Costing Note – CN 001.0

Project: Fabric Church, Manchester

Subject: Fire Strategy Costing Note

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1 Introduction

This fire strategy costing note has been produced to assist the design team with cost planning for items relating to the fire strategy for Fabric Church, Manchester development. It is provided for design team information only and is not intended for Building Regulations submission.

The design note identifies the key fire safety systems required to support the fire strategy under development.

This design note has been developed based on compliance with Part B of Schedule 1 to The Building Regulations 2010[1] (as amended). The strategy under development does not include any additional items required for property protection, business continuity or insurer's requirements.

BS 9999:2017[2] has been used as the reference for determining the features and systems required except for the flat which has been designed based on BS 9991:2024[3]. Unless otherwise noted in this costing note, at this stage it is assumed that all other systems shall comply with the recommendations of BS 9999:2017.

Input to assist in the specification of key fire safety systems is based on experience and initial calculations and is subject to confirmation following the completion of detailed analysis at later design stages.

1.1 Project Description

Fabric Church, Manchester is the redevelopment of Ardwick Green Barracks which were designed and completed in 1886. The building is Grade II listed and comprises 5 storeys, with a basement and a ground level and three upper levels, housing office accommodation and support facilities which front Ardwick Green North, with a two storey Drill Hall behind. A workshop building was added in the 1930s perpendicular to the Drill Hall and fronts on to Downing Street.

The refurbishment of the building follows a general arrangement as below.

a. Small Worship Space Wing – a youth lounge, breakout room, children's group space, group rooms, plant room, refuse store and cycle store on the First Floor; a small worship space on the First Floor.

[1] Statutory Instruments, '2010 No. 2214 Building and Buildings, England and Wales, The Building Regulations 2010' (as amended).

[2] BS 9999, 'Code of practice for fire safety in the design, management and use of buildings', 2017.

[3] BS 9991, 'Fire safety in the design, management and use of residential buildings – Code of practice', 2024.

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b. Large Worship Space Wing – a library, café/foyer, co-working space, group room, pilates studio, spin studio and storage rooms on the Ground Floor; a large worship space, chair store and sound desk on the First Floor

c. Barracks Wing – an office and neighbourhood co-working space on the Ground Floor; a WC, meeting room and multi-function room on the First Floor; and a multi-purpose room on the Second Floor.

d. Flat – a single residential flat on the upper most level.

2 BS9999 Risk Profile

BS 9999 requires the non-residential buildings (or parts of the building) to be classified into a risk profile.

The building is expected to serve the public and therefore be given an Occupancy Characteristic B: Occupants who are awake and unfamiliar with the building. Even though the office spaces will are expected to serve occupants who are awake and familiar with the building, for the sake of conservatism, Occupant Characteristic B is adapted for all spaces.

A building comprising offices, seating areas, lounges and classrooms will have a fire growth rate characteristic of 2 – Medium fire growth rate.

The predominant, more onerous as well in certain spaces, risk profile for the building is therefore considered to be 'B2'.

3 Costing Note – Fabric Church, Manchester

1: Fire Strategy Summary Costing Note – Fabric Church, Manchester

Fire Safety Provision	Item
Evacuation Strategy	Fabric Church, Manchester, will operate under a simultaneous evacuation strategy whereby upon activation of a detector or a manual call point, the building will evacuate.
Occupant Load	The occupant load in the building is to be coincidental. The maximum occupancy numbers for each storey / part of storey are provided below. However, at any particular time, the sum of these occupant loads shall not increase the total occupant load for that wing. • Small Worship Wing – will have a coincidental occupancy of 275 persons maximum in the wing at a time. – Ground Floor: 115 persons – First Floor: 160 persons – Second Floor: 60 persons • Large Worship Wing – will have a coincidental occupancy of 675 persons maximum in the wing at a time. – Ground Floor: 600 persons – First Floor: 600 persons • Barracks Wing

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Fire Safety Provision	Item
	– Ground Floor: 64 persons – First Floor: 60 persons – Second Floor: 60 persons • Flat – Second Floor: 2 persons
Automatic Detection and Alarm	Under BS 9999, the building requires a minimum of Category M fire detection and alarm system. However, the building, except the flat, will be provided with a Category L2 fire detection and alarm system which is to be designed and installed in accordance with BS 5839-1:2013. The flat will be provided with a Category LD1 fire detection and alarm system which is to be designed and installed in accordance with BS 5839-6:2019. Where ceiling voids exceed 800mm (either in the base provision or once tenanted), smoke detectors are required within the void unless subjected to a risk assessment that demonstrates that the risk of fire spread within the void is low. Where higher than ambient noise levels are expected, e.g. plant areas or when occupants that are hard of hearing may be in isolation VAD (Visual Alarm Devices), i.e. flashing beacons, shall also be provided.
Automatic Suppression System	It is not proposed to provide sprinkler protection to the building. This is not required for compliance with BS 9999.
Travel Distances	Café/foyer: • One Way Travel: 18* • Two Way Travel: 45* *Where premises contain provisions for the consumption of alcoholic beverages then a reduction in the travel distances of 25% has been introduced in accordance with BS 9999. Large Worship Space: • One Way Travel: 24m • Two Way Travel: 60m Flat: • 9m from the furthest point in the flat to the door to the escape stair. All other areas: • One Way Travel: 23m • Two Way Travel: 57.5 The above distances are based on actual layouts post-fit out. Where the layout is not known, 2/3rd of the above distances should be applied.

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Fire Safety Provision	Item
	Travel distances in all areas, except the flat, have permitted variations as follows: • +15% change due to an upgraded fire detection and alarm system in all areas except flats. • +5% change in the Large Worship Space as a 3-4m ceiling height is available. • -10% in the café/foyer as consumption of alcoholic beverages is expected in the area as it contains a bar.
Horizontal Escape Widths	To support the anticipated occupancies, the following clear widths should be at least: • Small Worship Wing – Ground Floor Storey Exits: 1050mm – First Floor Storey Exits: 1050mm – Roof Terrace: 850mm • Large Worship Wing – Ground Floor Storey Exits: 1050mm – First Floor Storey Exits: 1050mm • Small Worship Wing – Ground Floor Storey Exits: 1050mm – First Floor Storey Exits: 1050mm – Roof Terrace: 850mm • Barracks Wing – All storey exits: 850mm • Flat – Ground Floor Final Exit: 850mm – Ground Floor Room Door: 800mm – Second Floor Door Widths: 850mm The two final exit doors providing escape to Ardwick Green Road North should provide a clear width of at least 1830mm. All exits from any space should provide a clear width of at least 850mm if the is occupied by a maximum of 60 persons. All exits from the stairs need to be at least as wide as the stairs.
Escape Stair	The Small Worship Wing and Large Worship Wing are served by three internal stairs and an external stair. These internal stairs should provide a

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Fire Safety Provision	Item
	clear width of at least 1200mm. The external stair should provide a clear width of at least 1050mm. The single stair serving the Barracks Wing needs to provide a clear width of at least 1000mm. The single stair serving the Flat needs to be at least as wide as 850mm.
Refuge Spaces	Refuges not less than 900 mm x 1,400 mm should be provided on all levels except where step free egress can be provided from the ground floor. They should be provided in all stairs for the levels above the ground floor. The refuge spaces must be located such that they do not compromise the escape width. Each refuge area should be provided with a two-way emergency voice communication system conforming to BS 5839-9[4]. The communication system should consist of type B outstations which communicates with a staff-controlled station located at the base of the stair or at the fire control panel.
Passenger Lift	There are no evacuation lifts in the building. Control system for the passenger lift should be designed such that it is provided with suitable electrical signal(s) to recall it to the exit storey and take it out of service in accordance with BS-EN 81-73:2020[5].
Refuse Store	Refuse storage room should be accessed directly from outside. When accessed from within, it should be accessed via a protected lobby provided with permanent ventilation (no less than 0.2 m^2 natural opening, or a suitable mechanical equivalent).
Internal Linings	All internal wall and ceiling linings should achieve Class B-s3, d2.
Elements of Structure (R)	As the building does not exceed 18m in height, loadbearing elements of structure are to achieve 60 minutes fire resistance when tested in accordance with BS 476-21[6] or BS EN 1363-1[7].
Compartmentation R (Load Bearing) E (Integrity)	All compartmentations should achieve the following fire resistance rating in accordance with BS 476-21 & BS 476-22[8] or BS EN 1363-1. • The lift shaft shall be enclosed in 60 minutes (REI) fire resisting construction.

[4] BS 5839: Part 9, 'Fire detection and fire alarm systems for buildings — Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems', 2011.

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

[6] BS 476: Part 21, 'Fire tests on building materials and structures. Method for determination of fire resistance of loadbearing elements of construction', 1987.

[7] BS EN 1363: Part 1, 'Fire resistance tests. General Requirements', 2012.

[8] BS 476: Part 22, 'Fire tests on building materials and structures. Method for determination of fire resistance of non-loadbearing elements of construction', 1987.

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Fire Safety Provision	Item
I (Insulation)	• All stairs in the building excluding the external stair, shall be enclosed in 60 minutes (REI) fire resisting construction. • Compartment Walls achieving 60 minutes (REI) separate the Barracks Wing, Large Worship Wing and the Flat. • All risers shall be enclosed in 60 minutes fire resisting construction (EI), unless the fire stopping strategy is to provide fire stopping at each slab level. • Refuse storage, storage areas (other than refuse storage), plant room, cycle store and kitchen should be enclosed in 30 minutes fire resisting construction (EI). • Rooms containing life safety equipment should be enclosed in 120 minutes fire resisting construction (REI). • Additional fire protection to the external facade for controlling external fire spread greater than 1 m from relevant boundary shall achieve a fire resistance of 90 minutes (E) and 15 minutes (I).
Fire Doors	Where doors are in fire resisting walls, the guidance of BS 9999 is to be followed, including: • Doors in fire compartment walls above shall have the same fire rating as the wall in which they are located. • Doors providing access to all internal stairs should achieve 30 minutes (EI) fire resistance and be installed with cold smoke seals (FD30S).
Protection of Openings	Any openings in the fire resisting construction should be suitably fire stopped to maintain the same fire resistance as the element of construction being penetrated.
Fire-fighting Access	As the total floor area of the building is between 2000m^2 and 8000m^2, 15% Perimeter Access through Barracks Wing frontage is available for pumping appliance from the Ardwick Greens Road North.
Fire and Smoke Dampers	Where ducted ventilation systems serve more than one compartment or pass through escape routes, detector actuated fire and smoke dampers are required where they penetrate fire resistant walls or floors to maintain the fire resistance. The fire and smoke damper system must achieve the same period of fire resistance as the construction they are passing through but be no less than 60 minutes. The fire and smoke damper system must achieve ES classification in accordance to BS EN 13501-3[9] by testing to BS EN 1366-2[10]. Any kitchen extract ductwork shall be fully fire resisting where it passes through more than one compartment, as fire dampers are not appropriate

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

10 BS EN 1366-2, 'Fire resistance tests for service installations. Fire dampers', 1999.

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Fire Safety Provision	Item
	for kitchen extract ductwork as the build-up of grease may prevent the mechanism from operating correctly. The ductwork should be installed independently from other ventilation systems.
Cavity Barriers	All concealed spaces and cavities shall be subdivided with imperforate cavity barriers in the following locations: • To subdivide any cavity such that the maximum cavity dimension does not exceed 20m (where the cavity linings do not achieve either Class 1 or Class 0 the dimension shall not exceed 10m). • At the edges of cavities (including around openings). • Above sub-dividing cross-corridor doors, where the door does not form a part of a fire resisting wall sub-dividing the floor. • At the junction of fire resisting construction and a cavity wall. • Every cavity barrier shall achieve at least 30-minutes (integrity) and 15 minutes (insulation) fire resistance.
Ventilation Systems	Day to day building ventilation and air conditioning that may recirculate smoke during a fire shall shut down upon detection of smoke. Where ceiling voids are used for supply/extract of air, smoke detectors shall be provided at duct entry/exit points to close fire and smoke dampers. Where floor voids are used for air supply/extract, smoke detectors shall be provided to allow supply/extract from the void to cease. Smoke detectors shall be fitted in the extract ductwork before the point of separation of the recirculated air and the air is to be discharged to the open air, and before any filters or other air cleaning equipment. Detectors shall cause the system to shut down or switch to extraction mode (to open air only). There should be an Automatic Opening Vent (AOV) at the head of the stair within the flat with an aerodynamic free area of not less than 0.7m$^{2.}$
External Wall Surfaces	As the building is less than 18m in height, it is recommended that the external wall elements to be constructed of materials which offer a Class 0 (national class) or Class B-S3, d2 or better (European class) in accordance with BS 9999 and a B2 risk profile.
Roof Materials	The covering product of the roof linings is to achieve at least Class B_{roof}(t4) or better in accordance to BS EN 13501-5[11]. Roof covering products (and/or materials) defined in Commission Decision 2000/553/EC of 6 September 2000, implementing Council Directive 89/106/EEC, can be considered to fulfil all of the requirements for the performance characteristic 'external fire performance' without the need for testing.

[11] BS EN 13501: Part 5, 'Fire classification of construction products and building elements – classification using data from external fire exposure to roofs tests', 2016.

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Fire Safety Provision	Item
	Should PV panels be installed on the roof, routing of electrical wiring through combustible insulation should be avoided.
Emergency Power	Emergency power is required in accordance with BS 9999[12] and BS 8519[13] to all life safety systems, as set out in the respective design standards, including: • Fire detection and alarm system. • Emergency lighting. • Emergency voice communication systems. • Smoke control systems including extract fans, automatic opening vents and dampers.
Emergency Lighting	Emergency lighting of escape routes is to be provided to all escape routes in accordance with BS EN 1838[14] and BS 5266-1[15].
Escape Signage	Escape signage must be provided within all escape routes in accordance with BS ISO 3864-1[16] and BS 5499-4[17].
Exit Door Opening Mechanisms	Exit doors should be readily openable to avoid undue delay to people escaping. Doors should only be fitted with simple, easy to operate fastenings which are operable from the side approached by occupants escaping. Electrically powered locks will return to the unlocked position upon: • Operation of the fire alarm system. • In the event of power loss or system error. • On operation of a manual device (i.e. green break glass).
External Hydrants	A hydrant is located on Ardwick Green North Road within 90m of the building entry points – to be confirmed by the client.

[12] BS 9999, 'Code of practice for fire safety in the design, management and use of buildings', 2017
[13] BS 8519, 'Selection and installation of fire-resistant power and control cable systems for life safety, fire-fighting and other critical applications - code of practice', 2020.
[14] BS EN 1838, 'Lighting applications. Emergency lighting', 2013.
[15] BS 5266: Part 1, 'Code of practice for the emergency lighting of premises', 2011.
[16] BS ISO 3864: Part 1 'Graphical symbols — Safety colours and safety signs Design principles for safety signs and safety markings', 2011.
[17] BS 5499: Part 4 'Code of practice for escape route signing', 2000.

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