2,3,4)	1985	11/11/1985	01/06/1992	2395
Approximate Date of Construction				
20:20 House		20/4/05	1/1/08	987

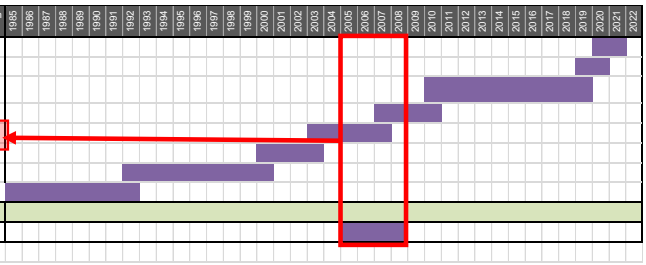

Figure 3 – 20:20 House construction plotted against the release dates of ADB

The building construction predates the Building (Amendment) Regulations 2018 and Approved Document B 2019 (amended May 2020). On buildings over 18m in height, restrictions on the classifications of surfaces and combustibility of the walls were in place at the time of this building's construction. This is in order to reduce the surface's susceptibility to ignition from an external source and to reduce the danger from fire spread up the external face of the building. The use of combustible materials in the cladding system and extensive cavities may present such a risk in tall buildings.

The 20:20 House building has a top storey more than 18m in height.

For buildings with a storey 18m or more above ground (excluding mechanical levels), the 2013 version of ADB sets out the following:

- All external wall surfaces should meet the provisions in Diagram 40.
- Those wall surfaces below 18m should be Class C-s3,d2 or better
- Those external wall surfaces located 18 m or more above ground must be Class B-s3,d2 or better.
- If an elevation is within 1000mm of a relevant boundary, then the entire wall should be of Class B-s3,d2 or better.
- Any insulation product, filler material (not including gaskets, sealants and similar) etc used in external wall construction must be of limited combustibility (Class A1 or Class A2).
- Flammable insulation is permitted to be used in the exterior wall when protected on both sides by solid
- masonry or concrete walls at least 75 mm thick.

BS-EN 13501-1[4] classification system, Class A1 indicates non-combustible materials: Class A2 indicates a material of limited combustibility and will not significantly contribute to any state of a fire.

[4] British Standards Institute. BS-EN 13501-1. Fire classification of construction products and buildings elements - Part 1: Classification using data from reaction to fire tests. 2009.

Classes B through F indicate combustible materials, Class B will not lead to a flashover situation but will contribute to a fire with Class F being easily combustible materials.

The smoke classification is broken down into numeric values. The numbers reflect how much smoke is produced during a fire. These values are summarised below:

S1 - no smoke produces
S2 - limited smoke production and smoke increase
S3 - No limitations on smoke production

Some construction products can melt and ignite to form Flaming Droplets. These 'flaming droplets/particles' will tend to initiate new fires away from the original point of ignition. The flaming droplet classification relates to the amount of time taken for flaming droplets to occur. These values are summarised below:

d0 - No flaming droplets produced within 600 seconds
d1 - no problems persisted for longer than 10 seconds within 600 seconds of the test being conducted
d2 - no limitations on droplets required.

ADB 2013 also requires that cavity barriers be installed to reduce fire and smoke progression in exterior wall cavities. Cavity barriers generally must be installed at the top and bottom of cavities, at slab levels, around windows, and otherwise at a maximum spacing of 10 to 20 m.

The barriers must provide at least 30 minutes fire resistance (E Integrity). They can be formed by any construction provided for another purpose if it meets the provisions for cavity barriers appendix A table A1 item 15 i.e. Cavity barrier, 30 minutes integrity (E), 15 minutes insulation (I) from each side separately.

Cavity barriers around stud wall or partition, or provided around openings may be formed of:

- Steel at least 0.5mm thick
- Timber at least 38mm thick
- Polyethylene sleeved mineral wool, or mineral wool slab, under compression.
- Calcium silicate, cement based or gypsum-based boards at least 12mm thick.

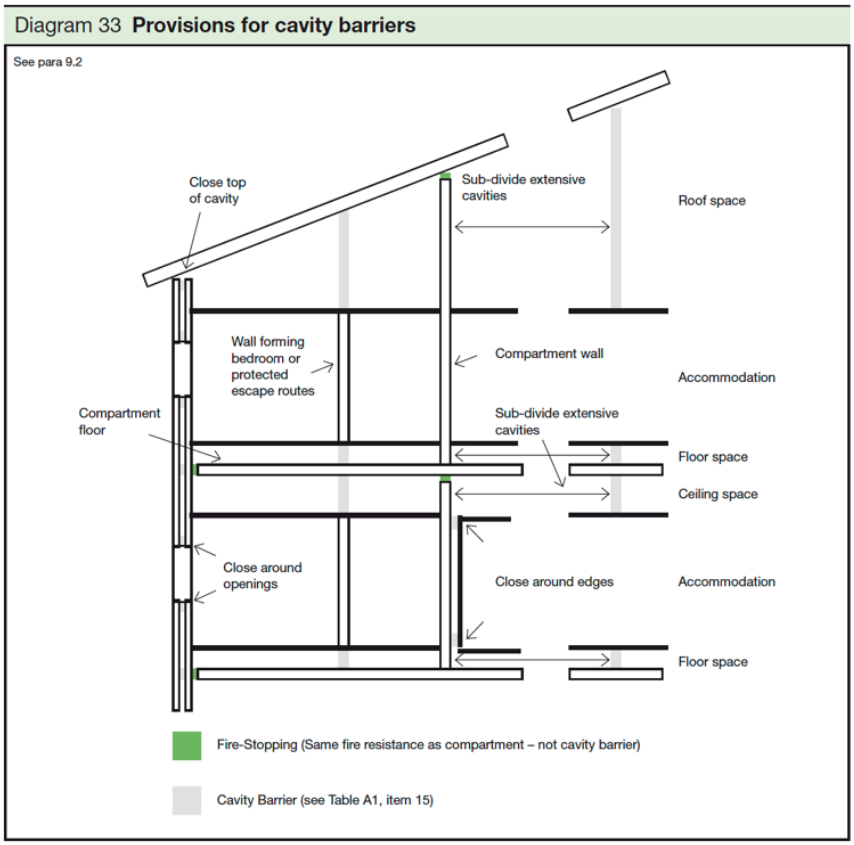

Figure 4 - Diagram 33 extracted from ADB 2013, Provision of cavity barriers

Materials can also be shown to meet the guidance of ADB if they satisfy performance criteria BR 135[5] using full-scale test data from BS 8414-1[6] or BS 8414-2[7], regardless of material class.

For buildings with a top storey less than 18m in height, traditionally, there have been no restrictions on the combustibility of the external wall construction, and only in limited circumstances any requirements relating to the reaction to fire classification of surfaces. However, external surfaces must always meet the requirements of Building Regulations and adequately resist the spread of the fire over the walls and from one building to another, having regard to the height, use and position of the building. That said in the interpretation of this regulation it is inherently possible that external walls in buildings under 18m may have used materials which promote more rapid fire spread than on buildings over 18m in height, where restrictions on the classifications of surfaces and combustibility of the walls were made clearer at the time of construction.

This is still the situation that applies in the case of new buildings with a top storey below 18m in height constructed in accordance with ADB, albeit that the imperative in functional Requirement B4(1) to ensure that the external walls of the building adequately resist the spread of fire over the walls is just as applicable to low-rise buildings as it is to those over 18m in height.

This inherent acceptance of much more rapid fire spread over the external walls is, nevertheless, clearly predicated on the understanding that there would not be an unacceptable risk to occupants and that other aspects, such as cavity protection in the wall build-up, where applicable, and adequate access and other facilities for the fire and rescue service are present, to the extent necessary, to enable effective intervention.

Diagram 40 of Volume 2 of Approved Document B 2006 edition sets out provisions for external surfaces or walls. For buildings under 18m in height and more than 1m from relevant boundaries, Diagram 40 makes no provisions.

[5] BRE Group. Fire performance of external thermal insulation for walls of multistorey buildings (BR135).
[6] British Standards Institute. BS 8414-1: 2015. Fire performance of external cladding systems - Part 1: Test method for non-loadbearing external cladding systems applied to the masonry face of a building.
[7] British Standards Institute. BS 8414-2: 2015. Fire performance of external cladding systems - Part 1: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame.

Provisions are made within Approved Document B to restrict the combustibility of external walls of high buildings. On buildings over 18m in height, restrictions on the classifications of surfaces and combustibility of the walls were in place at the time of this building's construction. This is in order to reduce the surface's susceptibility to ignition from an external source and to reduce the danger from fire spread up the external face of the building. The use of combustible materials in the cladding system and extensive cavities may present such a risk in tall buildings. In a building with a storey 18m or more above ground level any insulation product, filler material (not including gaskets, sealants and similar) etc used in the external wall construction should be of limited combustibility (with an exception for insulation within double-skinned masonry walls) and the external walls must meet the requirements of Diagram 40.

For external walls more than 1m from relevant boundaries, of a building over 18m in height, Diagram 40 of Volume 2 of the 2006 version of ADB requires "Index (I) not more than 20 (national class) or class C-s3, d2 or better (European class). Timber cladding at least 9mm thick is also acceptable" for parts of the walls below 18m from ground and "Class 0 (national class) or class B-s3, d2 or better (European class) for parts of the walls above 18m.

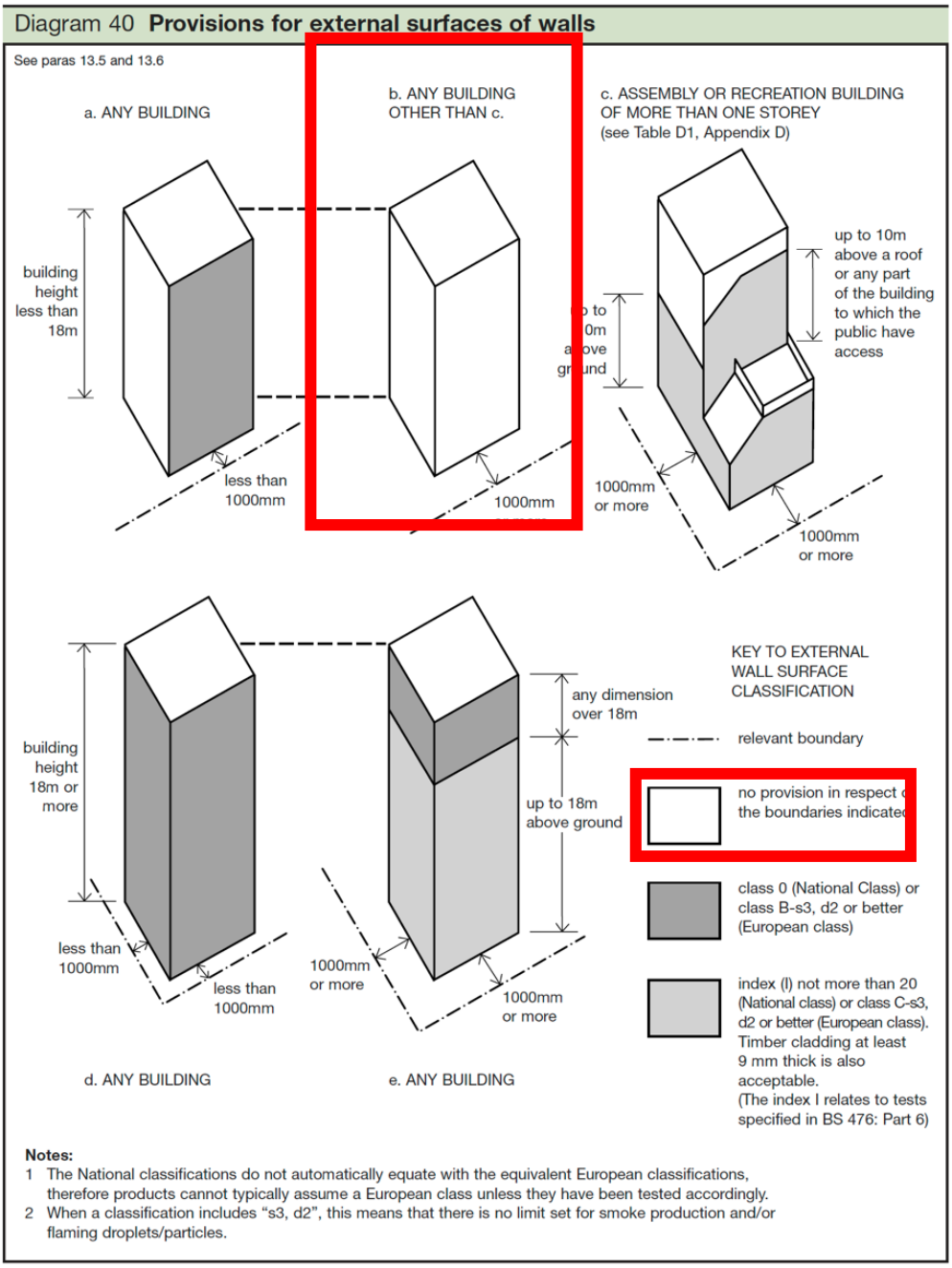

Figure 5 - Diagram 40 of ADB (Fire Safety) Volume 2, 2006 Edition

Table 10.1 of Volume 1 of Approved Document B 2019 edition sets out the current provisions for external surfaces or walls. For buildings under 18m in height and more than 1m from relevant boundaries, Table 10.1 makes no provisions.

Table 10.1 Reaction to fire performance of external surface of walls

Building type	Building height	Less than 1000mm from the relevant boundary	1000mm or more from the relevant boundary
'Relevant buildings' as defined in regulation 7(4) (see paragraph 10.10)		Class A2-s1, d0[1] or better	Class A2-s1, d0[1] or better
Assembly and recreation	More than 18m	Class B-s3, d2[2] or better	From ground level to 18m: class C-s3, d2[3] or better From 18m in height and above: class B-s3, d2[2] or better
	18m or less	Class B-s3, d2[2] or better	Up to 10m above ground level: class C-s3, d2[3] or better Up to 10m above a roof or any part of the building to which the public have access: class C-s3, d2[3] or better[4] From 10m in height and above: no minimum performance
Any other building	More than 18m	Class B-s3, d2[2] or better	From ground level to 18m: class C-s3, d2[3] or better From 18m in height and above: class B-s3, d2[2] or better
	18m or less	Class B-s3, d2[2] or better	No provisions

NOTES:

In addition to the requirements within this table, buildings with a top occupied storey above 18m should also meet the provisions of paragraph 10.6.

In all cases, the advice in paragraph 10.4 should be followed.

1. The restrictions for these buildings apply to all the materials used in the external wall and specified attachments (see paragraphs 10.9 to 10.12 for further guidance).
2. Profiled or flat steel sheet at least 0.5 mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.
3. Timber cladding at least 9mm thick is also acceptable.
4. 10m is measured from the top surface of the roof.

Table 10.1 reaction to fire performance of external surfaces of walls

9. Findings from As-built Information Review

The original as-built information made available from the building original construction was limited to elevations and floor plans.

No detailed written fire strategy was available in order to confirm the basis of the original building design building

O&M (Operations & Maintenance) Manuals and ‘As-Built’ information was requested, however at the time of writing this FRAEW, no information had been made available.

10. Building Alterations

BEFS Ltd. were not advised that, nor identified evidence to suggest that the buildings have been altered, extended or adapted post-construction.

11. Site Survey(s)

The site investigation was completed on a single day and access was granted to review multiple access points across the façade and all external wall types were reviewed.

The weather during the site investigation was fine and dry.

The site survey confirmed wall construction was generally as detailed in the information provided by the client and from previous surveys.

As previous external wall surveys had already been completed, the extent of this survey was limited. One sample point of each wall type was viewed. This was considered reasonable as to not cause further damage and disruption whilst balancing the needs to confirm the validity of previous inspections. The external wall surveys that were previously completed have been reviewed and are as follow:

- A detailed intrusive investigation of the building ACM cladding completed by Wintech on 3rd August 2020
- A detailed intrusive investigation of the building external envelope completed by Wintech on 2nd November 2020
- A site monitoring report completed by Wintech on 11th October 2021
- A detailed intrusive investigation of the building external envelope completed by FirePrevent Ltd on 18th November 2021
- A detailed intrusive investigation of the building external envelope completed by International Fire Consultants Limited on 23rd November 2021
- Construction site inspection summary report by BB7 dated 18th July 2022

5 inspection points were used to confirm the wall construction of the various facades and presence of cavity barriers.

The external walls comprised the following (as indicated on the elevation drawings):

- Type 1 – Fibre cement cladding
- Type 2 – Brickwork
- Type 3 – Aluminium cladding
- Type 4 – Render
- Type 5 – Glazed curtain wall spandrel system
- Type 6 – Rock panel cladding (not inspected as part of the site survey)

Figure 6 - Location of survey points for invasive survey on the building West elevation

Figure 7 – Location of survey points for invasive survey on the building East elevation

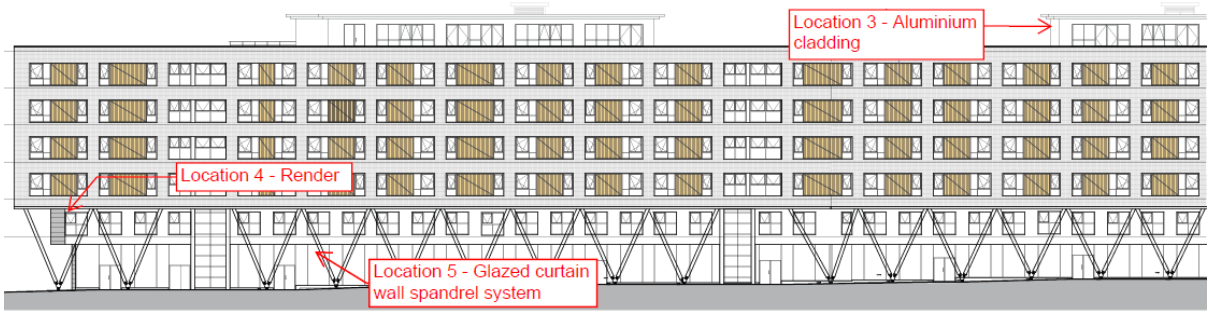

Figure 8 – Location of survey points for invasive survey on the building North elevation

As part of the sample inspection, the below areas were examined by drilling core holes and removing cladding panels to enable a visual inspection of the materials used within the cavity and the location and presence of any cavity barriers and any fire-stopping materials.

For the purpose of this report, the defects found below were indicative of all areas accessed during the survey.

Table 1 - Table of inspection areas and site notes

Inspection Point	Photo Reference
Location 1: 3rd floor West elevation The build-up of this system was found to be: - James Hardie VL fibre cement cladding panel - Galvanised steel support rails - Rockwool insulation - Wraptite VCL breather membrane - Bitumen covered blockwork with concrete mortar Workmanship was found to be of a good standard. Cavity fire barriers have been installed correctly.	 *Figure 9 – Breather membrane being installed*  *Figure 10 – Mineral wool insulation and cavity barriers being installed*  *Figure 11 – Fibre cement cladding outer face*

Inspection Point	Photo Reference
Location 2: 1st floor East elevation The build-up of this system was found to be: - Brickwork with concrete mortar - Cavity - Celotex foil faced PIR insulation - Bitumen covered blockwork with concrete mortar Cavity fire barriers were located horizontally at compartment floor level, but were found to be poorly installed with gaps present in some areas. Cavity closers were located around window openings No cavity fire barriers were located around extraction ducting penetrations	 *Figure 12 – Brickwork removed*  *Figure 13 – Celotex insulation located in front of blockwork*

Inspection Point	Photo Reference
Location 3: 6th floor East elevation The build-up of this system was found to be: - Genius Prime aluminium rainscreen panel - Aluminium support rails (helping hand brackets) - Cavity - 50mm Rockwool duo slab insulation - Steel frame system - Siniat Weather Defence sheathing board Siderise cavity fire barriers are correctly installed horizontally and vertically in most areas, however cavity fire barriers could not be located adjacent to all window/door openings Cavity fire barriers were located around extraction ducting penetrations.	 *Figure 14 – Aluminium panel removed to reveal mineral wool insulation and cavity barrier*  *Figure 15 – Mineral wool insulation removed to reveal a steel frame system and Siniat Weather Defence board*

Inspection Point	Photo Reference
Location 4: 1st floor North elevation The build-up of this system was found to be: - Unknown silicone or acrylic based render topcoat - Blockwork with concrete mortar Workmanship was found to be of a good standard.	 Figure 16 – Render coated outer wall  Figure 17 – Blockwork positioned behind the render coating

Inspection Point	Photo Reference
Location 5: Ground floor North elevation The build-up of this system was found to be: - Double glazed unit with rubber gasket seal and coloured blackout film to rear of unit - Aluminium curtain wall support frame - Open void on ground floor level units only - Mineral wool insulation on upper floor units - Concrete compartment floor on upper floor units - Fire batt to false ceiling void on upper floor units Workmanship was found to be of a good standard.	 Figure 18 – Glazed spandrel unit  Figure 19 – Open void on the ground floor units

12. External Wall Construction & Cladding

The findings from the invasive survey(s) highlight here is it survey or surveys please and the review of the documentation provided, confirm the external wall constructions to be as follows:

Type 1 – Fibre cement cladding
Type 2 – Brickwork
Type 3 – Aluminium cladding
Type 4 – Render
Type 5 – Glazed curtain wall spandrel system
Type 6 – Rock panel cladding

Below provides a more detailed analysis of the wall types on site and the risk posed for each wall type.

Wall type 1 – Fibre cement cladding Error! Reference source not found.

Located between the 1st and 5th floor levels. Approximate 15% of overall coverage.

Table 2 Wall type 1 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	James Hardie VL fibre cement cladding panel	11mm	Mechanical	Vertically arranged
2	Galvanised steel support rails	2mm	Mechanical	Arranged horizontally and vertically
3	Rockwool insulation	100mm	Mechanical	
4	Wraptite VCL breather membrane	1mm	Mechanical	
5	Bitumen covered blockwork with concrete mortar	100mm	Mechanical	
Internal				

Table 3 - Materials in the external wall constructions fire performance Wall Type 1

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
James Hardie VL fibre cement cladding panel	Primary	A2-s1, d0	Yes	Yes
Galvanised steel support rails	Primary	A1	Yes	Yes
Rockwool insulation	Primary	A1	Yes	Yes
Wraptite VCL breather membrane	Primary	B-s1, d0	Yes	Yes
Bitumen covered blockwork with concrete mortar	Primary	Assumed Class A1	Yes	Yes

Figure 20 - wall type 1

Cavity Barriers

Tenmat 'closed state' cavity fire barriers are installed vertically at either side of the window frame in the system and are mechanically secured in place with good compression to the inside face of the outer cladding panel. Tenmat 'open state' cavity fire barriers are installed horizontally at the top and bottom of the cladding system. Where they adjoin the 'closed state' cavity fire barriers, the 'closed state' cavity fire barriers take priority. The 'open state' cavity fire barriers are mechanically fixed in place and are used to separate the fibre cement cladding system from the brickwork system.

Figure 21 - Example of cavity barriers

Penetrations

There are no penetrations in the fibre cement cladding system other than windows and balcony doors. Where windows and balcony doors are present in the system Tenmat 'closed state' cavity fire barriers are installed vertically at either side of the window/door frame.

Figure 22 - Example of cavity barrier adjacent to window opening in the system

Analysis

All materials that form the fibre cement cladding system are non-combustible with the exception of the breather membrane, which has a Class B European fire classification. All materials are compliant with Part B of the current Building Regulations and the Building Regulations at the time of construction.

Cavity fire barriers bordering the cladding system are of the correct type and are correctly installed as per the manufacturers recommendations.

Accordingly, the risk of flame spread associated with this cladding is considered to be insignificant.

Wall type 2 – Brickwork

Located between the ground and 5th floor levels. Approximate 60% of overall coverage.

Table 4 Wall type 2 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	Brickwork with concrete mortar	120mm	Mechanical	
2	Cavity	60mm	N/A	
3	Celotex foil faced PIR insulation	50mm	Mechanical	
4	Bitumen covered blockwork with concrete mortar	100mm	Mechanical	
Internal				

Table 5 - Materials in the external wall constructions fire performance Wall Type 2

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
Brickwork with concrete mortar	Primary	A1	Yes	Yes
Celotex foil faced PIR insulation	Primary	Assumed Euro class E	Yes	No
Bitumen covered blockwork with concrete mortar	Primary	Assumed A1	Yes	Yes

Figure 23 - Wall type 2

Cavity Barriers

Cavity fire barriers in the form of 'closed state' mineral wool were positioned horizontally at compartment floor level in all intrusive investigation areas in the brickwork system. These horizontal cavity fire barriers were in some instances poorly installed with some small gaps present.

Cavity fire barriers could not be located vertically on compartment wall lines during intrusive investigations in the brickwork system.

As the brickwork system comprises of an inner and outer skin of solid masonry more than 75mm thick between a cavity, there is no requirement to provide cavity fire barriers horizontally at compartment floor level or vertically on compartment wall lines. It should however be ensured that all openings such as windows and balcony doors are closed with a cavity closer and the system is closed at the top.

Figure 24 - Example of horizontal cavity barrier in the brickwork system

Penetrations

There are window and balcony door openings in the brickwork system along with plastic extraction ducting penetrations. All window and balcony door openings in the brickwork system were found to have been fitted with cavity closers during intrusive investigations. No cavity fire barrier was located around the plastic extraction ducting in the system during intrusive investigations.

Figure 25 - Example of plastic extraction ducting penetration

Analysis

All materials that form the brickwork system are non-combustible with the exception of the Celotex PIR insulation, which has a Class E European fire classification. The facing brickwork complies with the functional requirements of Part B of the current Building Regulations and the Building Regulations at the time of construction.

Some of the non-facing materials used as part of the external façade systems are combustible but compliant with the functional requirements of Part B of the Building Regulations at the time of construction.

Cavity fire barriers are provided horizontally at compartment floor level in the system. The system cavity is closed around window and balcony door openings and the system is sealed at the top.

Accordingly, the risk of flame spread associated with this system is considered to be between low and moderate.

Wall type 3 – Aluminium cladding

Located on the 6th floor only. Approximate 15% of overall coverage.

Table 6 Wall type 3 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	Genius Prime aluminium rainscreen panel	3mm	Mechanical	Horizontally arranged
2	Aluminium support rails (helping hand)	Unknown	Mechanical	Vertically arranged
3	Cavity	Unknown	N/A	
4	Rockwool Duo slab insulation	50mm	Mechanical	
5	Steel frame system	Unknown	Mechanical	
6	Siniat Weather Defence sheathing board	Unknown	Mechanical	
Internal				

Table 7 - Materials in the external wall constructions fire performance Wall Type 3

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
Genius Prime aluminium rainscreen panel	Primary	A2-s1, d0	Yes	Yes
Aluminium support rails	Primary	A1	Yes	Yes
Rockwool Duo slab insulation	Primary	A1	Yes	Yes
Steel frame system	Primary	A1	Yes	Yes
Siniat Weather Defence sheathing board	Primary	A1	Yes	Yes

Figure 26 - Wall type 3

Cavity Barriers

Siderise 'closed state' cavity fire barriers are installed vertically on compartment wall lines in the aluminium cladding system. The cavity fire barriers are mechanically secured in place with good compression to the inside face of the outer cladding panel. It was noted that the vertical cavity fire barrier had been cut in some areas due to the design of the cladding panels, thus creating a small gap in some locations where fire and smoke may by-pass the barrier.

Siderise 'open state' cavity fire barriers are installed above door and window openings on the 6th floor to separate the aluminium cladding system from the roof. These cavity fire barriers are correctly installed and run continuously through the system. Due to the design of the cladding panels, Siderise cavity fire barriers are also fixed to the inside face of the aluminium cladding panels where the horizontal 'open state' cavity barriers are positioned. Where the 'open state' barriers adjoin the 'closed state' barriers, the 'closed state' barriers take precedence.

Cavity fire barriers were not located to the side of all window and door openings in the aluminium cladding system.

Figure 27 - Example of cavity barriers in the aluminium cladding system

Penetrations

There are window and balcony door openings in the aluminium cladding system along with plastic extraction ducting penetrations. As described in the cavity barriers section, sufficient cavity fire barriers are not installed around all window and balcony door openings. Some cavity fire barriers have been found to be missing vertically adjacent to window and balcony door openings.

All plastic extraction ducting penetrations in the aluminium cladding system were found to have been installed with a form of cavity fire barrier during intrusive investigations.

Figure 28 - Example of cavity fire barriers around plastic ducting penetrations

Analysis

All materials that form the aluminium cladding system are non-combustible. All materials are compliant with Part B of the current Building Regulations and the Building Regulations at the time of construction.

Cavity fire barriers installed vertically and horizontally in the system are of the correct type and for the most part correctly installed.

There is a lack of cavity fire barriers adjacent to some window and balcony door openings in the system.

Accordingly, the risk of flame spread associated with this cladding is considered to be insignificant.

Wall type 4 – Render

Located on the 1st floor level only. Approximate 5% of overall coverage.

Table 8 - Wall type 4 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	Unknown silicone or acrylic based render topcoat	Unknown	Mechanical	
2	Blockwork with concrete mortar	100mm	Mechanical	
Internal				

Table 9 - Materials in the external wall constructions fire performance Wall Type 4

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
Unknown silicone or acrylic based render topcoat	Primary	Assumed A2-s1, d0	Yes	Yes
Blockwork with concrete mortar	Primary	A1	Yes	Yes

Figure 29 - Wall type 4

Analysis

The materials that form the render system are non-combustible and are compliant with Part B of the current Building Regulations and the Building Regulations at the time of construction.

Accordingly, the risk of flame spread associated with this cladding is considered to be insignificant.

Wall type 5 – Glazed curtain wall spandrel system

Located on all floor levels. Approximate 5% of overall coverage.

Table 10 - Wall type 5 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	Double glazed unit with rubber gasket seal and coloured blackout film to rear of unit	40mm	Mechanical	
2	Aluminium curtain wall support frame	Unknown	Mechanical	
3	Open void on ground floor level only			
4	Mineral wool insulation on upper floors	Unknown	Loose fill	
5	Concrete compartment floor on upper floors	Unknown	Mechanical	
6	Fire batt to false ceiling void on upper floors	Unknown	Mechanical	
Internal				

Table 11 - Materials in the external wall constructions fire performance Wall Type 5

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
Double glazed unit with rubber gasket seal and coloured blackout film to rear of unit	Primary	Assumed A1	Yes	Yes
Aluminium curtain wall support frame	Primary	A1	Yes	Yes
Mineral wool insulation on upper floors	Primary	A1	Yes	Yes
Concrete compartment floor on upper floors	Primary	A1	Yes	Yes
Fire batt to false ceiling void on upper floors	Primary	A1	Yes	Yes

Figure 30 - Wall type 5

Analysis

The materials that form the glazed curtain wall spandrel system are non-combustible and are compliant with Part B of the current Building Regulations and the Building Regulations at the time of construction.

Accordingly, the risk of flame spread associated with this cladding is considered to be insignificant.

Wall type 6 – Rock panel cladding

Located on the 6th floor level. Coverage is insignificant and amounts to only two separate panels.

Table 12 Wall type 6 construction

Layer	Material	Thickness / Dimensions	Fixing Type	Comments
External				
1	Caramel oak finish rockpanel rainscreen cladding panel	9mm	Mechanical	
2	Aluminium support rails (helping hand)	Unknown	Mechanical	
3	Cavity	Unknown	N/A	
4	Rockwool duo slab insulation	50mm	Mechanical	
5	Tyvek Firecurb membrane	Unknown	Mechanical	
6	Blockwork with concrete mortar	Unknown	Mechanical	
Internal				

Table 13 - Materials in the external wall constructions fire performance Wall Type 1

Material / System	Primary / Secondary	Fire performance	Compliance with ADB at the time of construction	Compliance with ADB 2019
Caramel oak finish rockpanel rainscreen cladding panel	Primary	A2-s1, d0	Yes	Yes
Aluminium support rails (helping hand)	Primary	A1	Yes	Yes
Rockwool duo slab insulation	Primary	A1	Yes	Yes
Tyvek Firecurb membrane	Primary	B-s1, d0	Yes	Yes
Blockwork	Primary	A1	Yes	Yes

Cavity Barriers

Siderise cavity fire barriers are located adjacent to openings in the system.

Penetrations

There are only window penetrations in the system.

Analysis

All materials that form the rockpanel cladding system are non-combustible. All materials are compliant with Part B of the current Building Regulations and the Building Regulations at the time of construction.

Accordingly, the risk of flame spread associated with this cladding is considered to be insignificant.

Soffit Detail

There are two different variations is soffit detail on the building external envelope. The North elevation soffit below the 2nd floor level comprises of the following (external to internal):

- Rock panel cladding panel;
- Steel support rails;
- Cavity;
- K Rock mineral wool insulation;
- Steel deck on the underside of the concrete floor.

The soffit on all other areas of the building including the under croft resident's carpark below the 1st floor level comprises of the following (external to internal):

- Cement particle board;
- Unknown PIR insulation board;
- Steel and aluminium support rails;
- Cavity;
- Steel deck on the underside of the concrete floor.

Figure 31 - Example of soffit detail on the building South elevation

Specified Attachments

There are three different types of balcony present at 20:20 House.

Inset attachment balconies are surrounded on three sides by brickwork façade and openings. The balconies are steel framed with an aluminium decking floor and a metal balustrade with glazed infill.

Cantilever attachment balconies have a steel frame and aluminium decking floor. The balcony balustrades are metal with glass infill panels, however they are also fitted with a fibre cement board cladding partial enclosure to the outlooking face. The attachment balconies are in a vertically stacked configuration.

The terrace type balconies on the 6th floor only are set back from the building external elevations and form part of the building structure. The balconies have a stone flag finished floor.

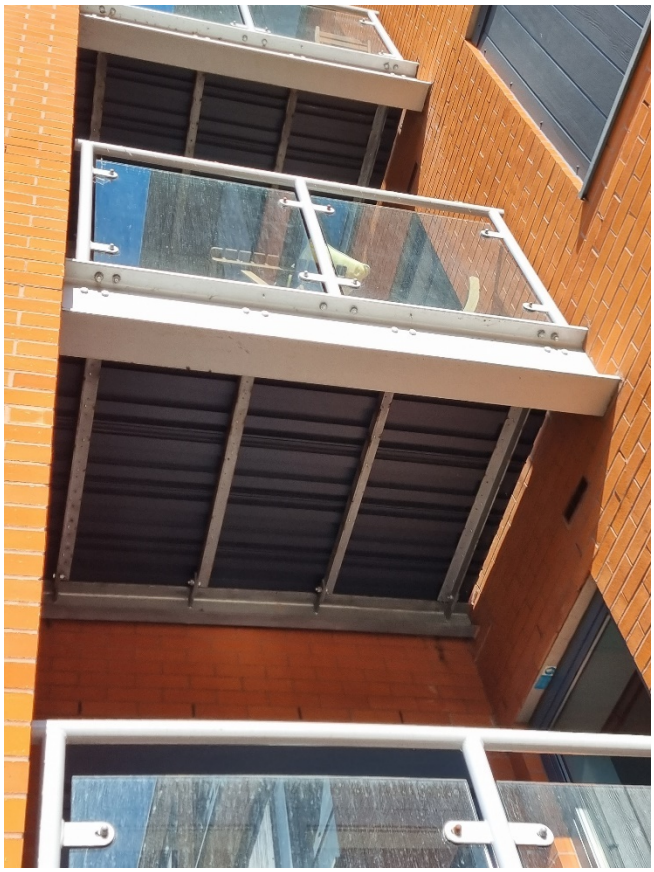

Figure 32 - Example of inset attachment balconies

Workmanship

Generally, workmanship was of a good standard throughout the external and internal areas of the building. However, some minor deficiencies were noted with the provision of cavity fire barriers in the brickwork system and aluminium cladding system.

All structural steel noted during the intrusive investigations was found to be protected with fire resisting materials.

Fire stopping in compartment walls and floors was found to be of a good standard however, some fire stopping between compartment floors in riser cupboards was inadequate and is due to be rectified.

Figure 33 – Example of fire stopping in the building false ceiling voids

13. Risk Factors

The fire risk posed by the external wall construction and cladding is considered to be influenced most by factors falling under 3 broad headings:

- Fire performance
- Façade configuration
- Fire strategy & fire hazards (including fire and rescue service intervention)

Positioning the risk level on a scale of “low” to “high” risk is ultimately dependent on addressing the following questions:

- Is external fire spread likely to be within normal expectations and taking into account the consequences of such fire spread?
- If external fire spread is likely to be more rapid than normally expected, is the likely rate of spread clearly unacceptable in terms of life safety, taking into account the consequences?
- Normal expectations of tolerable external fire spread are that people will be able to escape or be rescued by the fire and rescue service before being harmed.

The following are events indicative of a situation which is demonstrably unsafe:

- Extremely rapid external fire spread;
- Fire spread that gives rise to widespread secondary fires, resulting in occupants being unduly harmed or prevented from escaping;
- Fire that spreads in such a way that the communal means of escape are compromised before occupants can safely use them to escape; and
- The inability of fire and rescue service intervention to prevent the above and avoid undue harm to occupants.

Fire Performance

Positive risk factors identified are:

- The external surfaces of the building have A1 or A2 European fire classifications.
- The façade cladding panels are mechanically fixed
- Large areas of the building external facings are typically brick
- Masonry brickwork is at least 75 mm thick
- Glazing and glazed curtain walling
- No gaps between panels
- Facings into the cavity at least Class A2
- The fibre cement cladding system cavity is closed by barriers/fire stopping located in line with all of the following: compartment floors, around openings, e.g. windows, doors
- Insulation is A1 in all systems with the exception of the brickwork
- Substrate is Masonry, >75 mm thick
- Sheathing boards in the aluminium cladding system is Class A1
- Spandrel/infill panels are Glazed (excluding vision glazing), with Class A1/A2 core

Neutral risk factors identified are:

- Solid metal panels with low melting point (<800°C) (Typically, aluminium, zinc and copper)
- Horizontal compartment floor cavity barriers present with no more than minor workmanship defects in the brickwork system

Negative risk factors identified are:

- Cavity barriers are not present around all window/door openings in the aluminium cladding system, or cavity barriers ineffective through poor installation
- Insulation is European fire class E in the brickwork system

As such, an initial “Medium” risk band is allocated.

On the above basis, the fire performance aspect gives an initial “Medium” risk band (falling just above “Low” within the “Medium” risk band), with a limited potential for rapid fire spread.

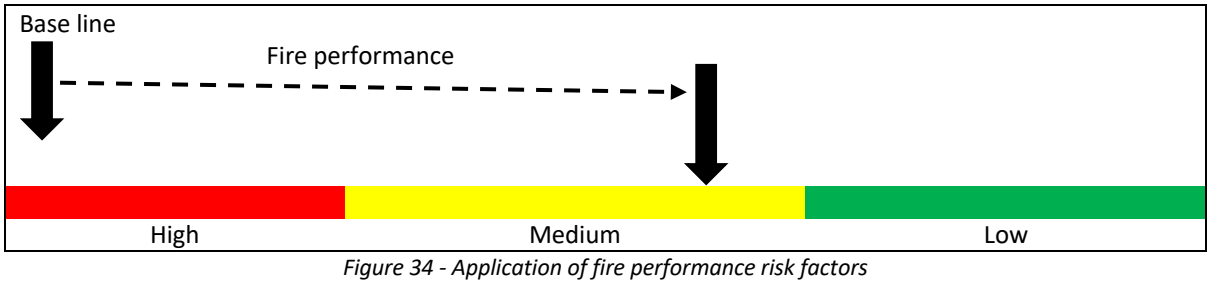

Figure 34 - Application of fire performance risk factors

Façade Configuration

Positive risk factors identified are:

- Continuous vertically running cavity with cavity barriers or fire stops as appropriate
- Isolated areas of panels that do not cross compartment boundaries or cause a fire to cross a compartment boundary
- There are non-combustible open balconies (Where these extend along a facade, they have the potential both to interrupt a cavity; and deflect flames away from the building and away from the facade)

Neutral risk factors identified are:

- The height of the base of the cladding above ground is 2m to 5m
- The cladding is limited in extent such as to delay fire spread over the external walls
- Where vents pass through a cavity, either the cavity does not include combustible materials; or the cavity is faced on either side by brick or concrete at least 75 mm thick and any combustible insulation in the cavity is not thermoplastic
- The cladding is adjacent to windows and openings onto escape routes, but the same fire could not spread to affect more than one escape route

Negative risk factors identified are:

- Building height between 18m to 30m
- There is scope for a cladding fire to breach compartment wall and floor boundaries significantly worsened by the nature and the extent of combustible material in the external wall construction
- Windows and other openings in line with vertical cavity
- Infill/spandrel panels are in a vertical continuous line with windows such as to increase the likelihood of secondary fires where spanning a compartment boundary and in particular a compartment floor
- Where fire spread under an overhang can give rise to extended flame lengths over the soffit and up the external wall beyond

The façade configuration risk factors are not considered to move the risk rating from the “low” risk band, either negatively or positively.

On the above basis, the “Medium” risk band from the fire performance factors lowers further to a “Low” risk band based on the façade configuration aspects.

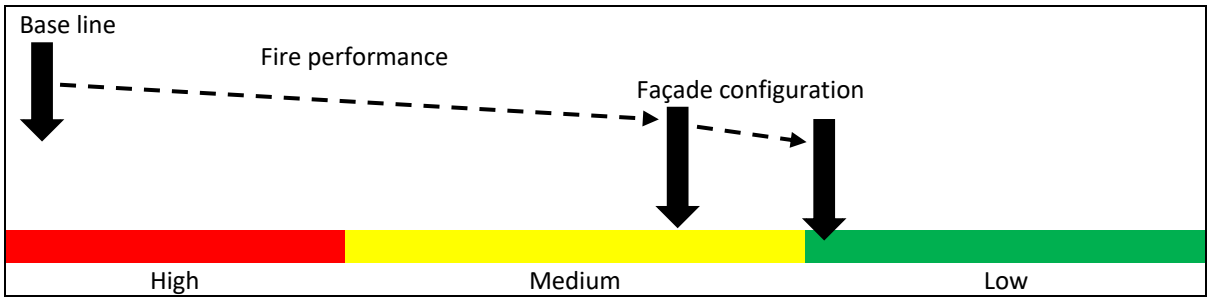

Figure 35 - application of facade configuration risk factors

Positive risk factors identified are:

- There is fire detection and a fire alarm system that can currently support escalation from a stay put evacuation strategy to a simultaneous evacuation strategy
- There is access to more than one staircase for escape, where it is not possible for the same fire to affect all escape routes.
- Good access for firefighting vehicles
- The building is served by two fire-fighting shafts
- Residential apartments are provided with an internal protected entrance hallway with a travel distance less than 9m to the common corridor
- The building internal areas and external risk areas such as the carpark and bin storage area are secured by lockable doors/gates
- The building management have policies in place regarding the use of balconies by residents

Neutral risk factors identified are:

- General needs use of the building.
- Stay put evacuation strategy.
- Adequate compartmentation in line with the expectations for a block of flats
- Provision of Grade D LD3 detection within flats.
- A suitable dry rising main is installed.
- Suitable firefighting lift present
- Vehicle parking under overhangs Open-sided car parking directly underneath

Negative risk factors identified:

- There is a raised decked garden area at the rear of the building, which is fitted with timber decking and is approximately 3m from the building external facade

On the above basis, the “Low” risk rating from the previous façade configuration factors remains in the “Low” risk band with a limited potential for rapid fire spread.

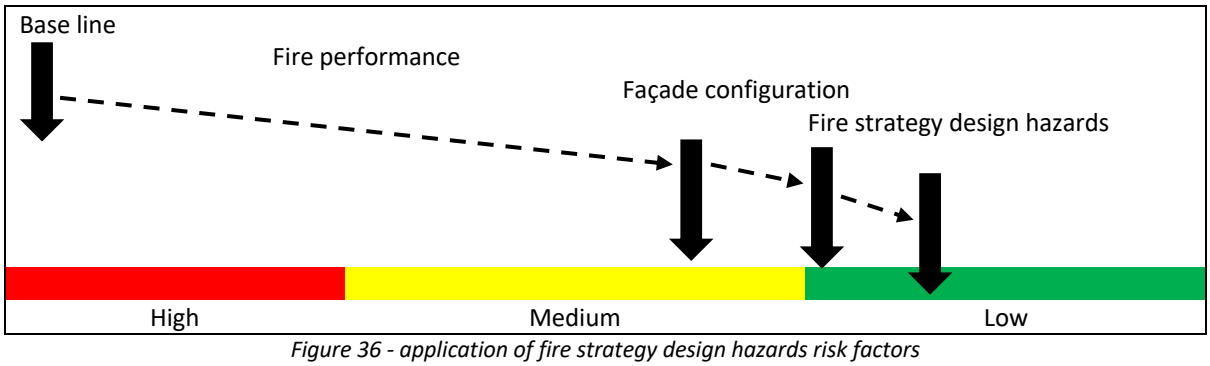

Figure 36 - application of fire strategy design hazards risk factors

Outcome from FRAEW Analysis: **Low Risk**

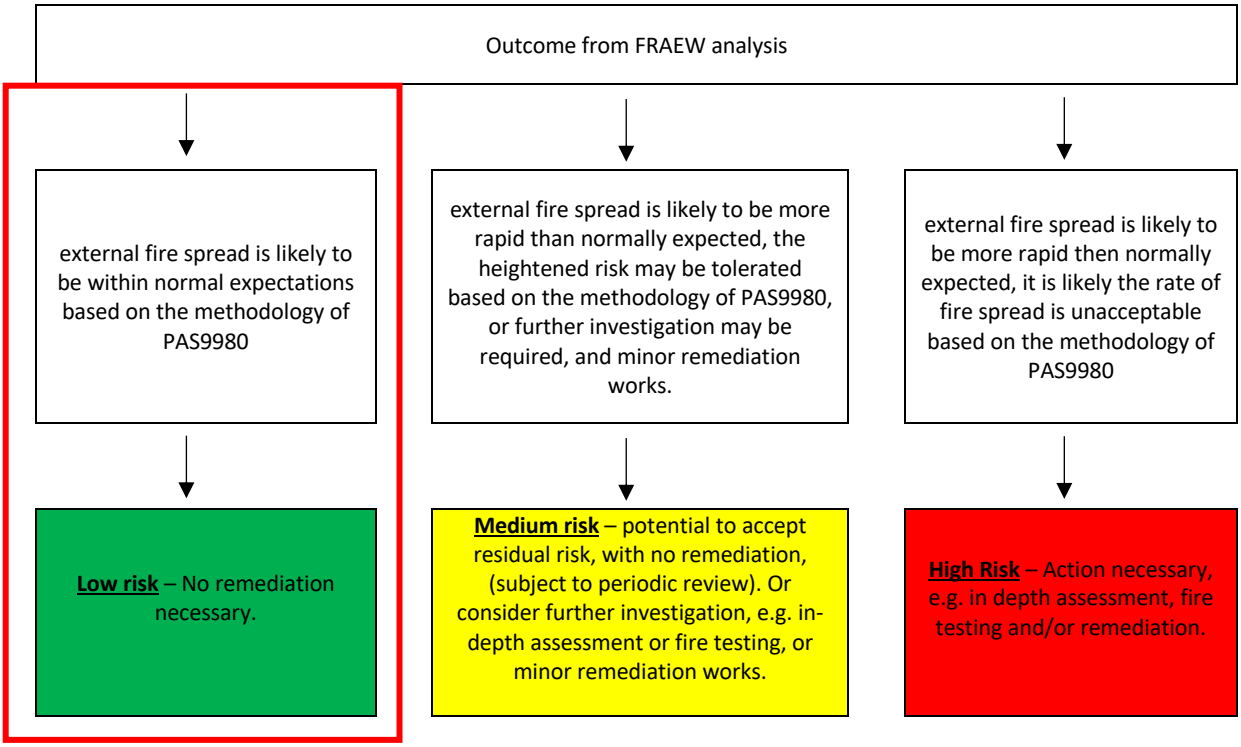

Figure 37 - FRAEW outcome flowchart

Table 14 - Risk outcomes in relation to expectations of the rate of fire spread over the external walls

Low – external fire spread is likely to be within normal expectations based on the methodology of PAS9980		
dominance of significant positive factors	Likely to add to the weight attached to an overall conclusion that the outcome is suggestive of a "low" risk in relation to external fire spread (i.e. a high probability of the success criteria being met)	Tends towards the conclusion that the risk is tolerable and no action to remediate is necessary.
Medium – external fire spread is likely to be more rapid than normally expected, the heightened risk may be tolerated based on the methodology of PAS9980, or further investigation may be required, and minor remediation works.		
A dominance of neutral factors, or a broad spread of factors	the risk is somewhere between the "high" and "low" risk as described above and, therefore, possibly in the middle of the scale and a "medium" risk. This adds weight to the overall conclusion that the external walls on the building could give rise to a fire risk within normal expectations, albeit that this is a conclusion that lacks the certainty afforded by known compliance with the BR 135 [15] benchmark. Equally, it might reflect that there is insufficient knowledge to quantify their influence on either a "low" risk or a "high" risk outcome. However, an outcome of "medium" risk is not to be taken as a default position in these circumstances; such an outcome needs to be based on reasonable evidence. In concluding that there is "medium" risk, there might be an element of uncertainty regarding the risk, which can either be tolerated or needs further refinement before reaching that conclusion. However, there needs to be sufficient certainty that the risk is not "high".	Tends towards the conclusion that either the residual risk can be tolerated, or further investigation or in-depth technical assessment should be carried out in relation to fire performance to refine the risk.
High – external fire spread is likely to be more rapid then normally expected, it is likely the rate of fire spread is unacceptable based on the methodology of PAS9980		
dominance of significant negative factors	Leads to the opposite conclusion, namely that it is likely to add weight to the overall conclusion that the outcome is suggestive of a "high" risk in relation to external fire spread (i.e. a high probability of failure to meet the success criteria) and there is a strong case to justify remediation or other action.	Tends towards the conclusion that further investigation/in-depth technical assessment is required in relation to the fire performance or remediation is necessary.

14. Analysis and Conclusion

The external wall comprises of xx wall types.

Type 1 – Fibre cement cladding
Type 2 – Brickwork
Type 3 – Aluminium cladding
Type 4 – Render
Type 5 – Glazed curtain wall spandrel system
Type 6 – Rock panel cladding

In the context of a risk-based approach and using the methodology outlined in PAS 9980, the risk in question is the combination of:

- the likelihood of undue speed of fire spread over the external walls of the building; and
- the likely consequences, namely the resultant occurrence and extent of secondary fires on other floor levels; and
- the likely consequences in terms of evacuation before the onset of untenable conditions in the escape routes, whether evacuation is intended to occur immediately on the warning of fire or, in the case of a stay put strategy, at some point during the course of the fire; and the likelihood of effective intervention by the fire and rescue service at a point before all of the above occur.

This report has judged the existing building's external wall construction against these benchmarks. However, the extent to which a building conformed to building regulations, guidance and standards at the time of construction is important for context when considering the risk.

A risk rating has been determined using the methodology outlined in PAS 9980, with 3 levels of risks considered: high, medium and low. The terms "high risk" and "low risk" are largely defined by the consequences that follow, i.e. whether there is a need for remedial action or not (or, in some cases, whether further investigations and in-depth analysis is needed).

The fire risk posed by the external wall construction and cladding is considered to be influenced most by factors relating to fire performance, façade configuration and fire strategy/fire hazards. These factors have been considered within this report and the overall risk rating for the building in relation to fire risk associated with the external walls is deemed to be Choose an item.. A graphical depiction of the application of the risk factors and the resulting risk rating is shown below:

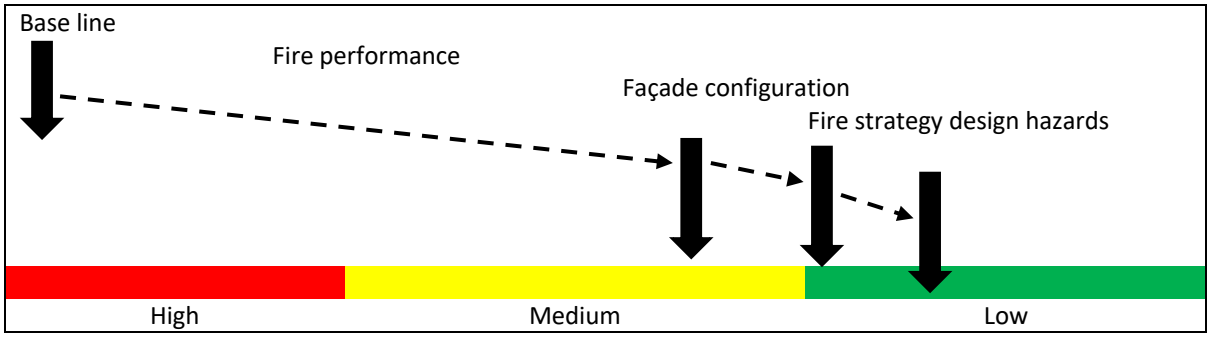

Figure 38 - Overall risk factor applied

In coming to this conclusion, the following aspects were considered to be particularly relevant:

- The external surfaces of the building have A1 or A2 European fire classifications.
- The façade cladding panels are mechanically fixed
- Large areas of the building external facings are typically brick
- Masonry brickwork is at least 75 mm thick
- Glazing and glazed curtain walling is present
- No gaps between cladding panels
- Facings into the cavity at least Class A2
- The fibre cement cladding system cavity is closed by barriers/fire stopping located in line with all of the following: compartment floors, around openings, e.g. windows, doors
- Insulation is A1 in all systems with the exception of the brickwork
- Substrate is Masonry, >75 mm thick
- Sheathing boards in the aluminium cladding system is Class A1
- Spandrel/infill panels are Glazed (excluding vision glazing), with Class A1/A2 core
- Continuous vertically running cavity with cavity barriers or fire stops as appropriate
- Isolated areas of panels that do not cross compartment boundaries or cause a fire to cross a compartment boundary
- There are non-combustible open balconies (Where these extend along a facade, they have the potential both to interrupt a cavity; and deflect flames away from the building and away from the facade)
- There is fire detection and a fire alarm system that can currently support escalation from a stay put evacuation strategy to a simultaneous evacuation strategy
- There is access to more than one staircase for escape, where it is not possible for the same fire to affect all escape routes.
- Good access for firefighting vehicles
- The building is served by two fire-fighting shafts
- Residential apartments are provided with an internal protected entrance hallway with a travel distance less than 9m to the common corridor
- The building internal areas and external risk areas such as the carpark and bin storage area are secured by lockable doors/gates
- The building management have policies in place regarding the use of balconies by residents.

At this time, I therefore conclude that, in my view, the fire risk is sufficiently low that remedial works are not required to the building. The building therefore meets the Option A1 criteria of the EWS1 review process and the EWS1 form should be signed on this basis.

15. Recommendations and Remedial Actions

The conclusion from this FRAEW is that improvements or alterations to the fire safety design and fire strategy in the building are not necessary.

As such, and given the materials present and other associated fire safety factors within the building, the following measures are considered proportion and are recommended to be implemented in order to reduce the likelihood of a fire spread from a flat into the external cladding system:

- Areas where fire stopping could not be fully completed (for example the floor of some riser cupboards) should be fully fire stopped;
- A new Type 1 fire risk assessment should be completed by a competent fire risk assessor.

The following ongoing management actions should be undertaken:

- The building management should ensure that the on-site caretaker carries out daily inspections of the building external perimeter and removes any waste combustible materials positioned close to the external façade;
- The building management should ensure they maintain their current residential balconies policy and make residents aware if they are in breach of this policy.

16. References

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- The Building Regulations 2010
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- BSI, PAS 9980 Fire risk appraisal and assessment of external wall construction and cladding of existing blocks of flats – Code of Practice, British Standards Institution, London, 2022
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- DCLG, “Approved Document B (Fire Safety) Volume 2: Buildings other than dwellings, 2019 edition incorporating 2020 amendments”, DCLG, London, 2020.
- DCLG, “Approved Document B (Fire Safety) Volume 1: Dwellings, 2019 edition incorporating 2020 amendments”, DCLG, London, 2020H M Government, Government statement on proportionality in building safety, July 2021
- DCLG, Independent expert statement in building safety in medium and lower-rise blocks of flats, July 2021
- RICS Surveying Safely, 2nd edition Global Guidance Note, 2018
- RICS Valuation of properties in multi-storey, multi-occupancy residential buildings with cladding (1st edition), March 2021.

Appendix 1 PI Insurance Certificate

cavendish · munro
professional risks

Verification of Insurance

Type of Insurance:	Professional Indemnity Insurance
Insured:	Building Envelope Fire Surveys Ltd
Primary Insurer:	100% Dual Corporate Risks Ltd (80% Liberty Mutual Insurance Europe SE, 10% AIG Company Markets (per DUAL Group Legal Entity Endorsement), 10% Everest 2786)
Limit of Indemnity:	£2,000,000.00 aggregate
Excess:	£25,000.00 each and every claim
Period of Cover:	01 May 2022 to 30 April 2023 both days inclusive

The policy is subject to the insuring agreements, exclusions, conditions and declarations contained therein. The above is accurate at the date of signature.

This document is furnished to you as a matter of information only and is valid at today's date. The issuance of this document does not make the person or organisation to whom it is issued an additional Insured, nor does it modify in any manner the contracts of insurance between the Insured and Insurers. Any amendment, change or extension of such contracts can only be effected by specific endorsement thereto.

Should the above-mentioned contract of insurance be cancelled, assigned or changed during the above policy period in such manner as to affect this document, no obligation to inform the holder of this document is accepted by the undersigned or by Insurers.

Signed: Date: 06 May 2022

Name: Paul Byrne

Position: Managing Director

For and on behalf of Cavendish Munro Professional Risks Ltd,
International House, 1 St Katharine's Way, London E1W 1UN.
Regulated and authorised by the Financial Conduct Authority.