



The Mackintosh Building

SOBC Addendum Report

Appendix A
Architectural & Technical Report

June 2025

Note regarding Appendix A: Architectural & Technical Report

Appendix A (Architectural & Technical Report) reproduces the report considered and approved by the GSA Board of Governors on 17 June 2025. It has not been updated to reflect the subsequent development of the strategic vision for the Mackintosh Building. The strategic position set out in the main body of this SOBC Addendum takes precedence over Appendix A where there is any difference in emphasis or interpretation.

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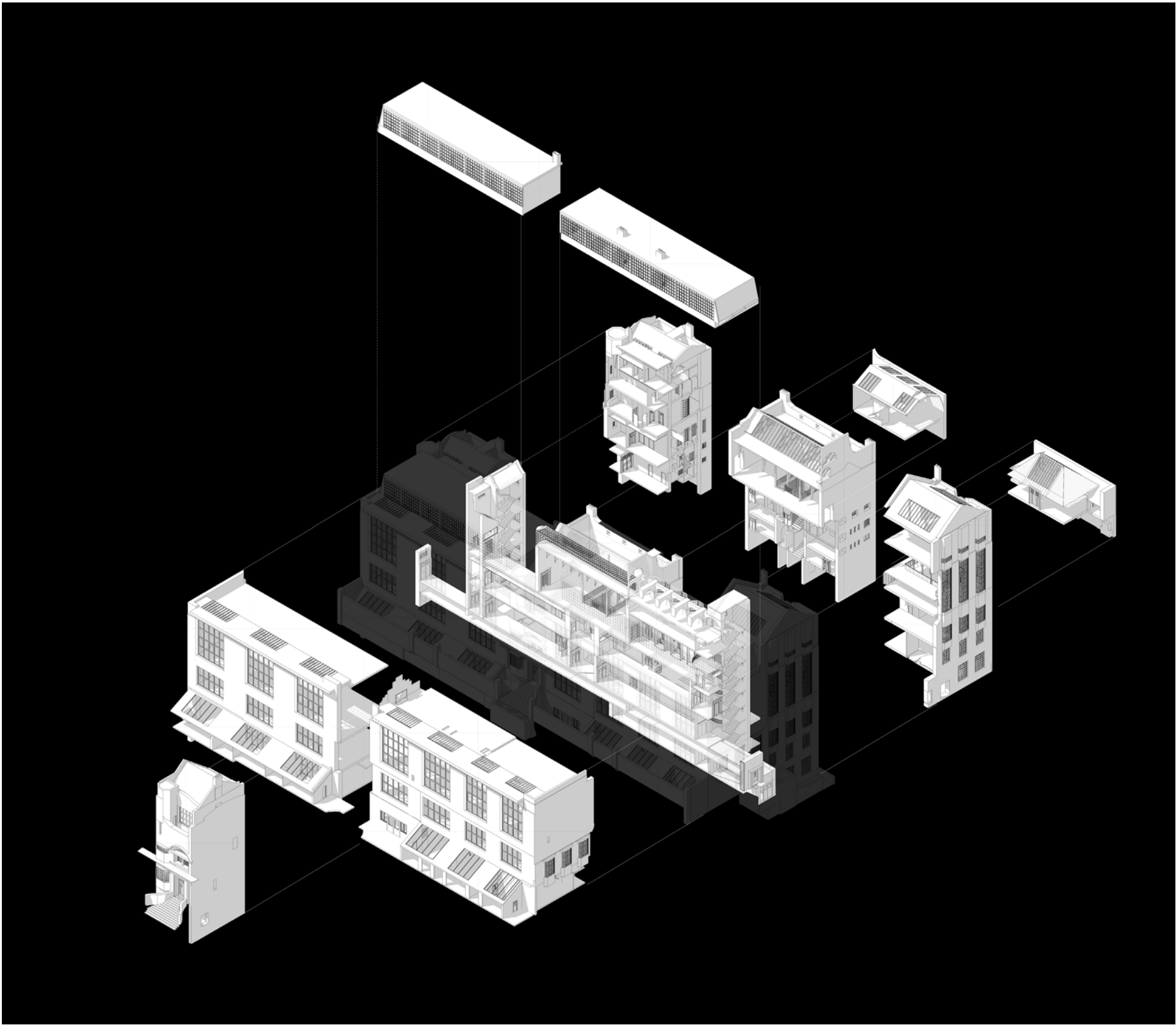
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Purpose of the Report

Overview

This SOBC Addendum Report is an update to the 2021 Strategic Outline Business Case (SOBC).

The 2021 SOBC evaluated options for the GSA's response to the 2018 fire at the Mackintosh Building. It identified a preferred solution that meets academic and institutional needs while honouring the building's architectural, historical, and emotional significance, addressing community expectations, and enhancing Glasgow and the region's cultural and economic vitality.

The 2021 SOBC focused on building a strong Strategic Case, with the other four business case elements (Economic Case, Financial Case, Commercial Case and Management Case) were outlined at a high level.

This Addendum Report has gone into more detail to address challenges and to provide greater clarity on the costs and potential delivery scenarios for the project.

The report provides an updated overview of the project's vision, objectives and critical success factor. It examines the cultural significance of the building and the definition of faithful reinstatement. Approaches to a fire strategy, accessibility and sustainability are considered as well as precedent studies. Potential delivery scenarios are described and meanwhile/interim uses are considered.

This Appendix is a detailed supplement to the main element of the SOBC, namely the Five Case Model Assessment.



Cast near south-facing corridor window

Critical Success Factors

Refined Success Factors

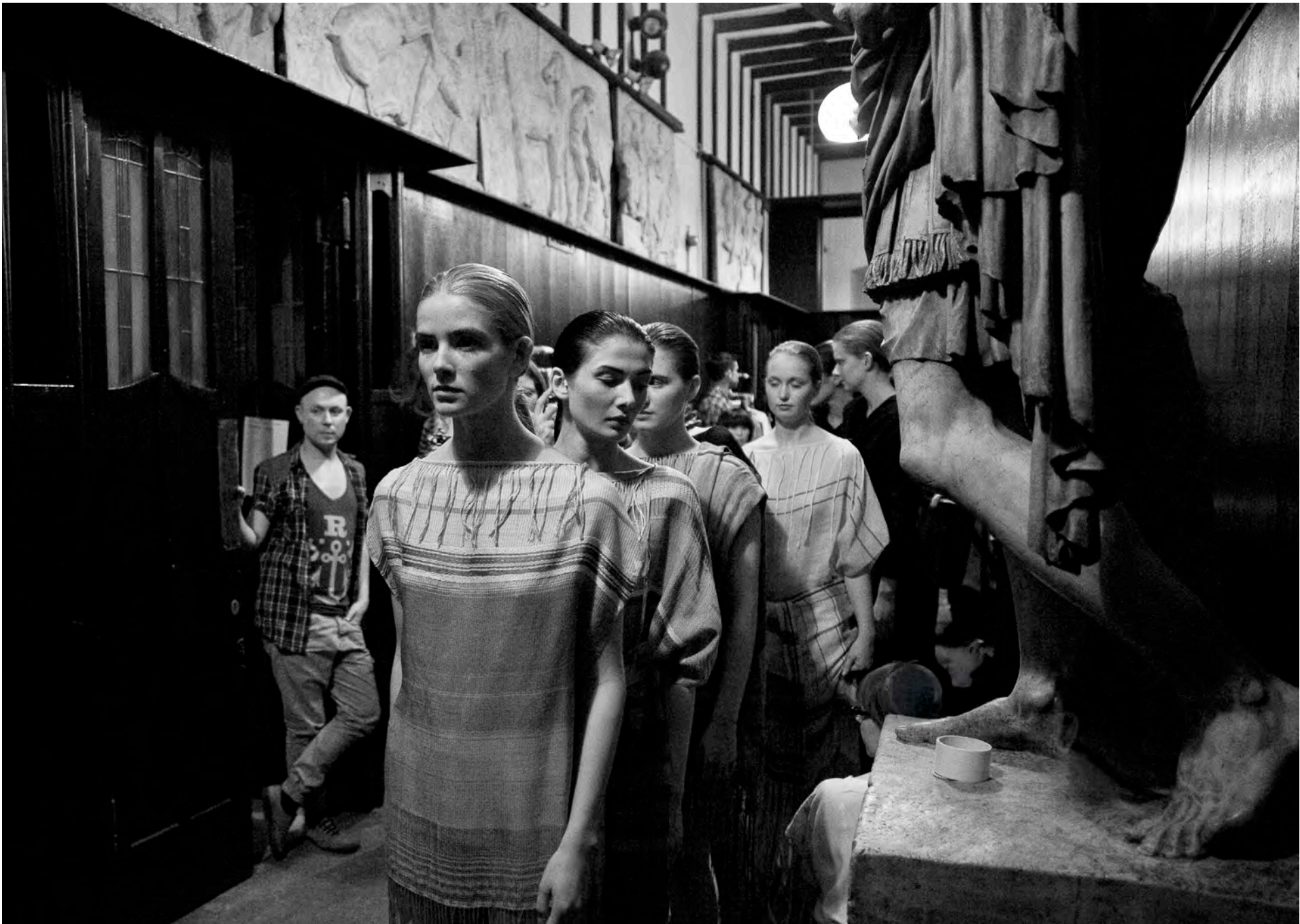
Critical Success Factors (CSFs) are essential to successful project delivery because they help ensure alignment with strategic objectives, the project's vision, and overall goals. At the outset of the SOBC addendum, stakeholders engaged in a structured discussion to identify the critical success factors. The dialogue culminated in a dedicated workshop with the GSA leadership team, estates representatives, and design team members, to refine the factors, focusing on economic and creative impact, the building's connection to the school, campus, city, and world, as well as functionality, sustainability, and how inspiring spaces drive creative practice and student recruitment.

This workshop resulted in the identification of four essential critical success factors.

To be considered a success the reinstatement must deliver:

1. A high-quality reinstatement of the primary significance of the iconic building as a purpose-designed art school and used for that purpose.
2. Functional, flexible and enjoyable spaces within the building that facilitate enable and inspire students, staff and partners to create, produce and share work at the Glasgow School of Art, now and into the future.
3. An inspiring place which attracts, evolves and unites the very best creative talent from across the globe into Glasgow. Through its provision of world class facilities and inspiring places to work, research, and create, the reinstated building will play a role in leading innovation, building collaborations, and retaining creative talent for the wider benefit of the community.
4. Positive contribution to the appearance, presentation, functionality and long-term sustainability of the wider campus at the Glasgow School of Art, towards the Vision and the aims of the Estate Strategy.

The Critical Success Factors define the principal criteria for assessing the success of possible delivery scenarios.





The Library

Definition of Faithful Reinstatement

The Strategic Outline Business Case 2021, confirmed The Glasgow School of Art's ambition is to deliver the faithful reinstatement of the Mackintosh Building as a world class exemplar of art, architecture, design and sustainability, fit for purpose in the twenty-first century as an inspiration to creative practice and the community and as an effective response to the climate emergency. This ambition has not changed, and the primary objective is to deliver a viable faithful reinstatement of the Glasgow School of Art Mackintosh Building. The following definition has been developed to support this ambition:

'Reinstatement' will focus on maximising opportunities to put back in place building fabric, structural and architectural design features that have been lost to fire.

'Faithful' means this reinstatement will focus on preserving and recovering to the building the cultural and heritage significance of the Mackintosh Building as a world leading art school, including the qualities of Charles Rennie Mackintosh's design intent. The reinstated building will have an appearance, atmosphere, and detail of key architectural features, with an authenticity of architectural quality that will evoke and restore its cultural and heritage significance.



Life Drawing Class c1900

"From some recent buildings which have been erected it is clearly evident that this style is coming to life again and I only hope that it will not be strangled in its infancy by indiscriminate unsympathetic people who will copy its ancient examples without beginning to make them conform to modern requirements."

Charles Rennie Mackintosh

Essay: Scotch Baronial Architecture (1891)

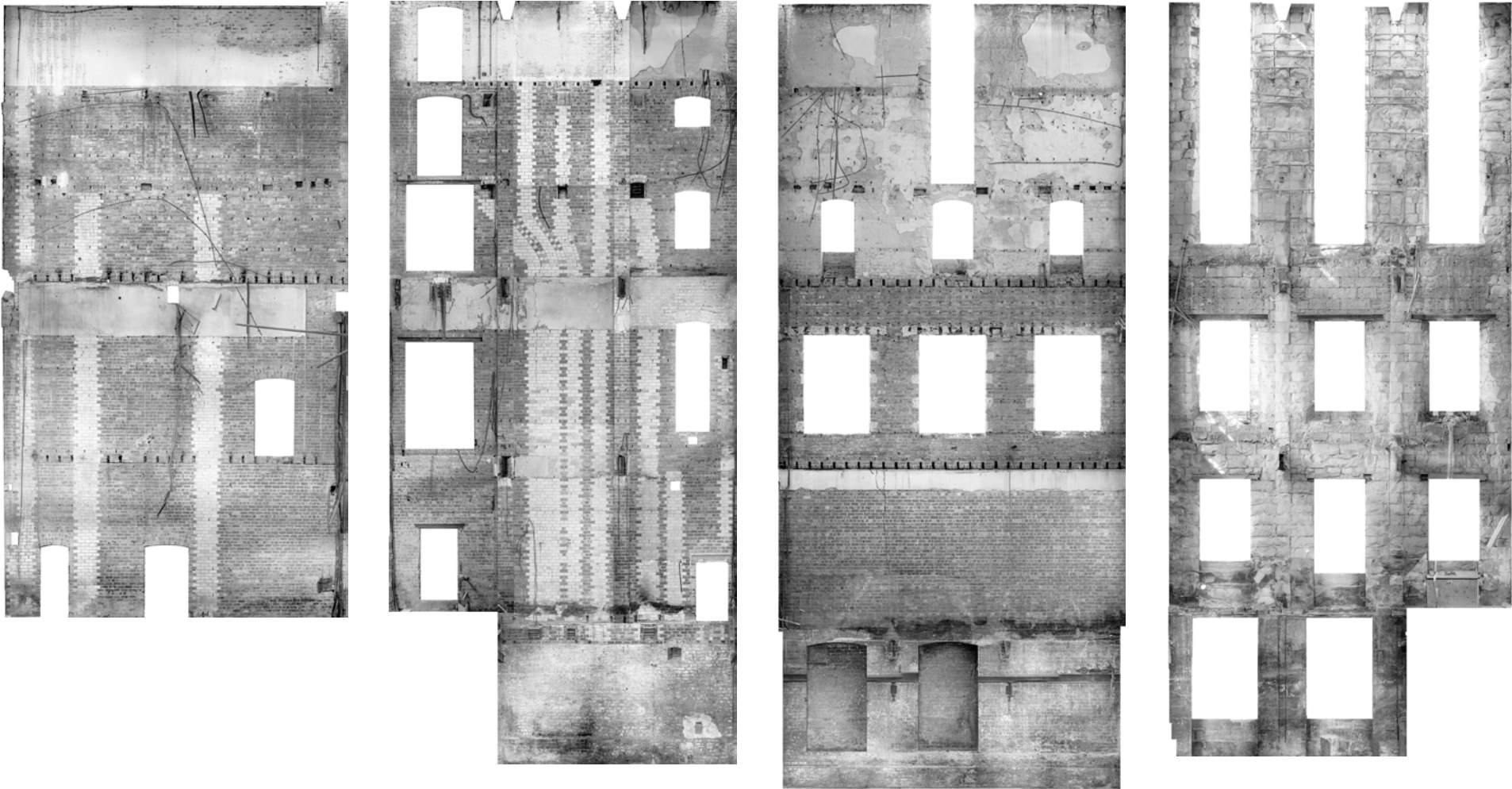
"All our great industries – whether of shipbuilding or house building, whether of engineering or machine making, whether of pattern making or the higher art of painting – must first have their origin in drawing, and without this basis none of them can be established. The shipbuilder must first design his model; the architect his structure, the engineer his railway, his docks, or his bridges; the painter his sketch; and the designer his ideal, before he can begin his operations."

Francis Newbery

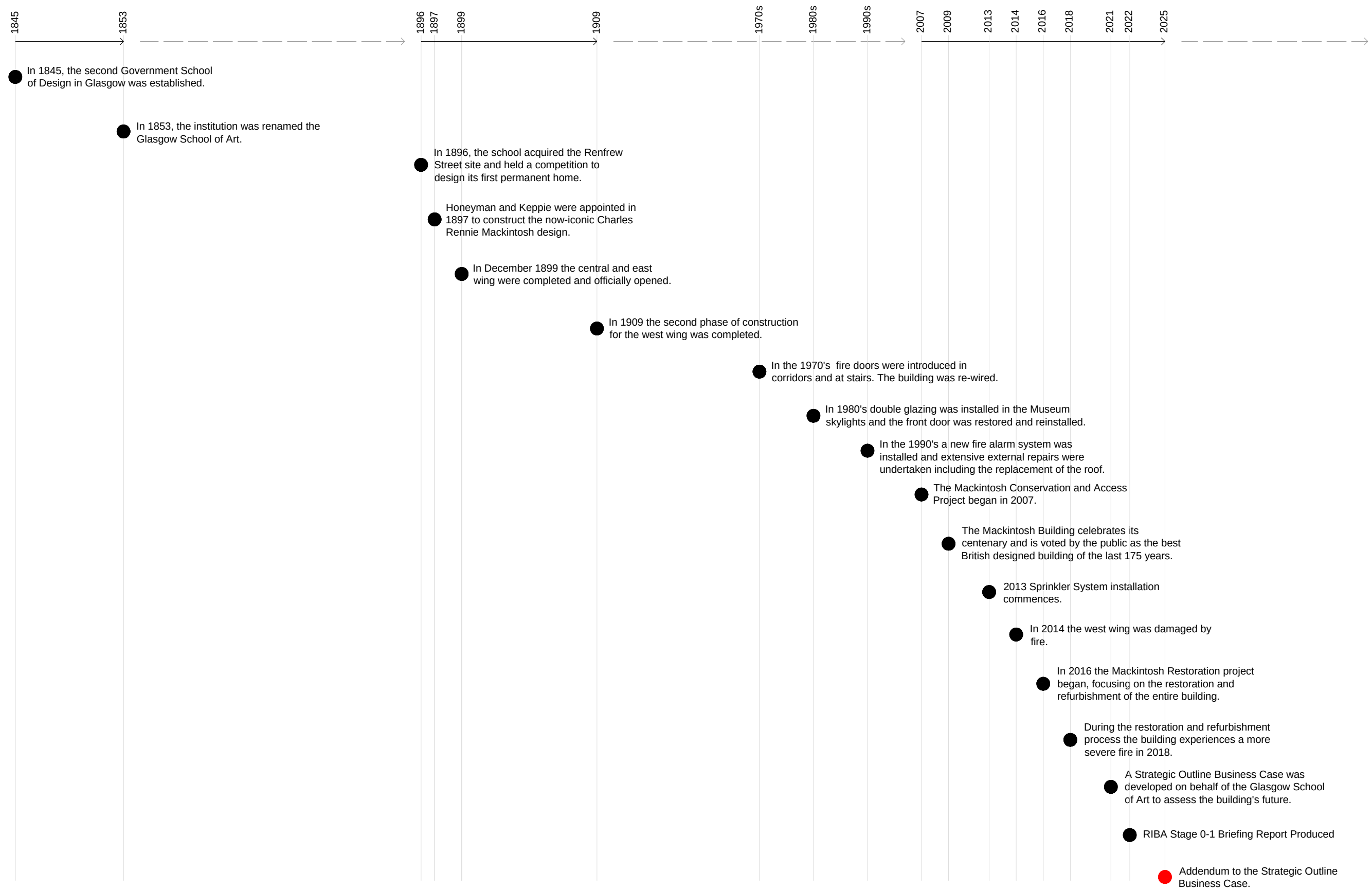
Address to The Glasgow School of Art (1885)

Appendix A

1.0 Project Overview & Updates



Drone imagery of library walls, post-2018 fire (North, East, South, West)



Timeline of the building's history.

Current Status of the Building

Commentary

The 2018 fire caused extensive damage to the building, stripping away almost all of the internal fabric, causing the collapse of significant sections of the structure. Much of the remaining structure is unstable and requires extensive stabilisation and protection.

The towering walls that remain in raw brickwork reinforce Mackintosh's interest in the Castellated Architecture of Scotland (MacGibbon and Ross' 5 *Volumes* were published from 1887-1892), and his ability to create large-scale production spaces filled with light.

Architectural Overview

Age Value

“‘Age Value’ accrues over time and is made visible by the presence of patina. Age value has an advantage over historical value. The latter can be comprehended only by those who have a precise knowledge about the monuments place in the sweep of historical and academic apprehension. Age value on the other hand, is self-evident and available to the ‘educated and uneducated’ alike.” (Stewart’s description of Stephen Cairns’ and Jane Jacobs’ concept of Age Value)

- Sally Stewart, Things Change: First Hand Accounts (Essay),
The Hill House - Not Forever, 2021

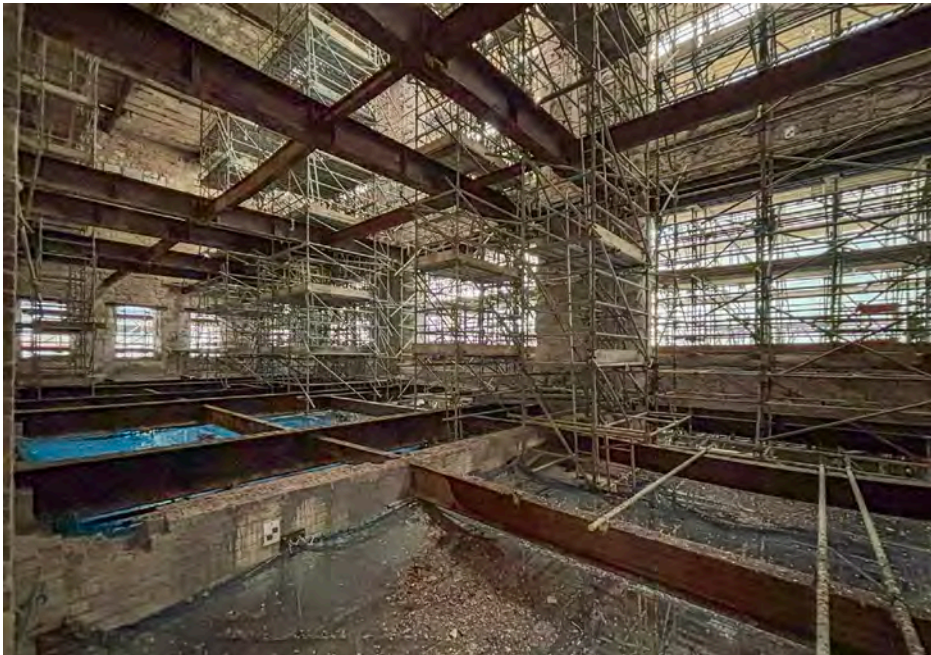
The fire has revealed previously concealed elements of the building - Vertical bands of bricks with differing surface finishes, door and opening arches formed of bricks on end, the rivets on fabricated beams, openings that were bricked up during the second phase of the construction of the building or later with more modern bricks. The shuttering boards marks on the underside of the concrete floor slabs and the rhythm of the steel filler joists. The way in which the structure was constructed is temporarily visible, enabling a greater understanding of how the building was designed and constructed.

The conservation statement by Simpson and Brown Architects (August 2021) extensively detailed the building's condition and the requirements to maintain and protect the retained, stabilised structure to avoid exasperating a deteriorating condition. A protective covering has since slowed further damage and allowed the structure to dry out.

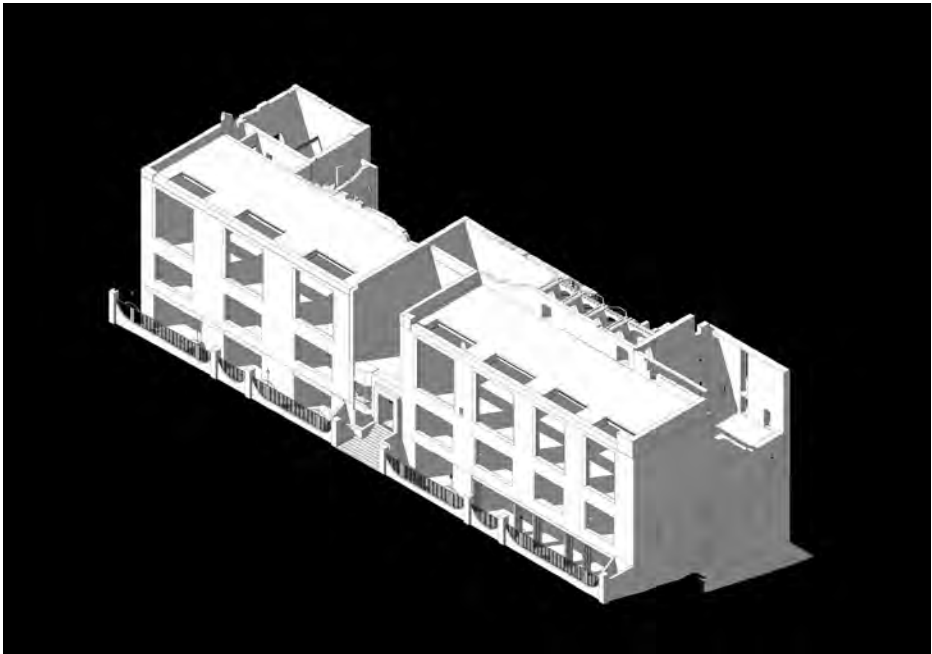
It's important to distinguish the far greater extent of the 2018 fire than the one of 2014. After 2014, the restoration effort was about repair. After 2018, the project as a whole is a rebuild containing elements of repair.



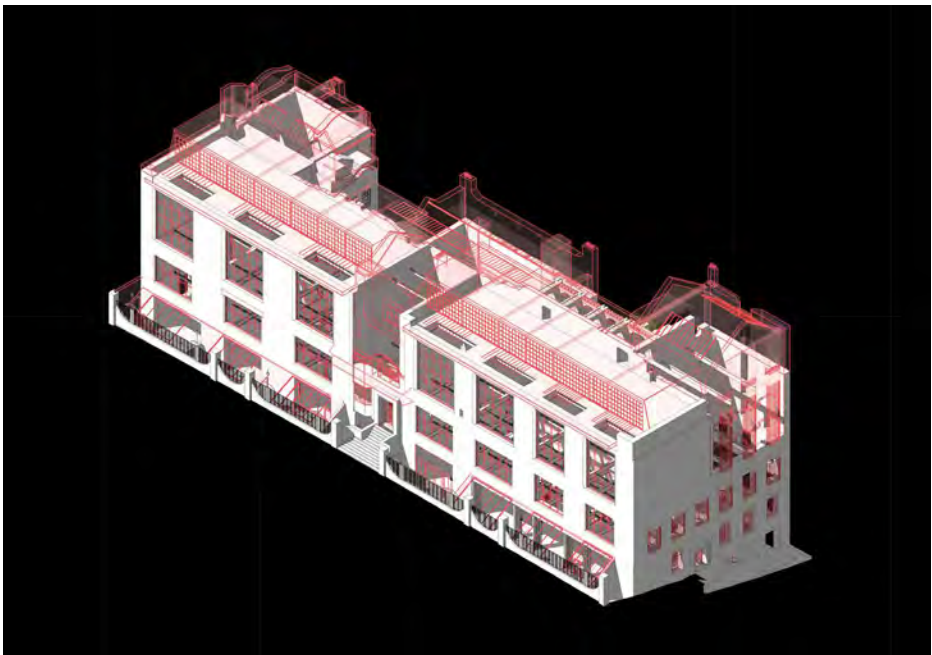
In 2024 the building was shrouded in scaffold. The wrap was removed from the walls in April 2025



West studios interior (Mar 2025)



What currently remains behind the scaffold



What has been lost or taken down (red)

Current Status of the Building

Architectural Overview - Eastern End of the Building

Caretakers House / Mackintosh Room / Studio

The stone elevation to Dalhousie Street is the least damaged of the stonework walls and has survived from basement level up to second floor level. The window reveals, lintels and surrounds are largely intact, but the windows to the Caretakers Apartment and the Mackintosh Room require some partial and full indenting of stones at reveals.

The brickwork external walls have survived from basement level up to second floor slab level. The fireplaces in the Caretakers apartment have also survived including hearths and some tilework.

Small areas of damaged plaster on lath and on brickwork have survived as have small areas of charred timber linings at window openings. All timber floors and doors have perished.

Some of the metal window frame survived and may be salvageable. Evidence of historic secondary glazing to the Caretakers Apartment windows also remains.

Studios

The stone walls on the north elevation are in poor condition particularly between basement and ground level and require replacement with new stone. The reveals to the large window openings are damaged and need to be replaced. The cast iron beams over the windows and the stone aprons above the windows need to be taken down, with stone set aside for potential re-use where possible. The stone at the north-east corner where Dalhousie Street meets Renfrew Street needs to be taken down and rebuilt, using as much salvaged stone as possible. The east wall to the studios has some extensive cracks that will need to be either taken down and rebuilt or repaired.

The brickwork cross walls and corridor spine wall survive from Basement Level up to Second Floor slab level and require extensive local repairs to pointing, cracks and arches. The brickwork cross walls at basement and ground floor level survived and also require repairs.

The concrete basement floors are intact but have been damaged by debris falling during the fire and require replacement. The concrete and steel joist floor slab at second floor level is intact, but damaged and will require replacement. It is currently helping to provide stability to the surrounding walls. All timber floors perished in the fire.

There is a small area of surviving timber floorboarding on battens in the basement. All doors and timber linings have perished. Some metal window frames survived but are warped and will require replacement.

East Stair

The East Stair largely survives from basement level up to second floor level with the exception of the last flight at the top of the stair which has been removed. The stair requires extensive repairs. The concrete treads and landings are cracked and require repair and some replacement. Approximately a third of the landings need to be replaced. Some of the 'Glasgow Marble' plaster has survived but is cracked and de-bonded from the brickwork walls. All windows need to be replaced. Some of the decorative tilework has survived.



Wall at Mackintosh Room and Caretaker's House



Stone at window head on East elevation



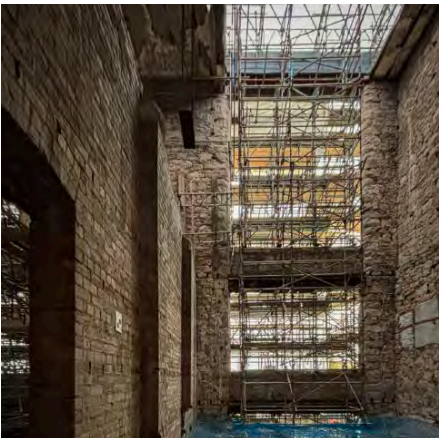
West and North Brick walls to Mackintosh Room



Caretaker's House fireplace



Windows at Caretaker's House



Windows to Ground and First Floor Studios



Cast iron window lintel at Ground Floor Studio



Damaged stonework at North Elevation Basement



Surviving timber strip flooring at Basement



Top of East Stair



East Stairwell - surviving tiling and plaster



East Stairwell - concrete treads and plaster

Current Status of the Building

Architectural Overview - Centre of the Building

The central section of the building contained the Entrance Hall, Directors Room and Studio, Museum and Central Stair as well as offices and toilets wrapped around the stair below the Museum.

Much of the best-preserved stonework in in this location. The stonework on the North Elevation is largely intact at first floor, ground floor and basement levels. The guardian angels over the entrance doors, the steps up to the main entrance and their curved side walls are intact.

All of the timber floors have perished and the cast iron beams which supported the floors failed and have been removed. There is a large surviving section of concrete floor of what was the heating coil room below the entrance hall, that will need to be replaced.

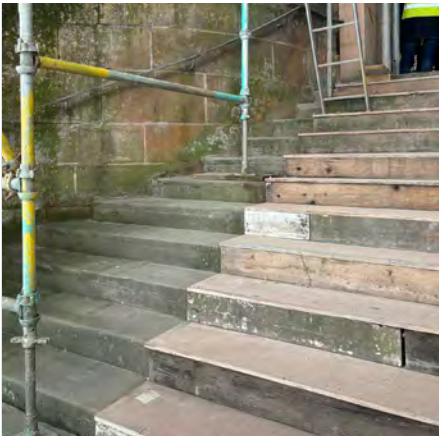
All timber doors windows and linings have perished. Some metal window frames and a small amount of glazing remain in the window openings once serving the toilets and offices located below the Museum.

The brick walls to the southern side and cross walls largely survive from Basement Level up to Second Floor slab level. The main corridor spine wall extends to 7 or 8 brick courses above Second Floor slab level. The brickwork requires extensive local repairs to cracks, lintels and arches over openings. Some of the brick piers for supporting beams require to be tied back to adjacent walls.

The central Stair has perished but seatings for the stone treads from Basement to Ground Floor Level are still visible. The timber stair from ground floor to the museum at first floor has completely perished.



Entrance steps wall and handrail



Entrance steps



Carved guardian above the main entrance



Oriel window to GF reception



Director's studio



Main entrance elevation from corridor



Corridor spine wall from main entrance



Corridor spine wall from main entrance



West external wall of offices, toilets and museum



Window openings to toilets and offices



Surviving metal framed window and glass



Seating for main stair from ground to basement

Current Status of the Building

Architectural Overview - Western End of the Building

Lecture Theatre/Library/Studio 58

All internal finishes, timberwork, floors doors and windows at The Library, Lecture Theatre, Furniture Store and Studio 58 perished in the fire. The stonework at the west elevation has been taken down to first floor window cill level and requires rebuilding with new and salvaged stone. The reveals and immediately surrounding stone at the window openings to the lecture theatre and Senior Architecture Studios requires partial indenting. The brickwork on the South elevation requires to be taken down from wall-head to first floor level. The brickwork core wall remains from sub-basement level to second floor slab level and requires some localised repairs.

Studios

The stonework to the western side of the north elevation is in better condition than the eastern half but has still suffered extensive damage. The window reveals at the large studio windows have been lost to the fire and the aprons between window heads and cills above need to be taken down to enable the steel lintels to be removed. The narrow piers of stone that could be left standing between the windows would require extensive support, and it may be prudent to carefully take them down to allow a coherent salvage and reinstatement. An allowance has been made in the costings for the taking down of stonework from basement to ground level at the corner of Renfrew Street and Scott Street.

The stonework on the west elevation of the studios survived from basement level to top of wall-head above second floor level. There is a significant amount of cracking in the stonework that will need to be repaired and the reveals and immediately surrounding stone to the ground floor windows requires to be partially or fully indented.

The brickwork cross walls and corridor spine wall survive from Basement Level up to 28 courses above Second Floor slab level and require local repairs. The brickwork cross walls at basement and ground floor level survived and require localised repairs. Some of the brick piers on the core wall at the Studios side require pinning back to the core wall. The brickwork arches and window openings of the Loggia have largely survived.

The concrete basement floors are intact but damaged and require replacement. The concrete and steel joist floor slab at second floor level is intact, but damaged and will require replacement. It is currently helping to provide stability to the surrounding walls. All timber floors perished in the fire. There is a small area of surviving timber floorboarding on battens in the basement. Some metal window frames survived at basement and subbasement level but are warped and will require replacement.

West Stair

The West Stair largely survived the fire. Many of the concrete tread units are showing signs of cracking and require repair and one of the flights requires 5 treads replaced and another requires 2 tread replaced. Two landings also need to be fully replaced. Some of the Glasgow Marble plasterwork has survived but is generally in poor condition and often detached from the brick substrate. Some of the decorative tiling has survived. The brick external walls appear in reasonable condition but require localised repairs especially at arches at the window heads.



Removed west wall of library



Senior architecture studio



Window cill level of library



Internal wall between studio 58 and stair



Concrete corridor floors



Basement level studios



Cast steel beams and North elevation in studios



Core wall at basement



Loggia



Second floor studio towards loggia



West stair



West stair tiling

Current Status of the Building

Architectural Overview - Remaining Features

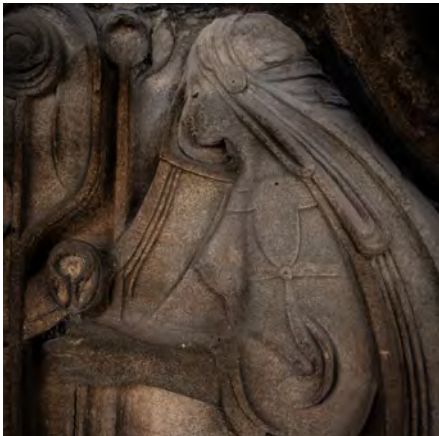
External Stonework at window heads on the east elevation, the stone wall and railings along the pavement on Renfrew Street, and the stone architraves and carved stone relief sculpture above the main entrance doors. The elaborate stonework surrounds to the west entrance door.

Much of the external metalwork survived – the railings along Renfrew Street including all five of the symbol round medallions. Most of the ground level metalwork railings and gates at the west elevation also survived.

The majority of the remaining stonework requires a large and costly quantity of support scaffolding and temporary bracing to prevent collapse, whereas the remaining brickwork, whilst requiring some temporary bracing and propping, has fared better than the stonework. The stone arches at the loggia have been stripped of their paint and now appear as bare brick as originally intended by Mackintosh. The core wall running east west through the length of the building has lost all of its linings and decoration and the shallow brick arches over the door and window openings have been revealed as have the patterns of different types of brickwork used in the service duct risers.

Some of the metal windows survived, most were distorted by the heat, but some still have some glazing, albeit cracked or broken. A particular delight is that some of the decorative tilework at stair landings has survived.

The fires of 2014 and 2018 were tragic events that have resulted in an incredible amount of loss to the structural and architectural elements of the building. They also form a part of the buildings history and have revealed much about the technical design and construction of the building.



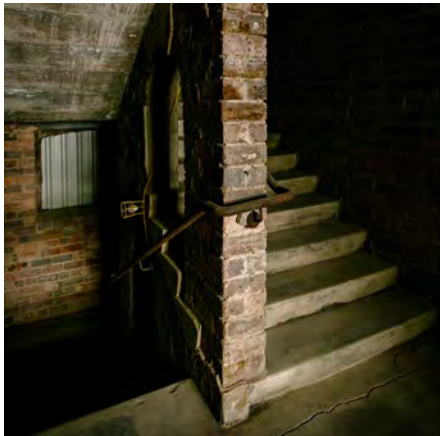
Stone relief over Main Entrance



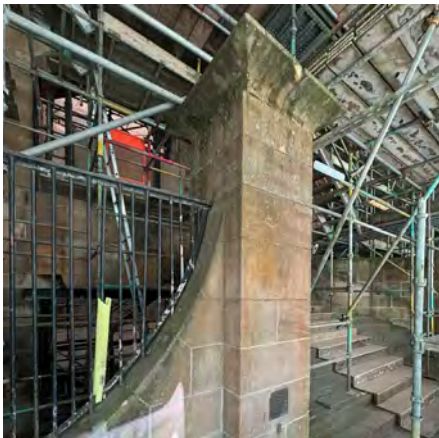
Tiles in the East Stairwell



Steel framed window and glazing



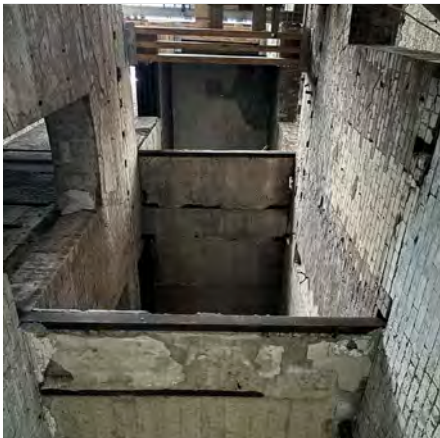
Concrete west stair and handrail



Stone wall, metalwork and stairs at main entrance



Brick arches at loggia



Steel beam and concrete infill floors at west corridor



Brickwork at second floor



Air Fan in the Basement



Window ironmongery on West Elevation



Metalwork on Renfrew Street



Tiles in the sub-basement

Current Status of the Building

Original structural form of the building

The original structure of the Mackintosh Building is generally cellular in nature with load bearing masonry walls internally and externally. The external walls to the north, east and west are sandstone masonry, with the south and internal walls built in brickwork. The exception is the west end of the north elevation where the façade is supported on a steel frame at basement level.

There are suspended concrete filler joist floors at second floor level which sit on a grid of primary and secondary steel beams. The main spine corridor in some areas of the building, particularly the west end is similarly formed of concrete filler joist. At first floor, ground floor and other intermediate mezzanine floor levels, the floor construction consisted of suspended timber joists supported on a similar grid of steel beams. The north half of the basement level and the sub-basement have ground bearing concrete floor slabs without a solum below. The southern half of the basement level had a mixture of concrete filler joist floors, timber joisted floors and some areas of ground bearing slab. The east and west stairs are formed of concrete treads and landings with some additional steel beams in certain areas. The central stair was formed of stone treads on masonry at lower levels and timber at upper levels. The foundations are understood to be traditional unreinforced concrete strips bearing directly onto a stiff clay.

While various minor alterations have been made to the building since 1909, the principal structure has never been significantly altered.

Structural Condition Following the Fires

The western half of building was damaged structurally by the fire in May 2014, especially the southwest corner block. Works to stabilise & repair the structure of the building included additional tying between wall-to-wall and floor-to-wall junctions to improve robustness, strengthening of slabs and rebuilding of timber elements and heavily fire damaged stone piers. Post 2014 fire structural repairs were complete just prior to the second fire in June 2018.

The key structural damage from the 2018 fire was:

- Loss of all timber floor and roof structure that helped tie and stabilise the internal and external masonry walls.
- Large sections of high-level masonry destabilised were left leaning out of plumb.
- Extensive damage and cracking to brick and stone walls and stone load bearing elements such as corbels and padstones.
- Separation along historically weak lines of connecting stone masonry walls and brickwork walls.
- Heavy spalling and damage on internal surface of stonework
- Cracking of cast iron lintels and distortion of steel lintels and beams.
- Spalling and cracking of concrete slabs and stair elements the east and west stairwells.
- Collapse of central stone stairs.

Summary of the Structural Works Undertaken to date

The works that have been carried out on the building since the 2018 fire in approximate chronological order include:

1. Immediate making safe works:
 - Reduction in height of high-level free-standing masonry in stone and brick where instabilities were observed.
 - Clearance of debris and framing from high level. Inspection of 2nd floor slabs.
2. Shoring works:
 - Shoring scaffold installed to east and west gable and northern façade.
 - Propping to cracked cast iron lintels on external facades.
 - Bracing at two levels in south east corner where all internal floors were lost.
 - Bracing internally and externally in the south west (library corner) to stabilise slab supported on heavily fire damaged library piers.
 - Remedial ties between walls.
3. Clearance and further stabilisation:
 - Systematic removal of up to 4m depth of internal debris at basement level, elements of historical significance retained, catalogued and stored.
 - Controlled dismantling of lower ring failed brick arches.
 - Propping of remaining arches and corbelling brickwork.
 - Removal of heavily fire damaged steel beams and fire damaged scaffold.
 - Controlled dismantling of main entrance floor slab where failed.
 - Installation of crash nets to allow safe access under remaining slabs.
 - Installation of props to support ends of grid of principal beams where failure of padstones was visible.
4. Dismantling of the library piers and second floor slab in southwest corner and installation of internal shoring bird cage scaffold to support south wall.
5. Erection of temporary weather protection – roof and wrap to facilitate drying out.
6. Trials of various spalled stone consolidation specifications.
7. Initial materials testing to inform outline scope of repairs.
8. Local areas of brick repairs to the spine wall (approx. 40% of length) including:
 - Stitching of main cracks
 - consolidation of flues
 - Rebuilding of central pier and reinstatement of lintels in main entrance
 - Rebuilding of nibs to support main beams



Shoring scaffold, viewed from Dalhousie Street

Understanding Cultural Heritage Significance

Conservation Management Plan

Introduction

A Conservation Management Plan (CMP) is a document that helps understand and manage a heritage asset, outlining its significance and providing a framework for its conservation and management, including policies for future decisions and actions.

In defining the future for the Mackintosh Building an updated Conservation Management Plan will be a key next step to build upon this Strategic Outline Business Case (SOBC) Addendum and support forward project direction. The CMP will evolve the conservation principles defined within this SOBC Addendum to guide next steps for continued design of an architectural scheme which conserves existing fabric, protects and where possible enhances heritage significance, and establishes a sustainable reinstatement of the Mackintosh Building for the Glasgow School of Art.

A vast corpus of information, knowledge and understanding of the Mackintosh Building already exists, with documentary evidence defined in many books, articles, and professional documents including previous Conservation Statements. These have been referenced during the work to produce this SOBC Addendum.

The Conservation Statement produced by Simpson Brown in August 2021 was commissioned with focus on future restoration of the Mackintosh Building and to explore how consolidation choices taken in the short term might interact or conflict with this restoration aim. Its purpose therefore means that the Statement, which is thorough and comprehensive, is specifically focused on academic understanding of certain key aspects of the building's construction.

Prior to this Conservation Statement, the Conservation Atlas was produced by Page/Park in 2016. The principle of Page\Park's heritage assessment in the Atlas is that given the extent of available information, an accurate restoration of the entire building is a real possibility. The Conservation Atlas therefore largely attributes the Mackintosh Building's significance to the pre-fire condition of the building.

The Mackintosh Building has seen much change since 2016. More original fabric has been lost to the 2018 fire. Alongside the further loss, through continued research, and even through current post-fire stabilisation efforts, our collective understanding of the fabric, detail and performance of the Mackintosh Building has continued to grow.

A revised Conservation Management Plan will acknowledge the status of the Mackintosh Building, making good use of the vast body of established knowledge, collating and appraising currently available information.

As explained above the CMP will also be a tool to support the new future of the building, evolving the conservation principles now defined within this SOBC Addendum (included here) into policies. The policies will guide and support faithful reinstatement alongside positive change to the Mackintosh Building to restore and where possible enhance heritage significance – recognising always that the cultural heritage significance of the building remains associated with its original purpose-designed use and continued function as part of a world leading art school for over 100 years.

Significance Led Design & Conservation Principles

The following principles are established to guide the design approach for sensitively reinstating the Mackintosh Building at the Glasgow School of Art:

- Through significance-led design the reinstated building will reflect original design qualities, balancing this with the essential requirement to meet and where viable exceed current regulations and standards.
- Alongside achieving exemplary conservation of surviving fabric and original design, a faithful reinstatement must ensure a functional building which meets modern statutory and regulatory requirements. This SOBC has verified that the implications of achieving these essential criteria will mean the Mackintosh Building cannot be rebuilt exactly to the form and construction detail that the original building had when completed in 1909. The reinstated building must be healthy, safe, and accessible for use by students, staff, and visitors, and cognisant of modern building regulations including fire safety, thermal performance and energy use, and inclusive access.
- A focus on retention and reuse of as much remaining original fabric as possible will be balanced with the reinstatement of the original design intent, in terms of use and functionality. Materials will be used that are compatible with the historic.
- The primary cultural and heritage significance of this important building lies in its ability to function as a world class art school. This significance will be restored by thoughtfully reinstating Charles Rennie Mackintosh's design intent for its use as an inspiration to artists and community, aligned with The Glasgow School of Art's vision
- The reinstated Mackintosh Building must be functional as a world class digitally enabled working Art School for everyone who works and studies at The Glasgow School of Art, achieving long-term operational and functional sustainability.



Fireplaces in the Caretaker's House

Approach to Cultural Heritage Significance

Redefining the Mackintosh Building’s Heritage Significance

During the development of this Strategic Outline Business Case Addendum Report we have evolved a reframed understanding of the cultural heritage significance of the Mackintosh Building, as a starting point to Conservation Management Plan policies and principles that will underpin project next steps. We recognise that the unique significance of the building in its pre 2018 fire condition lie in the exquisite combination of:

- Its original architectural and interior detailing exemplifying Charles Rennie Mackintosh’s unique artistic vision.
- Its highly successful design as a purpose-built home to Glasgow School of Art.
- Its long history of continued use as a fully operational art school for over 100 years, inspiring many generations of artists and designers.

The Category A listed Mackintosh Building is a monument of international heritage significance in the history of architecture and design. The building is widely considered the masterwork of Charles Rennie Mackintosh’s architectural career, and more broadly as a masterpiece of early modern architecture and one of the most influential buildings ever constructed in Great Britain. Its design embodies Charle Rennie Mackintosh’s highly imaginative holistic style of architecture, innovative interiors, and artistic furniture. Combining his love of nature and his European influence in an architecture the building both invoked Scottish traditional design in its use of features referencing baronial castles and was future thinking in its creation of minimalist spaces and use of new technologies.

The Glasgow School of Art was founded in 1845 to support the manufacturing industries of Glasgow, and rapidly expanded in following years in an architecture and function heavily informed by the evolving social and economic context of the city. By 1896 it had outgrown two premises on Ingram Street and the McLennan Galleries on Sauchiehall Street. Director Francis Newbery commissioned a new building through a competition, won by Honeyman and Keppie where 29-year-old Charles Rennie Mackintosh was working as a draughtsman, later to become project architect on the commission.

Phased in its original design and construction, 1897-1899 (central and east wing) saw the opening of the Glasgow School of Art in its new home from 1899, and then in 1909- 1910 (west wing) the building was complete.

Ever since, the Glasgow School of Art has evolved and grown to serve new industries and audiences through the delivery of innovative and world leading teaching and research in the visual creative disciplines. Today the Glasgow School of Art is one of the few remaining independent art schools.

The Mackintosh Building, as the purpose-built home of this highly influential global institution, remains the physical embodiment of these values, despite its fire ravaged current condition.

“For the next century its resilient structure, soaring studios and atmospheric spaces served to educate and inspire generations of architects, artists and designers, attracting students and visitors from across the globe. For over one hundred years it was a point of pride for Glasgow and a physical and emblematic representation of the city’s creative spirit.”
Robyn Calvert, The Mack (2024)

The many generations across the world who have been taught at, visited, or inspired by the Mackintosh Building means that its cultural heritage significance extends well beyond its built fabric. With a proven history of producing some of the world’s most influential and successful artists, designers and architects, the building’s cultural heritage significance arguably reaches to all those who have felt its influence, and to the work they have created subsequently.

Initially conceived in 1896, the building’s design remains today an excellent one in terms of the needs of an art school. It was a highly adaptable working building.

The fires of 2014 and 2018 have had a devastating effect on the Mackintosh Building with interiors almost wholly lost. Yet the building’s designed form still exists, and many of the physical aspects and attributes that made it a highly successful art school have survived as evident in the extant fabric. The Mackintosh Building retains its heritage significance as a purpose-built art school, due to its revealed archaeological value.

Reinstatement of architectural quality and aesthetic value is paramount, again balanced with the need to ensure construction detailing supports viable future use of the building as an Art School. Retention of this fabric significance must be balanced with the need to ensure good overall condition for viable future use of the building as an Art School.

The Mackintosh Building can be part of the educational, intellectual, and cultural experience of everyone who studies and works at The Glasgow School of Art. We recognise that we must respect and safeguard its historical significance. It must be permeable, useful, and contribute to the success of the GSA. It cannot become a museum, a historical curiosity – its value is in its ability to be a working art school, something it did successfully for over one hundred years.

The key conservation principle that has emerged through work to date is that a faithful reinstatement in a manner which recovers heritage significance of the Mackintosh Building is realistically achievable through an approach focused on ensuring the building can once again become a world leading Art School. Echoing the function for which it was originally designed, whilst ensuring its long-term sustainability, enabling it to perform for today and thrive into the future.



Museum, first floor (c.1900)



Museum, first floor (1909)

Planning and Listed Building Status

Introduction

A Planning Statement was prepared in February 2021 to support the Strategic Outline Business Case (SOBC) which identified faithful reinstatement as the best option for the Mackintosh Building. This option was approved by the GSA Board of Governors in June 2021.

This Planning Briefing Note has been prepared to support the SOBC Addendum and to highlight amendments in planning policy and planning history since the initial Planning Statement was prepared in February 2021 which should be considered within the different delivery scenarios. This note should be read in conjunction with the February 2021 Planning Statement included in the SOBC.

Planning Policy Updates

With regard to regulatory compliance, consideration is given to changes in planning policy to ensure the emerging delivery scenarios respond accordingly. The key change in planning policy in Scotland post February 2021 is the adoption of National Planning Framework 4 (NPF4). NPF4 replaces Scottish Planning Policy (SPP) and Strategic Development Plans, which in this instance was Clydeplan. The development plan covering the Mackintosh Building now comprises:

- National Planning Framework 4 (adopted February 2023) (NPF4); and
- City Development Plan (adopted March 2017) (CDP).

Glasgow's adopted CDP is extremely time-dated. A new plan is in the early stages of preparation. The GSA will engage in the plan-making preparation of the CDP. In the interim, where there is incompatibility between the 2017 CDP and 2023 NPF4, NPF4 takes priority. This note provides an overview of key relevant NPF4 policies and comments upon any incompatibility with CDP policies.

In general, the aims and objectives of CDP policy align with NPF4. However, NPF4 introduces renewed emphasis on the global climate emergency and the need to reduce greenhouse gas emissions thereby adapting to the future impacts of climate change. Policies also seek consider and respond to our rich heritage, culture and natural environment. NPF4 seeks to enable development which delivers social and economic legacy.

Given the time-dated nature of the adopted CDP, whilst there may not be incompatibility, in view of other changing regulations, and renewed emphasis on matters such as biodiversity and heating. Emerging proposals should seek to address both NPF4 and CDP albeit with the starting point in policy terms, would be NPF4.

Planning History

Prior to the 2014 fire there had been nine applications relating to the Mackintosh Building on the Glasgow Council Planning Portal, dating back to 1987, most of which were concerned with making minor alterations to the internal layouts of the building. Two others relate to the introduction of a lighting scheme and the installation of communications antennae. One from 2013 relates to the installation of a fire suppression system (a high-pressure misting system).

Since the fire of 2014, there have been six planning applications/listed building consent applications. Five relate to the restoration and minor alterations works proposed and undertaken following the 2014 fire. The sixth application relates to alterations including partial dismantling, consolidation and temporary works to make the building safe following the 2018 fire.

Neighbouring Planning Application

Other relevant planning history was included within the February 2021 Planning Statement. This note provides an update on nearby planning applications, namely developments for the adjacent site at 292 to 332 Sauchiehall Street (referred to as the former Jumpin Jaks / ABC within the February 2021 Planning Statement).

The former ABC site is one of two sites being promoted for development by Vita on Sauchiehall Street (the other being the aforementioned Jumpin Jaks). The former ABC site has a lengthy planning history. Given the proximity of the site to the Mackintosh Building, the GSA have taken an active interest in developments. Prior to Vita's involvement, the landowner of the former ABC site promoted complete demolition of the listed building on the basis of fire damage.

A listed building application was submitted on 15th February 2019 by the landowner and given reference 19/00266/LBA. Demolition was granted by Glasgow's Planning Application Committee with the decision notice being issued on 27th August 2024. A copy of the Committee Report and / or decision notice can be provided upon request. Demolition has progressed.

A planning application for Purpose-Built Student Accommodation (PBSA) for site at 292 to 332 Sauchiehall Street Glasgow (the combined former Jumpin Jaks and ABC) has been submitted on behalf of Vita (House of Social Rooke 2 Limited) and has been given Application Reference: 24/01680/FUL. The description of development is:

Erection of purpose-built student accommodation with ground floor food hall (Class 1A) Food and drink (Class 3) Public house and hot food takeaway (Sui generis) and Assembly and Leisure uses (Class 11) with associated landscaping, amenity, access and other ancillary works.

The application was validated on 4th July 2024 with a (revised) target date for determination of 31st January 2025. The application was accompanied with a suite of documents including a Design and Access Statement prepared by Haus Architects which provides an overview of the proposal and rationale. Also included is a GIA report titled, 'Daylight and Sunlight Impact on Neighbouring Properties Report'.

Upon review of the daylight and sunlight analysis, there are substantial concerns with the methodology and conclusions which have presumably informed the design. The proposed development will have a serious adverse impact on the Mackintosh Building. These concerns were raised with the Planning Authority with a holding representation being submitted on behalf of the GSA on 14th November 2024 and a formal objection on 8 April 2025. Historic Environment Scotland have also objected to the proposed development.

The GSA and HES objections can be found here: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://publicaccess.glasgow.gov.uk/online-applications/files/90CE36BE992A592610381F3A7591EB6B/pdf/24_01680_FUL-GLASGOW_SCHOOL_OF_ART-6490029.pdf

The GSA objection focusses on:

- Daylight and sunlight impacts.
- The effect upon the function of spaces within the Mackintosh Building.
- Privacy issues.

Next Steps

As work continues on updating outcomes of the SOBC and the consideration of options, it is recommended the GSA monitor and engage with the following:

- Emerging City Development Plan 2.
- Vita Planning Application 24/01680/FUL. (Determination due June 2025).
- Continue dialogue with key stakeholders such as GCC Planning, GCC Building Control and Historic Environment Scotland.
- Consideration of wider stakeholder engagement with politicians, heritage groups, and local community groups.

Planning and Listed Building Status

Planning History, cont.

Discussions Held with Glasgow City Council and Historic Environment Scotland

This note summarises the meetings and discussions held with Glasgow City Council Planning (GCC) and Historic Environment Scotland (HES) since the 2018 fire at the Glasgow School of Art Mackintosh Building

Initial discussions and meetings were all about the safety of the extensively fire damaged structure and the works required to stabilise and clear the building of debris. As proposals for the required structural stabilisation and repair of the fire damaged structure were being designed in 2021-2022, further discussions and meetings were held with GCC and HES about the statutory consents that would be required for the faithful reinstatement works and re-occupation of the Mackintosh Building.

The discussions and meetings held included the following people at GCC and HES:

Glasgow City Council Planning & Building Standards (GCC)

- Sarah Shaw (Head of Service - Planning)
- Raymond Barlow (Head of Service - Building Standards and Public Safety)
- Susan Connelly (Principal Planner)
- Iain Mason (Planning) – now retired
- Brian Tierney (Building Standards) – now retired
- Ken Donoghue (Building Standards)

Historic Environment Scotland

- Dr Louisa Humm (Senior Casework Officer)
- Dara Parsons (Head of Designations, previous Deputy Head of Casework)
- Barbara Cummins (Director of Heritage) – now retired.

Key Points Raised or Identified:

- 24 July 2024 - HES stated; “Our interest at this dountaking stage is to ensure that decisions taken now are clear, defensible and do not compromise the long-term options for the building.” and our position will remain that the principle of minimising the dountaking of this internationally important building should be

central to any discussions.”

- Any dountakings will require Listed Building Consent.
- GCC and HES expect Planning and Listed Building Consent for the new/rebuild element of the works to be applied for in advance of the work.
- 17 December 2024;
 - All noted opportunity to improve thermal performance and the need to develop a long- term sustainability strategy.
 - Officers appeared to accept the need for accessibility and Equality Act compliance.



Relief sculpture at main entrance

Overview of Building Control Requirements

Introduction

The reinstatement of the Mackintosh Building will be required to comply with the Building (Scotland) Regulations 2004 and subsequent amendments. Designs for the reinstatement should comply where possible with the requirements of the *Building Standards Technical Handbook January 2025: Non-domestic*. As the building is listed, designs will also be subject to Listed Building Consent, and the following documents should be consulted:

- Managing Change in the Historic Environment - Fire and Historic Buildings (2023)
- Guide for Practitioners 6: Conversion of Traditional Buildings (2007) – currently under review
- Guide for Practitioners 7: Fire Safety Management in Traditional Buildings (2010)

A guide to Fire Safety in Traditional Buildings is currently being drafted by Historic Environment Scotland, and was expected to be published in Spring 2024. When published it should also be referred to. The Technical Standards note:

“it may be appropriate to vary the guidance contained in the (Technical Standards) Handbook when assessing the guidance against the constraints in existing buildings, especially those buildings which are listed for their special architectural or historic interest. In such cases, it would be appropriate to take into account a range of fire safety measures that are sympathetic to the character of the building, whilst ensuring that an appropriate standard of fire safety is achieved. The following documents are cited to ensure that the guidance given encompasses best practice worldwide:

- *BS 7974: 2019 Application of fire safety engineering principles to the design of buildings, or*
- *International Fire Engineering Guidelines, 2005 (IFEG).”*

Some alternative approaches may need to be used to demonstrate compliance for repaired existing structural elements, as well as to allow for some extended escape distances. However, as previously noted, while the 2014 fire restoration was a repair of a historic building, the current proposal is a rebuild of a historic building. Therefore, GCC Building Standards will expect a more comprehensive compliance with current regulations than was achievable in 2016. GCC Building Standards have stated, in conversation, they are likely to treat the reconstruction of the Mackintosh Building as if it were a 'new build' project, notwithstanding the reconstructed building incorporating retained and repaired elements from the original building's fabric and structure.

Data

- The building use type is an Assembly - Education Building, Risk Group 2B.
- Escape distances should not exceed 15m single direction and 32m two directions.
- The overall GIFA of the building when fully reinstated will be 7020m2
- The height from the entrances at Scott Street and Dalhousie Street to the second floor level is approximately 19.16m

The maximum occupancy allowed by the Technical Standards is 1066 (calculated based on occupancy load factors of: *Meeting Rooms 1.0, Exhibition Hall (Museum)1.5, Art Gallery/Workshop (Studios) 5.0, Kitchens and Library 7.0*. The actual occupancy is likely to be meaningfully lower if the building is used as a 'Postgraduate School,' due to the space allocations for students exceeding the load factors.

The maximum occupancies as determined by load factor by floor are:
Sub-Basement: 44, Basement: 374, Basement Mezzanine: 10, Ground Floor: 188 Ground Floor Mezzanine: 18, First Floor: 263, First Floor Mezzanine: 20, Library Balcony: 10, Furniture Store Level: 29, Second Floor: 110

Compliance with Buildings Standards / Regulations:

While the works will include dismantling of elements of the existing structure and further extensive repairs to the balance of the existing and retained fabric and structure, the works must comply as much as possible with current regulations/standards (1.1 Structure, 1.2 Disproportionate Collapse, 2.3 Structural Fire Engineering). SER certification is required for all work stages

Building Warrant Applications:

The application process with GCC Building Standards must be discussed and agreed between all key parties, including the scope and whether warrants are applied in stages or as separate applications, based on the reconstruction and re-occupation schedule

Temporary Works:

Temporary works (scaffolding, propping, temporary roofs) are generally not warrantable, unless they remain after contract completion, at which point they may require warrant approval.

Key Points Raised or Identified by Glasgow City Council Building Standards (GCCBS)

- The repair and stabilisation works will require a Building Warrant.
- A building warrant will be required for any permanent reinstatement or new build work.
- GCC have verbally commented that they would expect the reinstatement of the Mackintosh Building to comply with the current Technical Standards.
- GCC were fully supportive of the need to find design solutions that make the reinstatement compliant with current escape standards. They were supportive of the proposed introduction of concrete floors and a concrete fire shaft.



Relief sculpture at main entrance

Approach to Fire Strategy

Introduction

Context

The statutory requirements for fire safety within buildings have developed through many iterations since 1897. Between 1897, when the first phase of the building was completed and 1909 when the second phase was added, fire safety requirements within buildings had progressed significantly. This can be easily appreciated when viewing the current state of the building: ‘Fire Proof’ elements that were added in the second phase - the east and west concrete stairs, the concrete second floor slab that replaced the previous roof over the first floor studios, the sections of concrete floor slab in the western circulation corridors - are all still intact and largely survived both the first and second fires.

Scotland was the first country in the UK to implement National Building Regulations: published in 1963 and came into force in 1964. In 1972 a survey of the Mackintosh building was carried out by Keppie Henderson, and a programme of refurbishment commenced. According to the author of the survey report - this was ‘a more intensive continuation’ of work that had been going on for some years, which had already led to the introduction of fire doors in the corridors and the construction of balconies in some of the studios. Dean of Guild Records from pre 1975 may shed more light on the exact nature of the changes implemented. In 1987 a Warrant Application was made to upgrade one of the fire escape stairs.

The Fire (Scotland) Act 2005 - imposed requirements on individuals, businesses, landlords, and public authorities to comply with fire safety standards. The requirements include conducting fire risk assessments, implementing fire safety measures such as fire detection and alarm systems, emergency lighting, and fire extinguishers, developing and maintaining emergency evacuation plans, and providing fire safety training to staff or occupants.

In 2006 the GSA commissioned FEDRA to produce a fire report which made numerous observations and recommendations noted in the production of this report. The report proposed two strategies – One with a sprinkler system and one without. In a further feasibility study report in 2008 FEDRA concluded that a mist fire suppression system should be installed

In 2013 a Planning and Listed Building Consent Application was made by Page and Park on behalf of the GSA to install a comprehensive sprinkler system. The fire suppression system was not completed or active at the time of the 2014 fire. After the fire in 2014, Page/Park architects were commissioned to design the repairs to the building. Atelier 10 fire engineers were also appointed, and a comprehensive fire strategy design was developed.

Both the 2014 and 2018 fires have been extensively investigated and reported on by the Scottish Fire and Rescue Service and discussed by the Culture, Tourism, Europe and External Affairs Committee on 17 January 2019.

Overview

In summary the Mackintosh Building suffered extensive damage to its western side during a fire in May 2014. The SFRS Fire Investigation Report into the 2014 fire noted: *‘The fire originated in the vicinity of a projector and an artwork constructed of highly flammable expanding foam which was located in the student display area of studio 19 in the basement in the west side of the building,’* and that; *‘The fire spread rapidly due to ducted voids running both horizontally and vertically through the building from the basement to the roof.’* and *‘No water sprinkler or other extinguishing system was installed. A sprinkler system was being installed and was in the latter stages of completion however it was not operational.’*

During the construction project to restore the building, a second fire occurred starting on the evening of 15 June 2018, approximately one year before the construction works were due to be completed. The SFRS Fire Investigation Report into the 2018 fire noted: *‘The fire was first seen in a duct at Level 4 at the east end of the building. By midnight a member of the Scottish Fire and Rescue Service noted that the building was ‘50% alight from the basement to the roof.’* By midday on the 18th June, when the SFRS sent a “Stop” message about the fire, the Mackintosh Building had suffered severe damage to both the structure and interior.

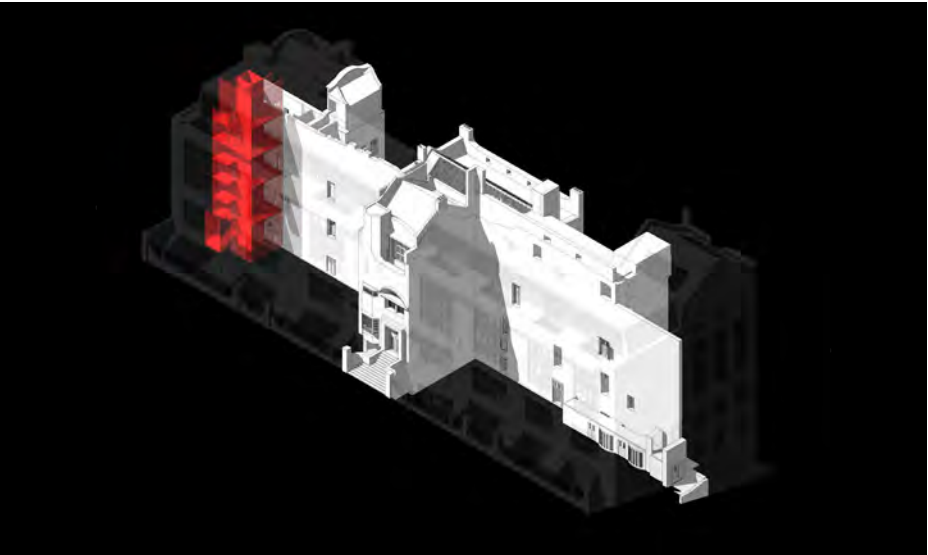
The report also noted: *‘Major contributory factors for the fire spreading in a rapid and uncontrolled way, were attributed to the compromised compartmentation and separation’ and, open brick and timber lined ducts running vertically and horizontally throughout the building. The construction, layout and high fire loading allowed the fire to spread unchecked from the area of origin in all directions.’*

The SFRS 2018 report commented that buildings are particularly vulnerable to fire when under construction. It made recommendations for when construction work is underway in section 17 which are summarised as follows:

- *Management teams responsible for delivery of construction or renovation projects, should ensure that, during the early planning stages of the project, they fully consider the risk of fire. When construction work commences a comprehensive Fire Risk Assessment should be undertaken by a competent person and mitigating actions and control measures should be implemented.*
- *Specific fire safety training should be delivered to all construction site staff.*
- *When buildings under construction reach a vulnerable condition, consideration should be given to provision of a comprehensive Fire Warning System.*
- *Passive and active fire safety measures to protect a building should, where practicable, be introduced as soon as possible during the construction phase, to provide compartmentation and separation, and reduce fire growth.*
- *Consideration should be given to creating improved relationships and information exchange between Enforcing Authorities through a new forum.*



2018 Fire



Potential location for new fire shaft

Approach to Fire Strategy

The Culture, Tourism, Europe and External Affairs Committee’s report, The Glasgow School of Art Mackintosh Building: The loss of a national treasure, was published in March 2019, and amongst numerous recommendations noted that Historic Environment Scotland should update guidance to reflect the need for improved compartmentation during construction of historic buildings. The Report was also critical of reliance on the installation of the mist system without carrying out ongoing work on fire stopping and compartmentation.

Analysis of the possibility of reinstating the 1909 Scheme

Modern statutory and regulatory requirements mean that the Mackintosh Building cannot be rebuilt to the exact form and detail of the 1909 construction. The reinstated building must be healthy, safe, and accessible for use by students, staff, and visitors, and cognisant of modern building regulations including fire safety, thermal performance, energy use, and inclusive access.

As a part of the Addendum to the SOBC update, an analysis of the original plans, in relation to contemporary standards and regulations has been undertaken. As expected in any analysis of a historic building, numerous non-compliances were found. These reflect the building’s adherence to the regulations of its time, not current standards. Building regulations apply at the time when building work is taking place, and there is no requirement to retrofit existing buildings to comply with updated building regulations. When a building is being altered or upgraded, current building regulations may apply, but they must be considered in conjunction with legislation which protects historic listed buildings. Applying standard fire safety measures to historic buildings can sometimes compromise their architectural integrity or heritage significance. Therefore, exemptions or alternative measures may be permitted.

Therefore, our analysis of the 1909 design does not imply the building was non-compliant before the 2014 and 2018 fires. Rather, it shows that an exact replica built today would not meet current regulations and technical standards which a new building must meet.

Proposed fire strategy for the full reinstatement of the Mackintosh

The overall principle of the proposed fire strategy approach at the Mackintosh Building is to achieve the current guidance in the Technical Handbook Section 2: Fire, as much as is reasonably possible having consideration to the limitations of the site and the briefing requirement to restore the building to its original condition.

The requirements to meet compliance will adopt many of the proposals recommended during the 2016 project but will build on them to address the need to fully comply with the regulations due to the project now being a reinstatement of a building rather than an upgrading of an existing building.

Compliance measures will include:

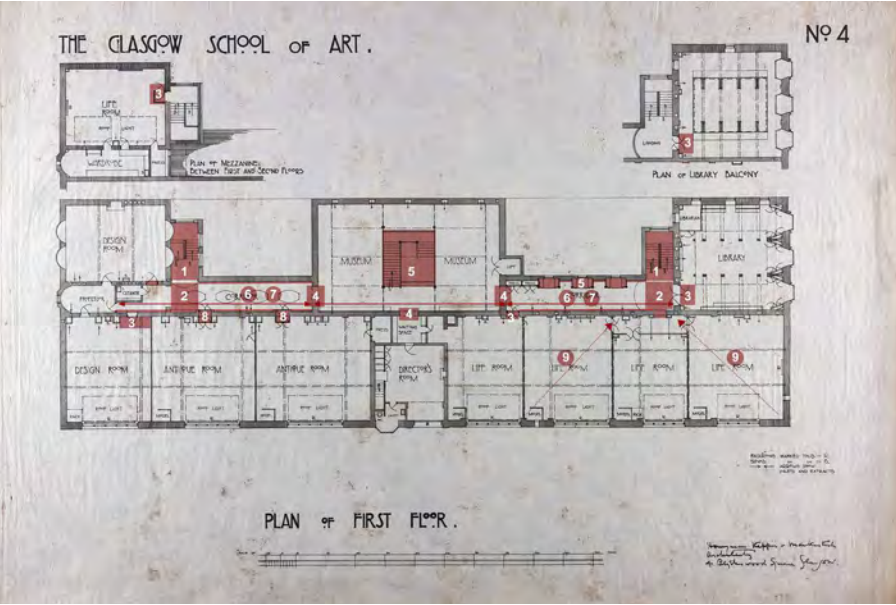
- Enhancing the existing compartmentation, predominantly through the upgrading of wall constructions to achieve 1hr fire resistance and through the introduction of concrete floors throughout.
- Putting in place a comprehensive provision for fire stopping and cavity barriers in the building.
- Providing an L1 fire alarm coverage with voice alarm in the building for the earliest warning of fire outbreak.
- Providing automatic smoke and heat exhaust ventilation systems to provide a path for the smoke to be exhausted out the building.
- Providing an automatic fire suppression system.
- Introduction of intumescent coatings to timber linings
- Provision of lobbies and or protected zones to stairs.
- Reduction of extended escape distances where possible

Expanded compliance measures will include:

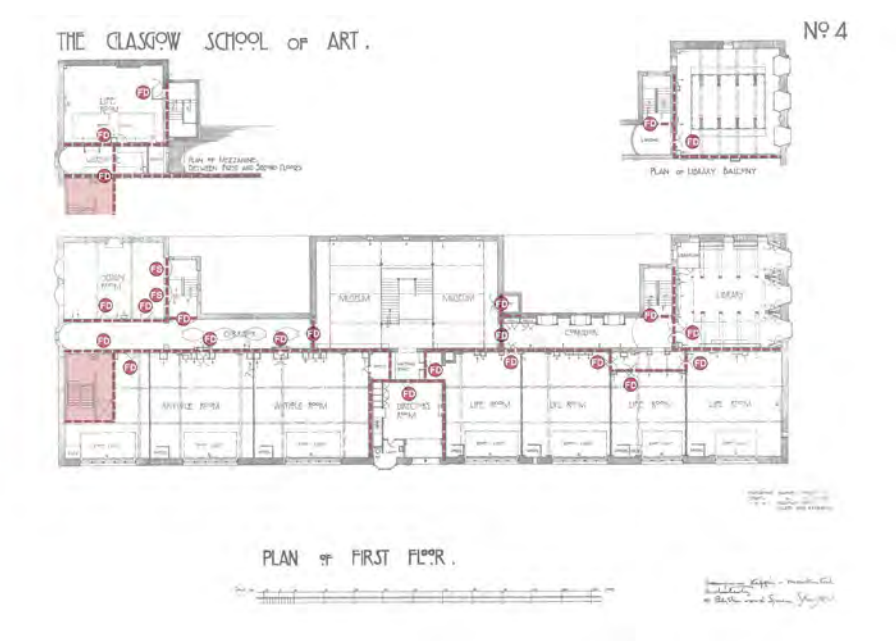
- Concrete Floors:**
As evidenced by the remaining concrete fabric of the building after the 2018 fire - the east and west stairs, concrete slabs at the second floor and some sections of the west wing corridor floor survived - the use of concrete as a fire resistant material is a proven technology. The need to rebuild all of the floors in the building enables the introduction of fireproof concrete floors throughout, creating floor by floor compartmentation.
- Fire Shaft:**
In new buildings, with a storey height of more than 18m the Scottish Technical Standards require the installation of a firefighting stair, lift, riser and lobbies. The shaft should be easily accessed from pavement/roadside.

A potential location for a firefighting shaft has been identified at the eastern end of the plan. The addition of a new stair in conjunction with the other stairs would also enable a higher level of occupants to use the building whilst providing three escape routes from the second floor.

The introduction of concrete floors and a firefighting shaft were positively responded to by Building Control in discussions held on 17 December 2024, and together with the compliance measures proposed during the 2016 project will form a comprehensive fire safety strategy.



1909 Plan showing areas of non-compliance with current Technical Standards



1909 Plan with proposals for fire strategy improvements

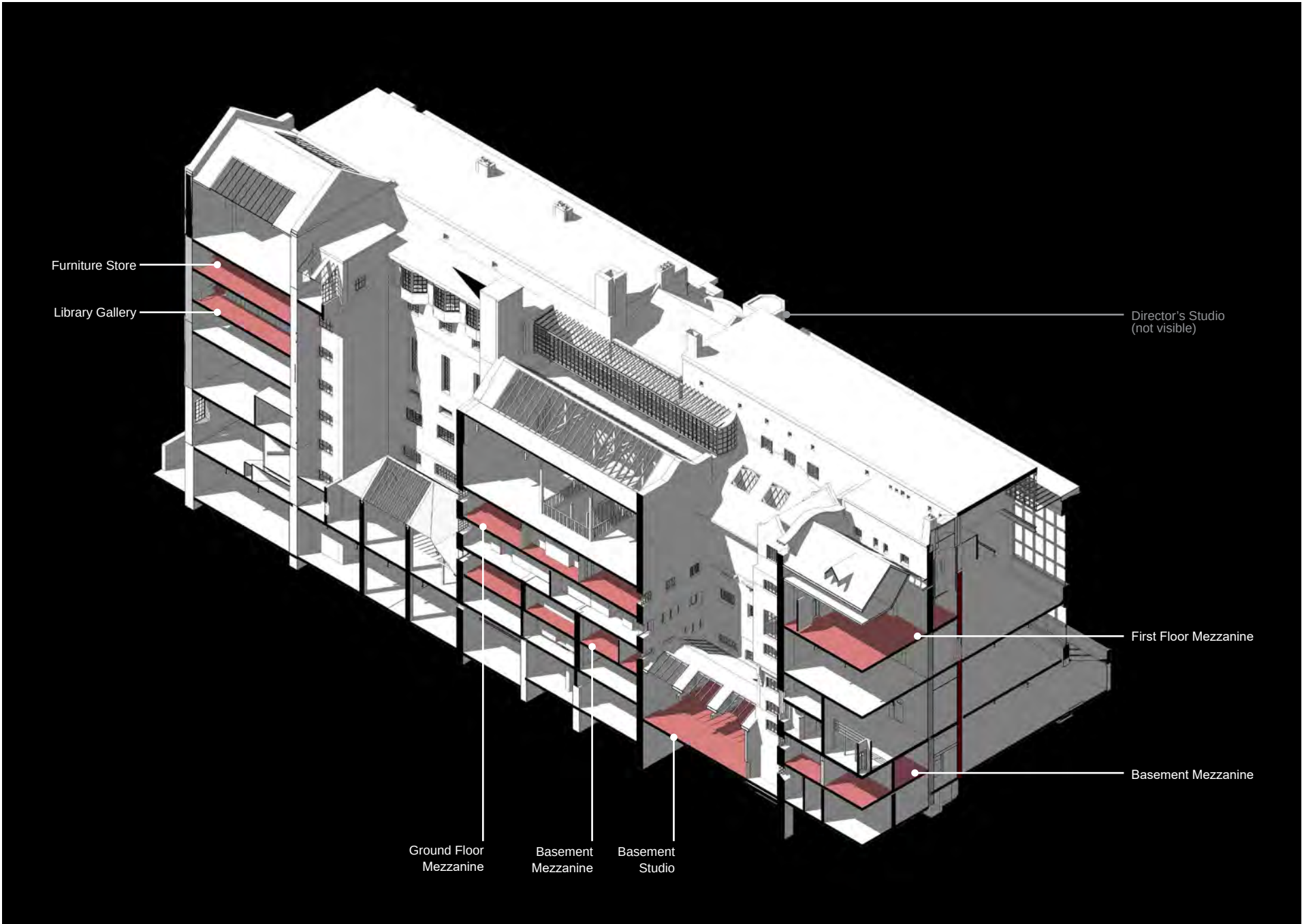
Approach to Accessibility

Historically Inaccessible Spaces

Improving accessibility to the Mackintosh building is key to the success of the reoccupied building, as well as being a regulatory requirement of the rebuild. The main entrance of the building is an inherent barrier to accessibility, with its sweeping flight of stairs. Once inside Mackintosh's design contains many mezzanines, with a total of 11 distinct levels. A single lift served only the primary floors, leaving many mezzanines inaccessible (highlighted on the diagram).

Statutory standards that should be complied with include:

- BS 8300: Part 1 and Part 2, 2018 – ‘Design of buildings and their approaches to meet the needs of disabled people – code of practice.’
- The Equality Act 2010
- The Scottish Technical Standards Mandatory Standards:
 - Standard 4.1: Access to Buildings - Every building must be designed and constructed in such a way that all occupants and visitors are provided with safe, convenient and unassisted means of access to the building.
 - Standard 4.2: Access within buildings: Every building must be designed and constructed in such a way that: in non-domestic buildings, safe, unassisted and convenient means of access is provided throughout the building.
- PAN 78: Planning and Building Standards Advice Note: Inclusive Design
- Guidance from Historic Environment Scotland (HES):
 - HES provide extensive advice on improving access to historic buildings:
 - Historic Environment Policy for Scotland 2019 notes: “the historic environment should be accessible and inclusive, providing a source of inspiration, enjoyment and learning for all.” and “*Changes to specific assets and their context should be managed in a way that protects the historic environment. Opportunities for enhancement should be identified where appropriate. If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be put in place.*”
 - Managing Change in the Historic Environment: Accessibility – updated 2022 notes:
 - 5. Where physical alterations are required, it is usually possible to achieve access improvements that are sensitive to the historic character of the building or place through high quality design, management and maintenance.
 - 2.3 ...With careful thought and planning, improved physical access to most elements of the historic environment can usually be achieved through reasonable adjustments without harming the character and appearance of the historic building or place.
 - 2.4 Ideally adjustments should seek to provide unassisted and dignified physical access for all.



Inaccessible mezzanine floors

Approach to Accessibility

Historically Inaccessible Spaces

These drawings highlight spaces of the building which do not have level access. The main barrier to accessibility, once inside the building, are the many intermediate levels that are often not connected to central circulation spaces served by the lift.

Accessibility Comments:

01 - Sub-Basement

Some storage rooms to the East of the sub-basement are not accessible, however these are not accessible to users of the building and are not considered an area of concern.

02 - Basement

The slab steps down at the East of the basement, lowering the floors in the caretaker's house and the anatomy studio by several steps.

03 - Basement Mezzanine

These mezzanine levels are only accessible by half-landings off the main and East stair, so have no access route via a lift.

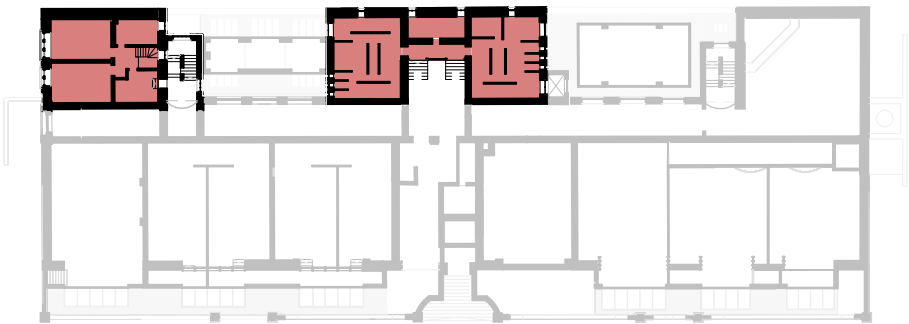
04 - Ground Floor

The ground floor has no large inaccessible spaces, as it is one of the primary levels served by the central lift.

05 - Ground Floor Mezzanine

The central mezzanine level is only accessible by the half-landing of the main stair, so has no access route via a lift. Similarly, the storage room above the boardroom is only accessible by stair. The headroom of this space is low enough that it should not be for general use.

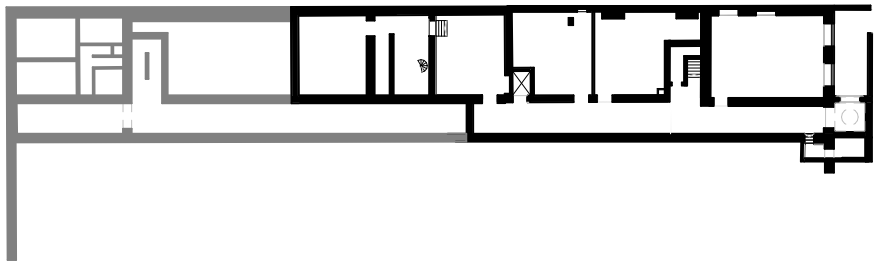
03 - Basement Mezzanine



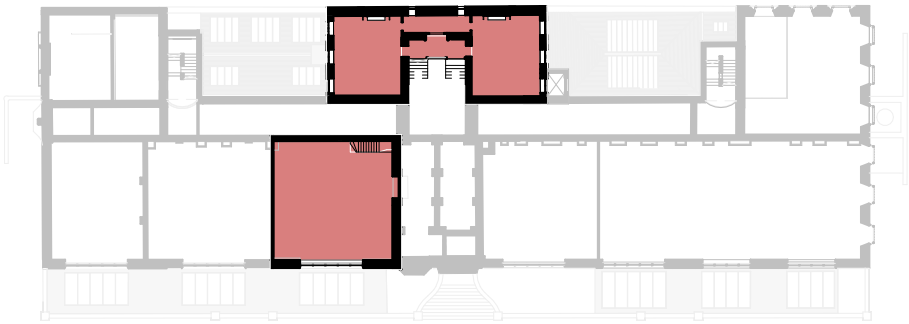
02 - Basement



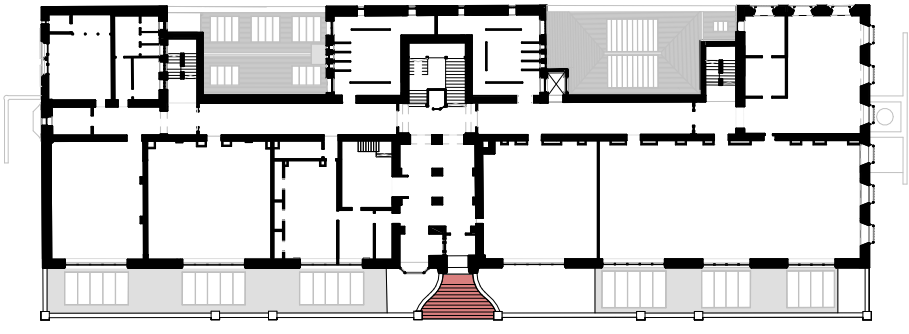
01 - Sub-Basement



05 - Ground Floor Mezzanine



04 - Ground Floor



Key:

 Areas without level access

Approach to Accessibility

Historically Inaccessible Spaces

These drawings highlight spaces of the building which do not have level access. The main barrier to accessibility, once inside the building, are the many intermediate levels that are often not connected to central circulation spaces served by the lift.

Accessibility Comments:

06 - First Floor

The first floor has no large inaccessible spaces, as it is one of the primary levels served by the central lift.

07 - Library Gallery above First Floor

The library gallery is only accessible via a landing on the West stair, with no connection to a lift. Additionally, the balcony itself becomes narrow near the windows, obstructing full access if a wheelchair user were to navigate this level as it was originally designed.

08 - First Floor Mezzanines

The East mezzanine level is only accessible by a half-landing of the East stair, so has no access route via a lift. The Director's studio is only served by its own narrow turnpike stair from the Director's office below.

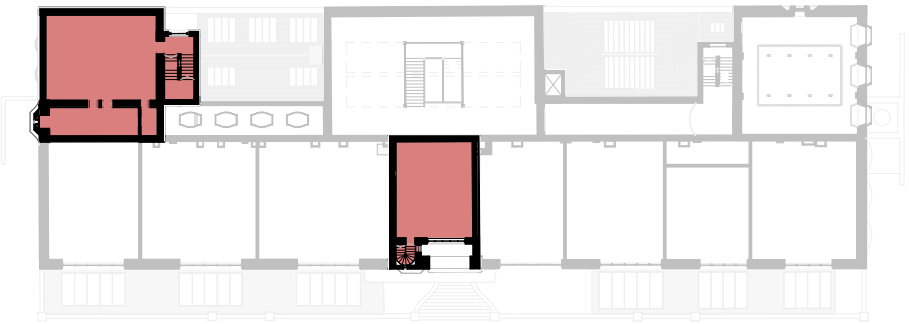
09 - Furniture Store Mezzanine

This mezzanine is accessible via the central lift.

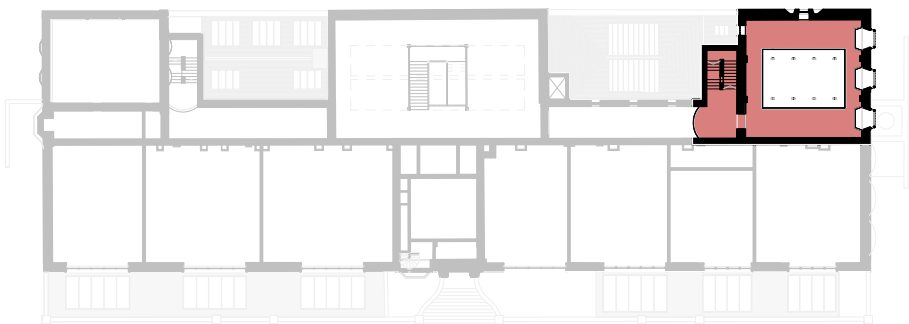
10 - Second Floor

The second floor has no large inaccessible spaces, as it is one of the primary levels served by the central lift.

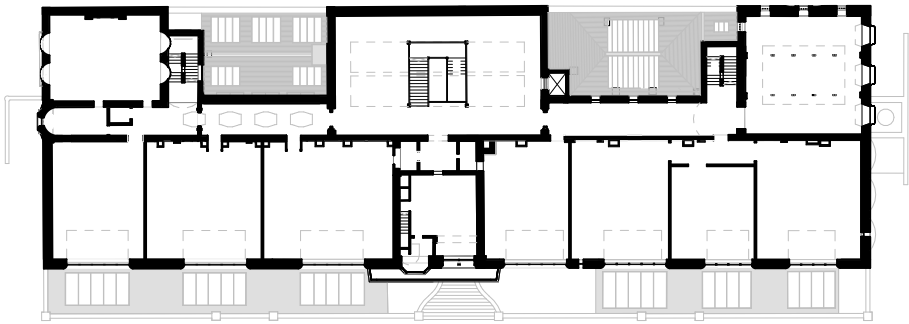
08 - First Floor Mezzanines



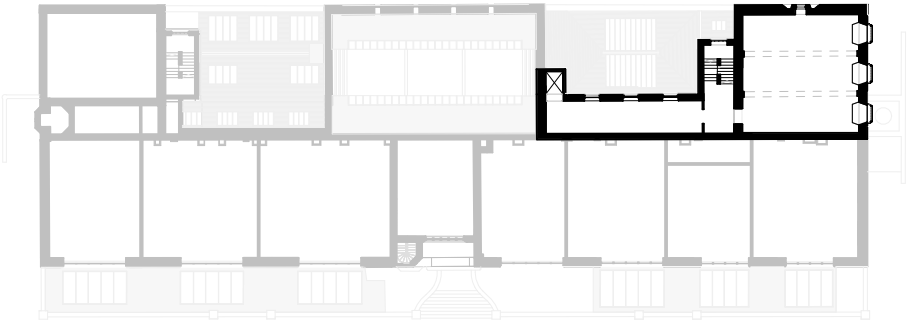
07 - Library Gallery above First Floor



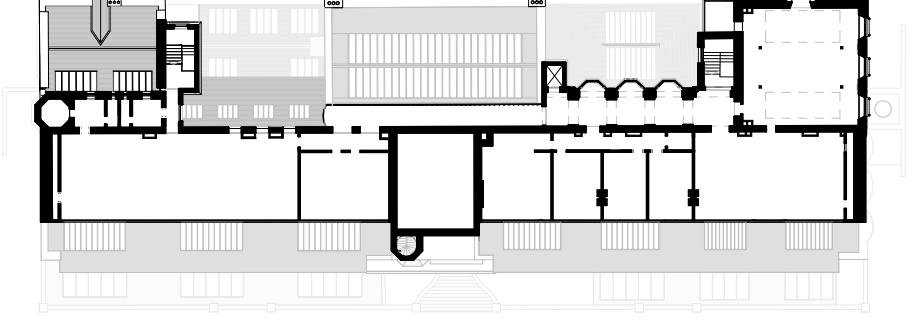
06 - First Floor



10 - Second Floor



09 - Furniture Store Mezzanine



Key:

 Areas without level access

Approach to Accessibility

Necessary Interventions

There are two main ways in which the original design does not satisfy modern requirements. Where inaccessible areas of the building have been identified, the following interventions are proposed:

Access within the Building: There are many mezzanine levels within the building that can only be accessed by way of stairs.

- 1. Adjustments to existing lift shaft
- 2. Adjustments to existing floor levels
- 3. New firefighting shaft

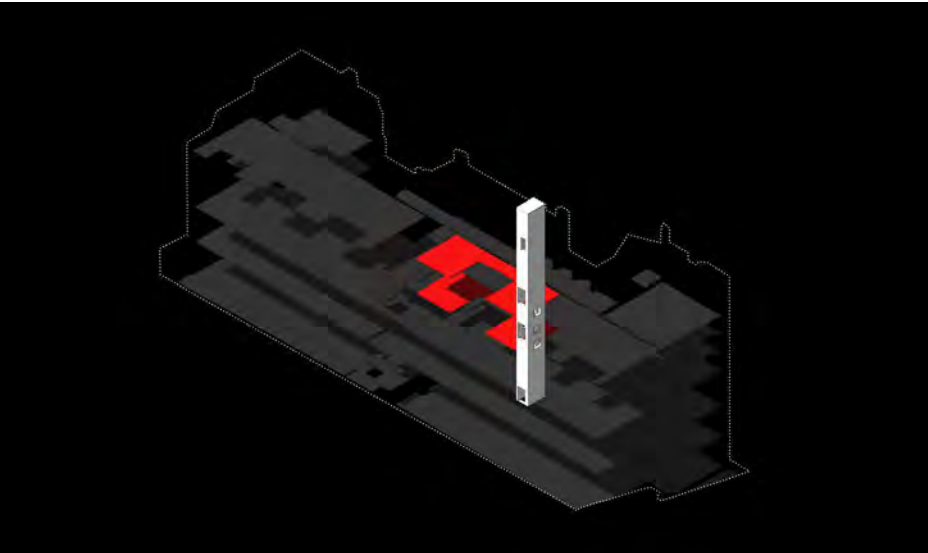
Entrances to the Building: The main physical barriers to easy and unassisted access are the flight of entrance stairs and lack of a landing at the front entrance, and the steep gradients of the pavements outside the basement entrances on Scott Street and Dalhousie Street.

- 4a. Platform lift at entrance
- 4b. Lift shaft at entrance

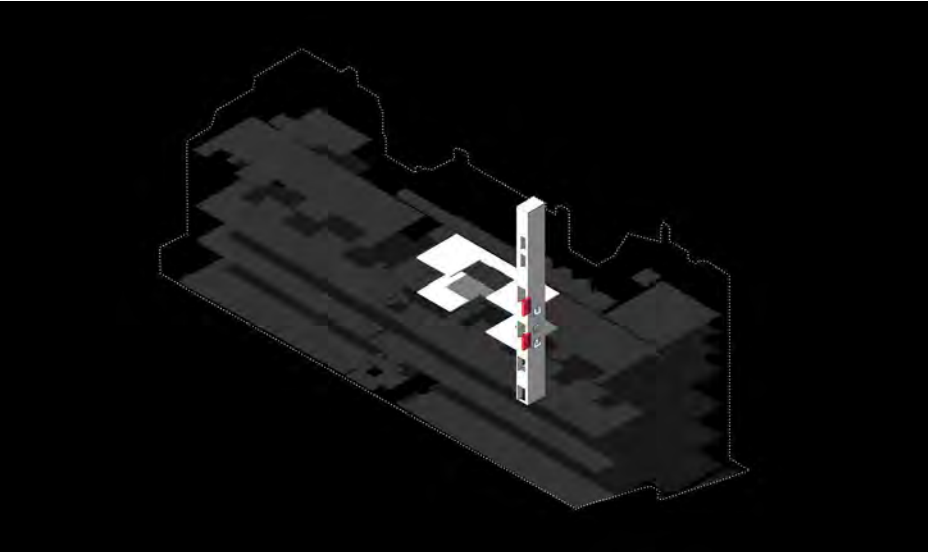
These studies have been undertaken to test the feasibility of the aspirations the GSA has set out. They are not resolved design proposals; however, their placement and form has been chosen to minimise impact to significant spaces while providing a practical, equitable user experience. Later stages of the reinstatement will involve further development of these ideas. At this this stage, these studies have allowed for preliminary costs to be attributed to the specific challenges of reinstating the building in an accessible way.

Accessibility Intervention 1 - *Adjustments to existing lift shaft*

The internal window cills at the basement and ground floor mezzanines are lowered to create new level access to both floors, enhancing accessibility.



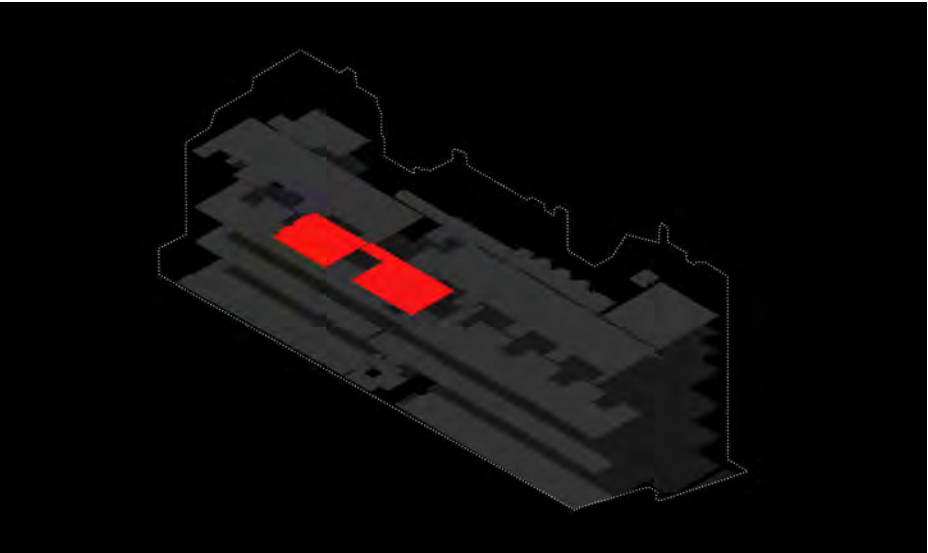
Both the basement and ground floor mezzanines were not accessible in 2014



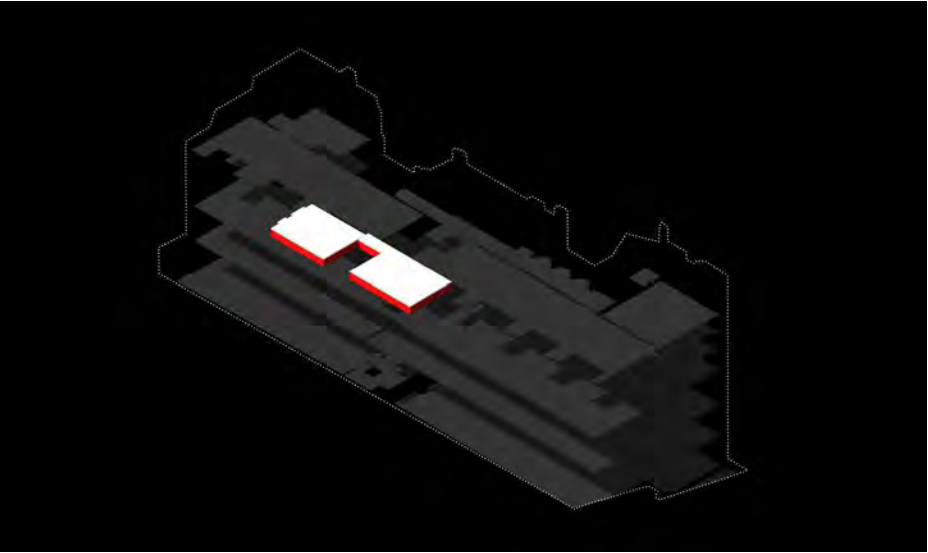
Lowering the internal window cills at basement and ground floor mezzanines create new level access from the existing lift shaft to both floors

Accessibility Intervention 2 - *Adjustments to existing floor levels*

Raising the lowered floor levels within the basement anatomy studio and caretaker's accommodation will enable level access into both spaces. It is anticipated that the caretaker's accommodation will not be reinstated and a new, larger studio space will be introduced in its place.



The basement anatomy studio and caretaker's accommodation were not accessible in 2014

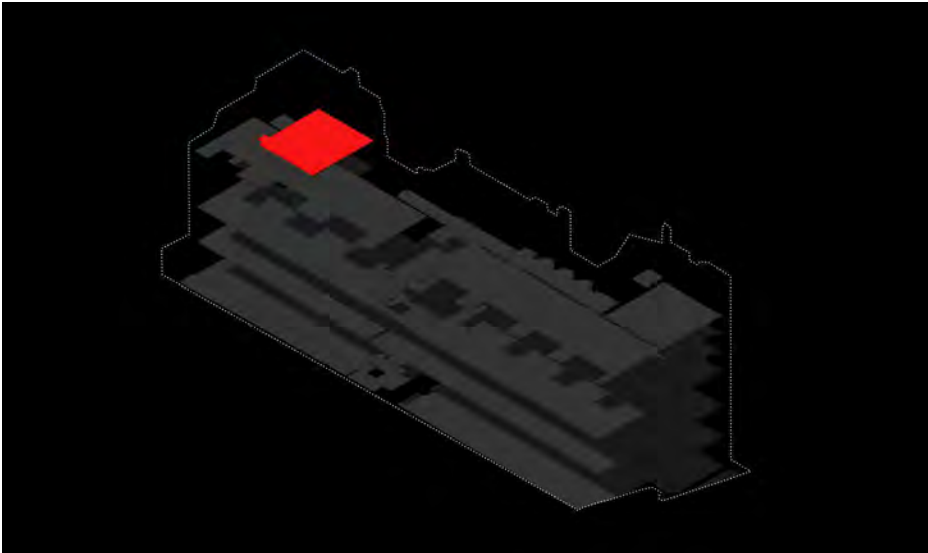


Raising the floor level will enable level access into both spaces

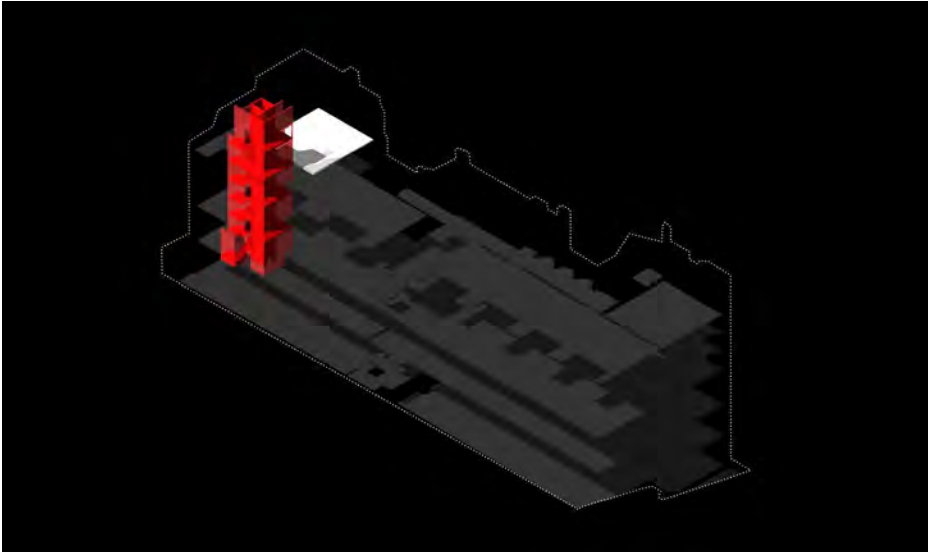
Approach to Accessibility

Accessibility Intervention 3 - *New firefighting shaft*

A new firefighting shaft is to be incorporated as an additional means of egress. The integration of a firefighting lift will provide level access to the top-lit studio on the first-floor mezzanine.



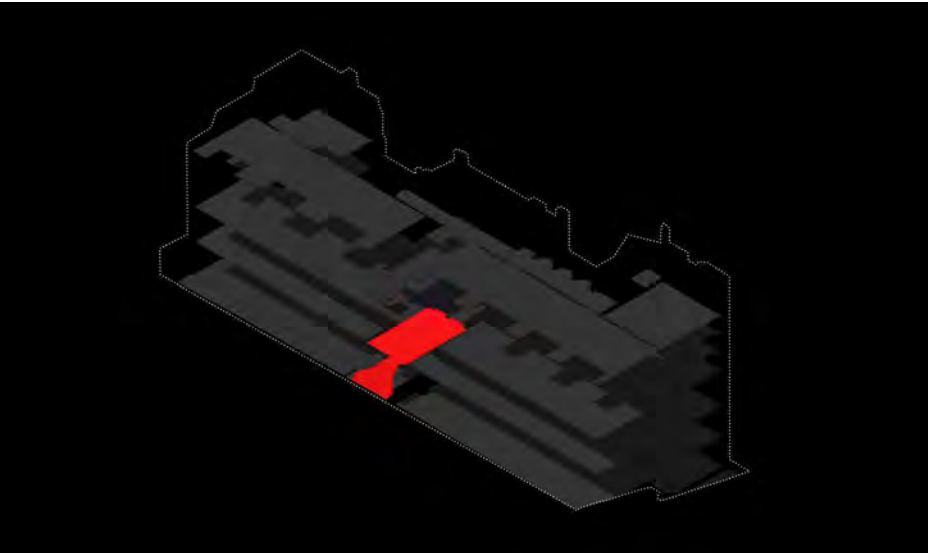
The top-lit studio on the first floor mezzanine was not accessible in 2014



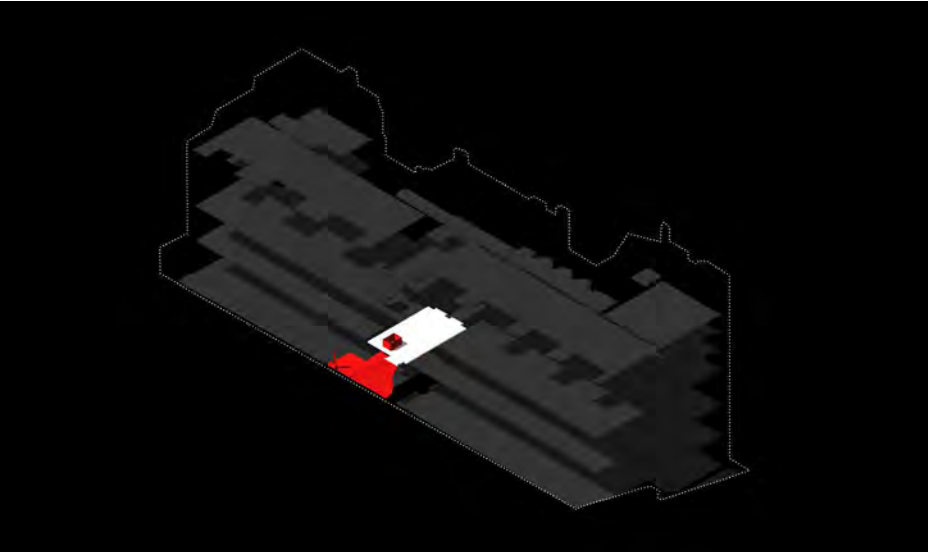
The addition of a firefighting lift will provide level access

Accessibility Intervention 4a - *Platform lift at entrance*

This design incorporates a discreet pivot gate within the existing railings and stone wall, ensuring a sensitive approach that preserves the original decorative metalwork. A ramp from Renfrew Street, with a gradient not exceeding 1:15, provides access to the basement mezzanine of the Mackintosh Building, leading to a platform lift. The lift offers direct access to the entrance lobby, adjacent to the main entrance doors, where the reception desk was formerly located.



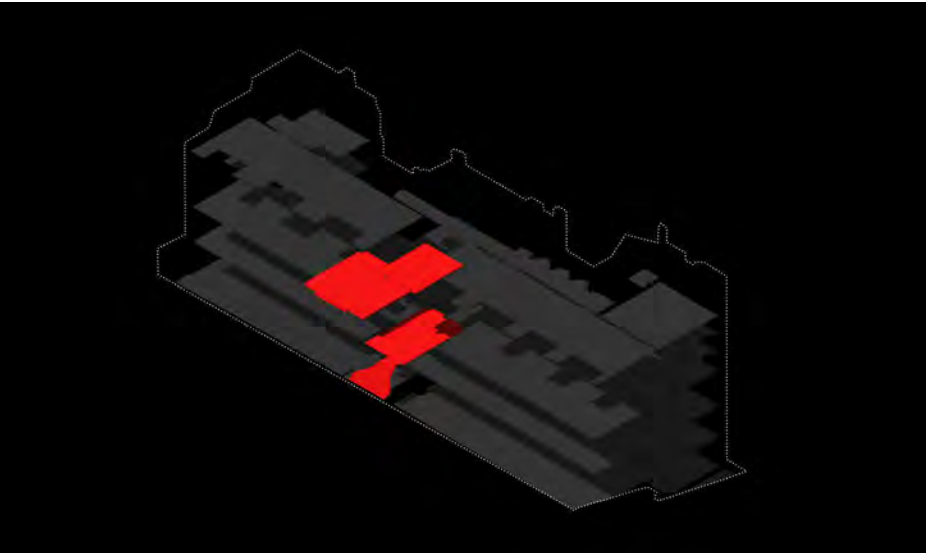
In 2014 the main entrance stair from Renfrew Street was not accessible



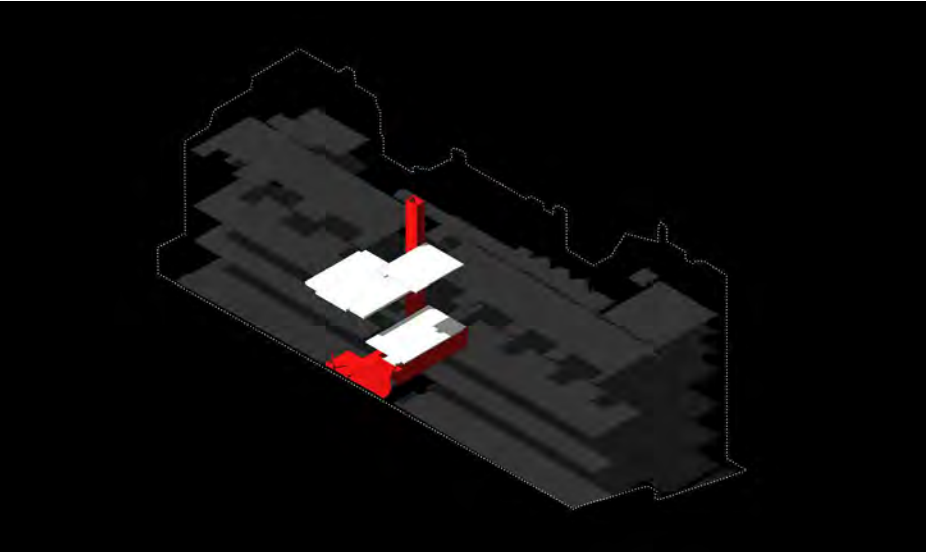
The addition of a gate leading from Renfrew Street, a ramp and platform lift provide new level access into the main entrance

Accessibility Intervention 4b - *Lift shaft at entrance*

This design integrates a discreet pivot gate within the existing railings and stone wall, ensuring careful preservation of the original decorative metalwork. A gentle slope from Renfrew Street (with a gradient of approximately 1:42) leads to the basement mezzanine of the Mackintosh Building, where a new lift provides vertical access to the entrance lobby and connectivity to the upper floors, including the previously inaccessible ground floor mezzanine and Director's Studio.



In 2014 the main entrance, ground floor mezzanine and Director's Studio were not accessible



The addition of a gate leading from Renfrew Street, a gentle slope and new lift provide level access into the main entrance, ground floor mezzanine and Director's Studio

Approach to Accessibility: Entrance

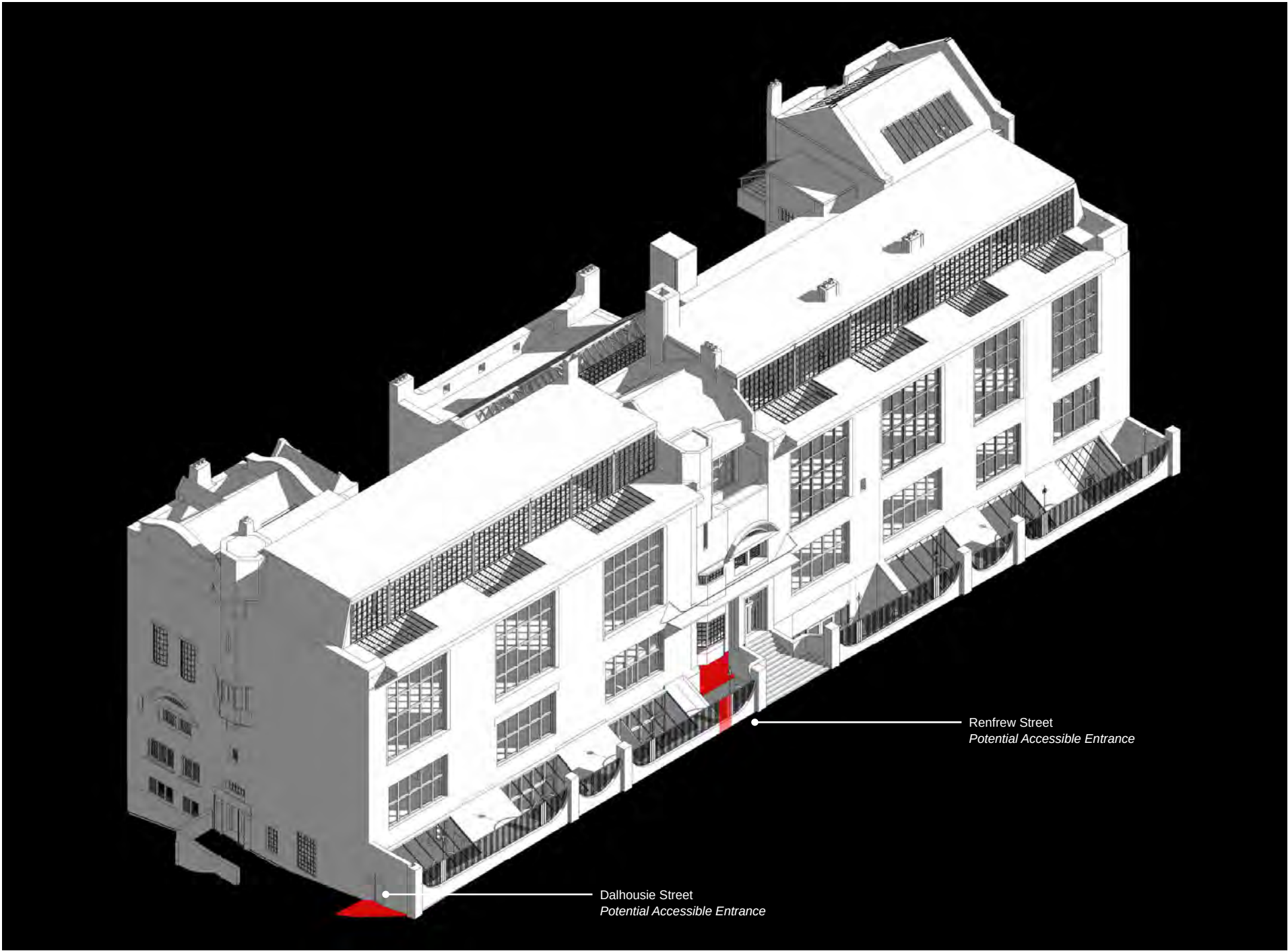
Two opportunities have been identified where, with skillful design, reasonable adjustments could be made to the building to improve access from the street while protecting the original design intent. The most inclusive and equitable solution would be the one which sees level access incorporated closest to the main entrance. The following pages contain two design exercises that test the feasibility of this.



Potential location for intervention to allow level access, on Dalhousie Street



Potential location for intervention to allow level access, adjacent to the main entrance on Renfrew Street



Feasible entrance locations

Approach to Accessibility: Entrance

Entrance Study A

This design incorporates a discreet pivot gate within the existing railings and stone wall, ensuring a sensitive approach that preserves the original decorative metalwork. A ramp from Renfrew Street, with a gradient not exceeding 1:15, provides access to the basement mezzanine of the Mackintosh Building, leading to a platform lift. The lift offers direct access to the entrance lobby, adjacent to the main entrance doors, where the reception desk was formerly located.

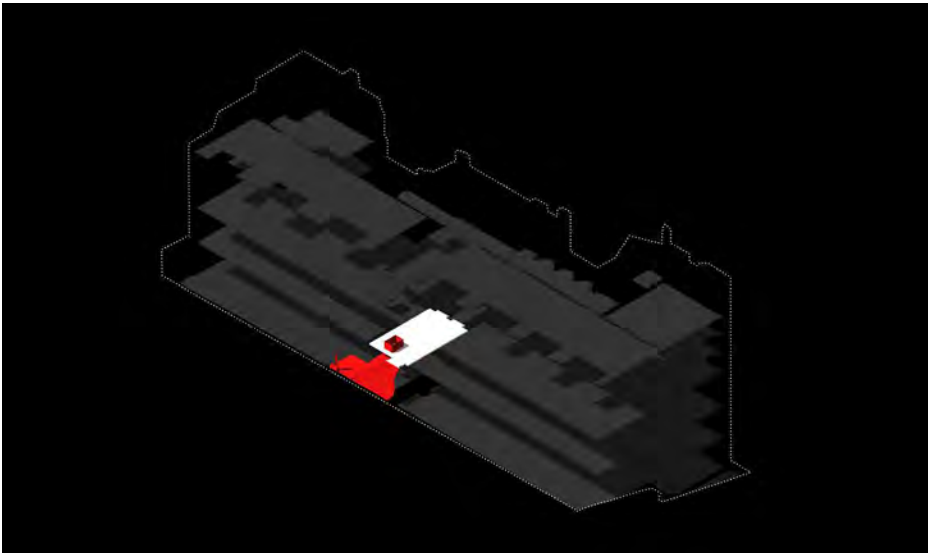
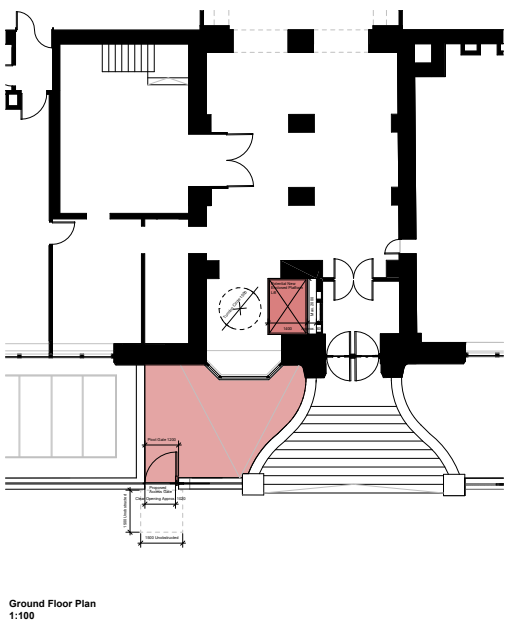
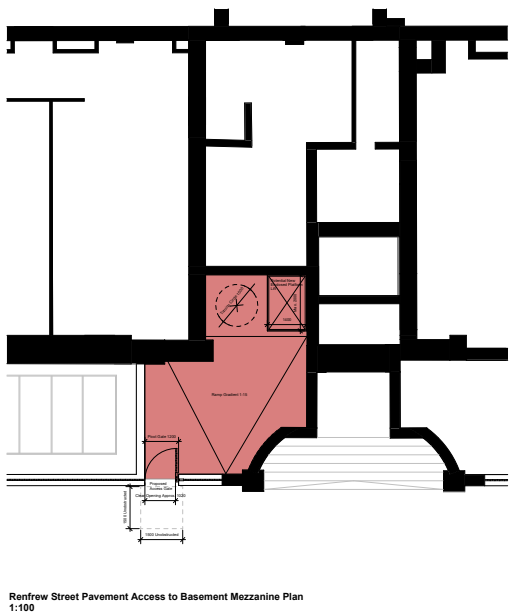
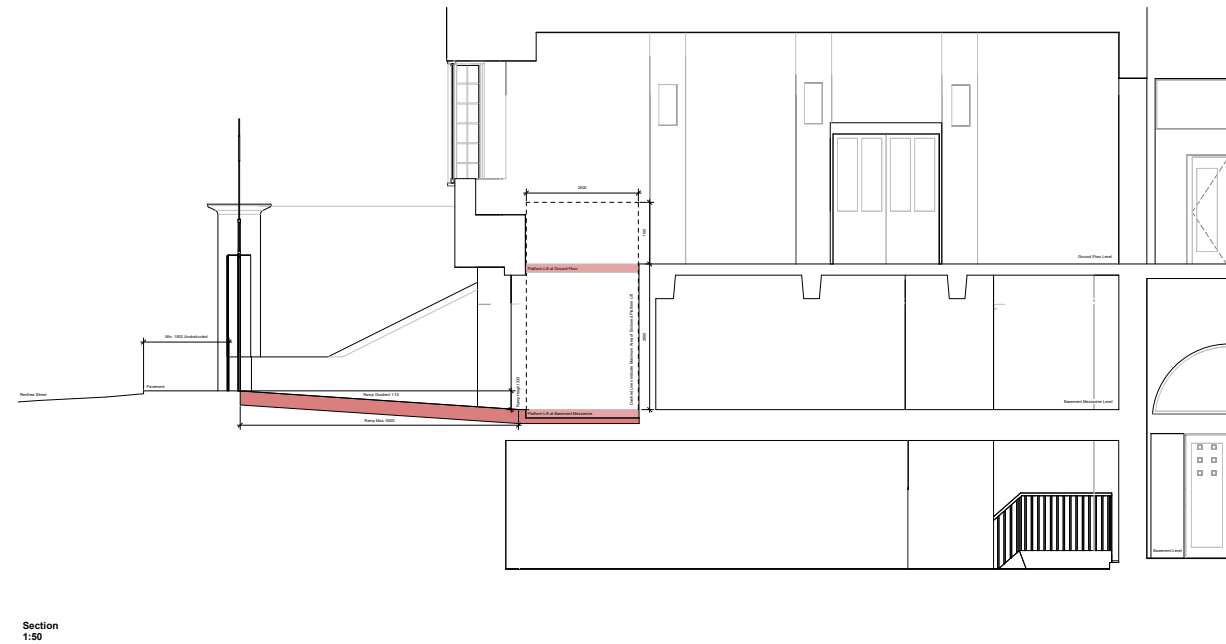


Diagram showing potential location of gate, ramp and platform lift



Approach to Accessibility: Entrance

Entrance Study B

This design integrates a discreet pivot gate within the existing railings and stone wall, ensuring careful preservation of the original decorative metalwork. A gentle slope from Renfrew Street (with a gradient of approximately 1:42) leads to the basement mezzanine of the Mackintosh Building, where a new lift provides vertical access to the entrance lobby and connectivity to the upper floors, including the previously inaccessible ground floor mezzanine and Director's Studio.

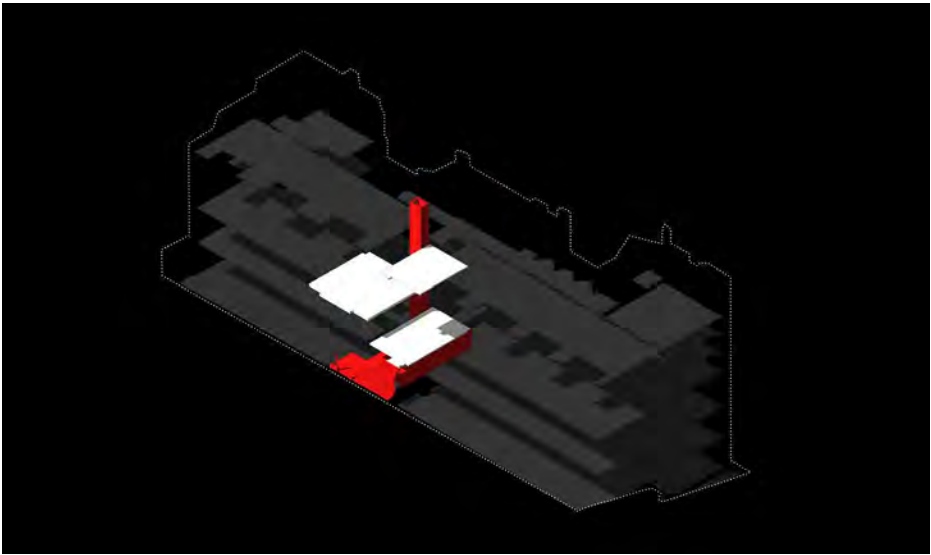
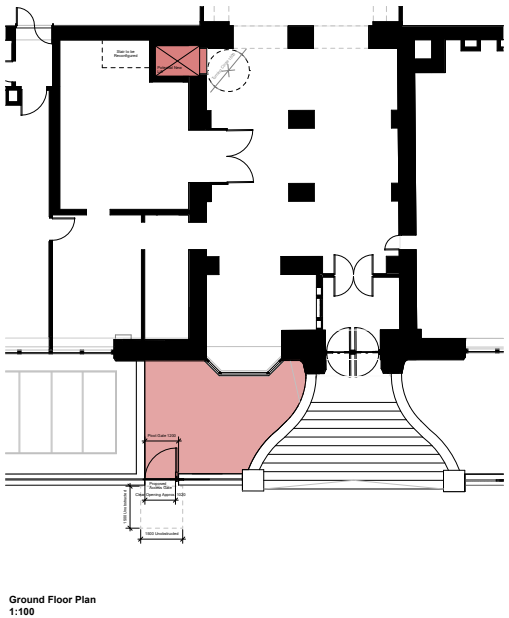
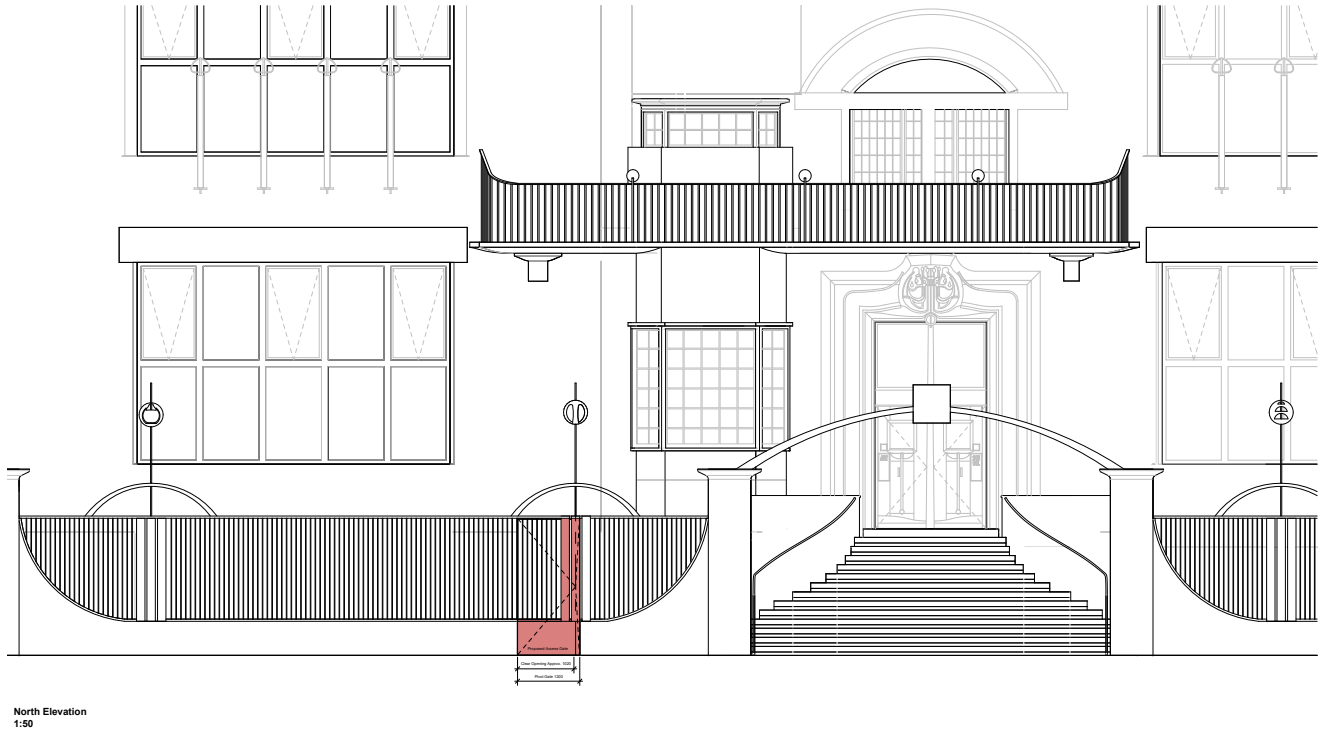
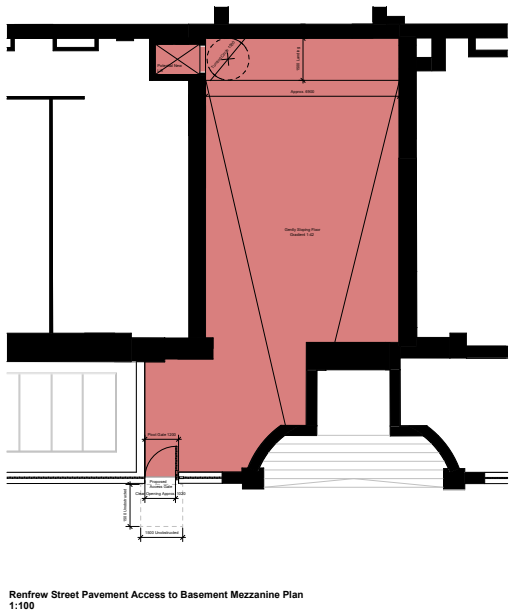
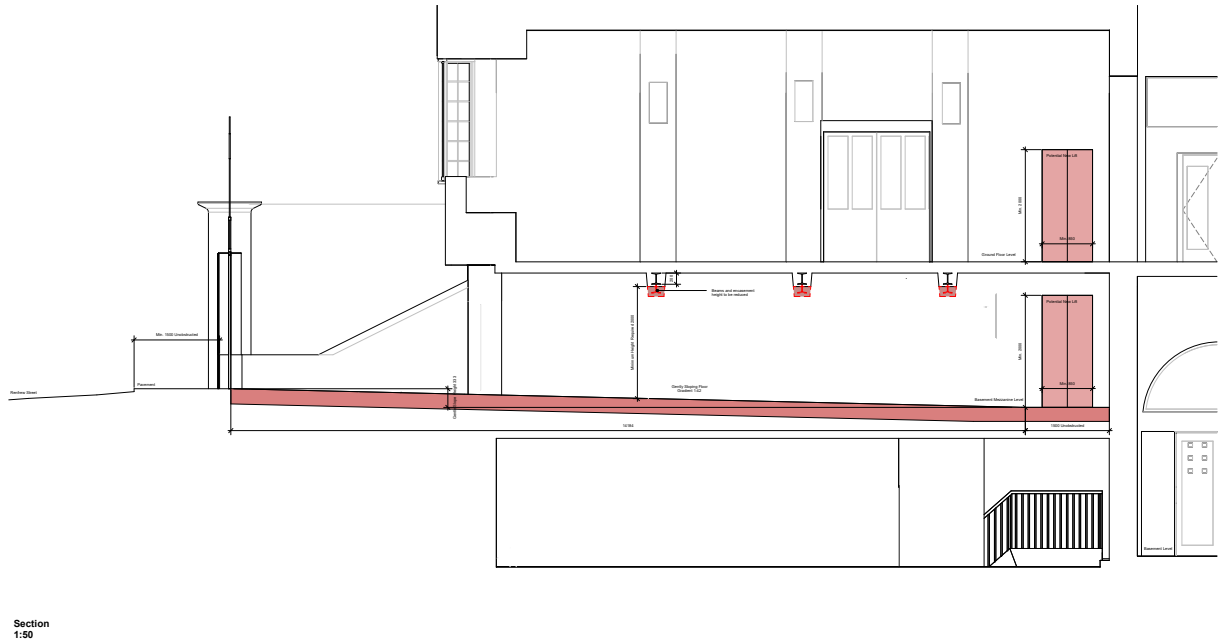


Diagram showing potential location of gate, gentle slope, lift shaft and access to additional floors



Approach to Accessibility

Accessibility Interventions

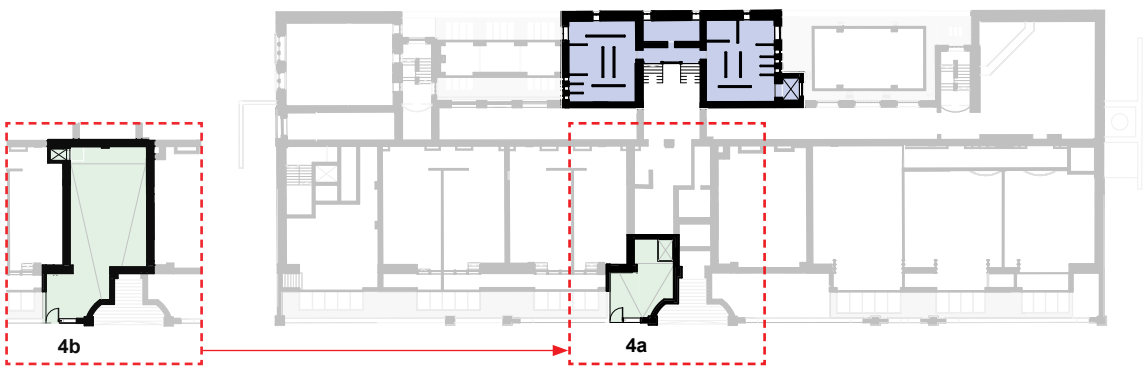
These plan drawings show the areas of the building now made accessible by the various interventions tested on the previous pages.

Different colours mark the groups of spaces made accessible by each separate intervention.

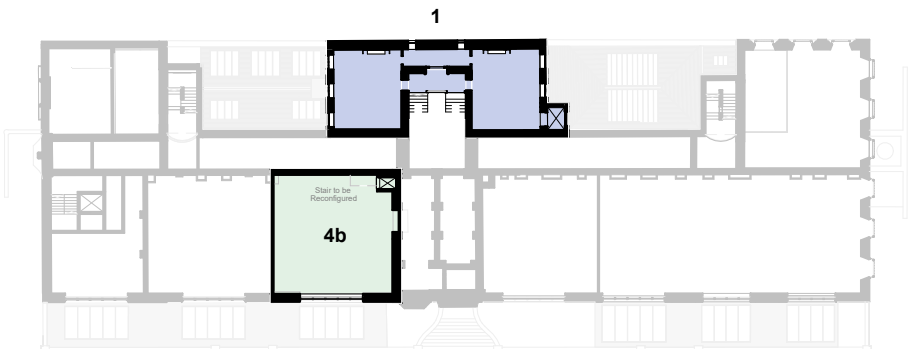
KEY:

- 1. Existing Lift Shaft Modifications**
Window cills dropped at Basement Mezzanine and Ground Floor Mezzanine, forming new level access to:
- Basement Mezzanine
- Ground Floor Mezzanine
- 2. Floor Level Adjustments**
Raise floor level within Basement Anatomy Room and Caretaker's House, forming new level access studios:
- Anatomy Room
- New Studio
- 3. New Fire Fighting Shaft**
Install new fire fighting shaft required as a additional escape route, forming new level access to:
- First Floor Mezzanine
- 4a. Access from Renfrew Street**
New ramp and platform lift leading from Renfrew Street to Basement Mezzanine, forming new level access to:
- Ground Floor Reception
- 4b. Access from Renfrew Street & New Lift Shaft**
New gentle slope and lift from Renfrew Street to Basement Mezzanine forming new level access to:
- Ground Floor Reception
- Ground Floor Mezzanine
- Directors Studio
- 5. Library Balcony**
The Library Balcony remains accessible by stair only

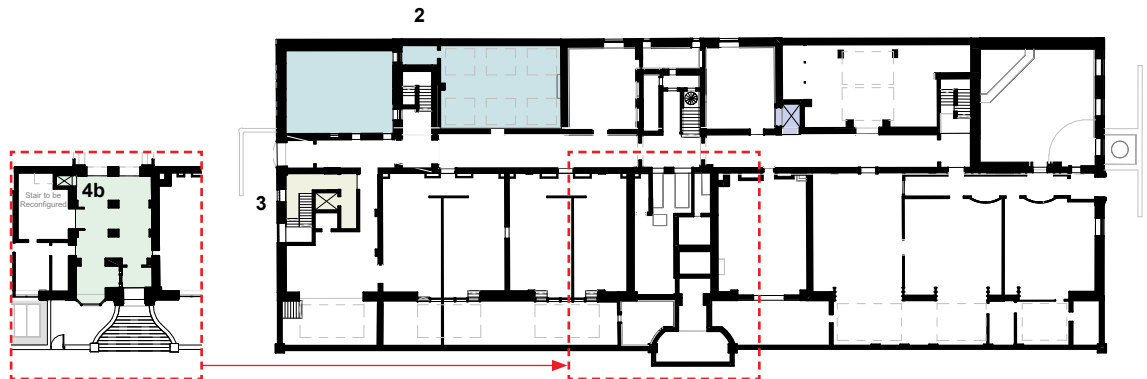
03 - Basement Mezzanine



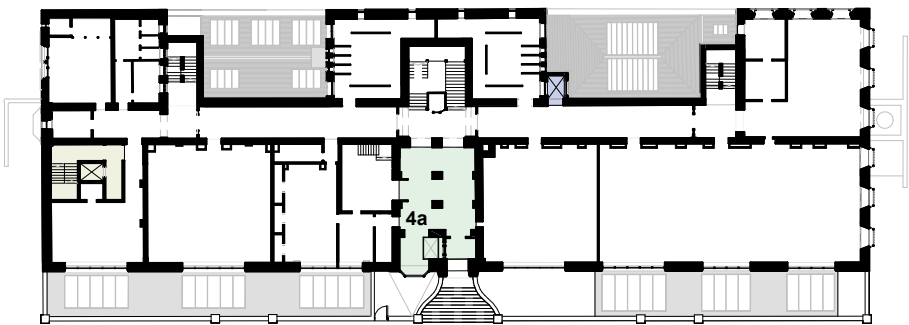
05 - Ground Floor Mezzanine



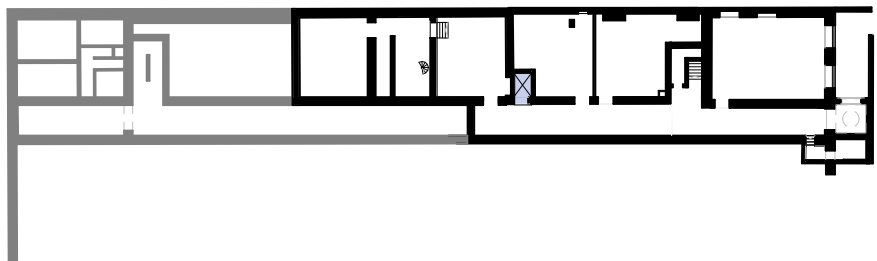
02 - Basement



04 - Ground Floor



01 - Sub-Basement



Approach to Accessibility

Accessibility Interventions

These plan drawings show the areas of the building now made accessible by the various interventions tested on the previous pages.

Different colours mark the groups of spaces made accessible by each separate intervention.

KEY:

- 1. Existing Lift Shaft Modifications**
Window cills dropped at Basement Mezzanine and Ground Floor Mezzanine, forming new level access to:
- Basement Mezzanine
- Ground Floor Mezzanine
- 2. Floor Level Adjustments**
Raise floor level within Basement Anatomy Room and Caretaker's House, forming new level access studios:
- Anatomy Room
- New Studio
- 3. New Fire Fighting Shaft**
Install new fire fighting shaft required as a additional escape route, forming new level access to:
- First Floor Mezzanine
- 4a. Access from Renfrew Street**
New ramp and platform lift leading from Renfrew Street to Basement Mezzanine, forming new level access to:
- Ground Floor Reception

or

4b. Access from Renfrew Street & New Lift Shaft
New gentle slope and lift from Renfrew Street to Basement Mezzanine forming new level access to:
- Ground Floor Reception
- Ground Floor Mezzanine
- Directors Studio

5. Library Balcony
The Library Balcony remains accessible by stair only
- 08 - First Floor Mezzanines
-
- 10 - Second Floor
-
- 07 - Library Gallery above First Floor
-
- 09 - Furniture Store Mezzanine
-
- 06 - First Floor
-
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Approach to Sustainability

Introduction

This section describes the approach to ensuring that the Faithful Reinstatement meets modern sustainability standards as far as is reasonably possible.

Previous Proposals

In summary, the 2021 SOBC proposed:

- An ‘exemplary’ rebuild that will be an ‘educator.’ Sustainability principles will be integrated into every aspect of development and delivery, making them core values.
- The project aims to provide good value for money while challenging traditional approaches to historic buildings, with building performance and user satisfaction as key indicators.
- A high-level objective will be to track progress against the United Nations Sustainability Development Goals (UNSDG) through setting targets and measuring benefits at the project level and the societal beneficiary level.
- A high-level outcome reporting matrix will be used and this will include assessing and tracking the relevant UNSDG to both The GSA and all segments of the wider community of interest.
- KPIs will be developed and measured across the main elements in the indicative diagram as a collective client, funder and design team exercise
- A ‘Fabric First’ approach should be adopted in terms of the design and specification of the reinstatement.
- The building project should aim to be net-zero greenhouse gas emission in both its material design and delivery as well as its operation and seek to adopt renewable energy solutions wherever possible.
- The principles and approach of the Passive Haus EnerPHit standard will largely be followed for fabric performance improvements, however the stringent fabric performance metrics of the voluntary standards (ie. for Space Heating Demand, OET/EUI) will not be targeted due to the extremely constrained nature of the development.
- The building can be designed to have an annual target heating and cooling demand of not more than c60 kWh/m2 per year in heating or energy. Total primary energy consumption (primary energy for heating, hot water and electricity) must not be more than c60 kWh/m2) per year.
- After rebuild the building must not leak more air than 1.0 times the building volume per hour.
- The project team will target BREEAM Outstanding.
- The project will target the Well Standard as an option for delivery before RIBA Stage 1.
- A soft Landings process should be adopted along with Post Occupancy Evaluation.

Changes in Approach

Generally, the sustainability principles stated in the 2021 SOBC Report remain relevant and appropriate to the project. Specific approaches that have changed since 2021 are: The project will no longer target achieving BREEAM Outstanding or the Passive House EnerPHit standard as requirements. While EnerPHit and BREEAM Outstanding are achievable in historic retrofit/rebuild projects, they may not be fully appropriate to the Mackintosh Building where achieving all the necessary criteria could conflict with the historical significance of elements of the building. For example, to achieve the EnerPHit maximum heat demand of 25kWh/m² would require the addition of significant thicknesses of insulation and triple glazed, thermally broken windows, which would alter the appearance of some of the most significant elements of the building.

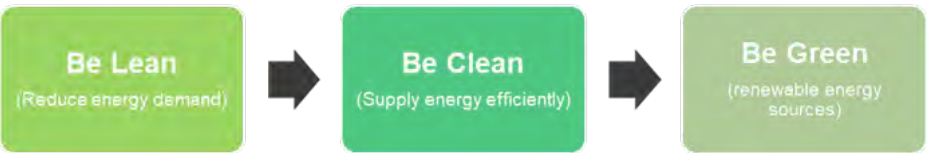
Many of the principles of BREEAM and EnerPHit will be adopted in the creation of a bespoke sustainability tracker for the project which will combine strategies from multiple frameworks to create a robust sustainability plan specific to the needs of the Mackintosh Building and its users. The bespoke tracker will address energy, water, materials, health and well-being, ensuring that the approach remains adaptive, and impact focused towards the goal of bringing the building back into use.

Proposals

The project will adopt ‘Passive Design’ strategies (this will mainly be airtightness and insulation – since daylighting / orientation / form factor etc. are already determined), efficient M&E ‘Active Systems’ and renewable energy measures will be reviewed.

- 1. Heating Demand and Energy in Use:** The project seeks to bring the building’s performance in line with current sustainable building design recommendations as far as is reasonably practical. It focuses on two key performance metrics:
 - Space Heating Demand (SHD): The amount of energy required to heat the building.
 - Operational Energy Usage Intensity (EUI): The amount of energy the building consumes during its operational life (e.g., for heating, cooling, lighting, etc).
- 2. Net Zero Carbon Targeting:** The project will use the Scottish Governments Net Zero Carbon Public Building Standard (NZCPSBS) as a way of reporting on ‘Net Zero’ for Operational Carbon.
- 3. Embodied Carbon Reporting:** The project will measure, and report embodied carbon emissions, which refer to the carbon footprint associated with building materials and construction processes. This will help to create a Whole Life Carbon assessment (WLC), which tracks both operational and embodied carbon throughout the building’s lifecycle. The WLC will be used to educate others and set a benchmark for sustainable building practices.

- 4. Lean, Clean and Green Energy Hierarchy:** The project will follow a widely recognized approach in sustainable design, which ensures that energy use is minimized and sourced responsibly:
 - Lean: Focuses on reducing energy demand through passive design strategies (e.g., improving insulation).
 - Clean: After reducing demand, the next step is improving energy efficiency by using high-efficiency mechanical, electrical, and plumbing (MEP) systems.
 - Green: For the energy that still needs to be used, it should come from renewable energy sources (e.g., solar, wind).



- 5. Holistic Approach:** The energy hierarchy will be integrated throughout the project, ensuring that energy efficiency is maximized across all stages. This includes architectural design, preservation of the building’s historic elements, structural sequencing (how construction is staged), and the installation of energy-efficient MEP systems.

In summary, the project is committed to using sustainable design principles to achieve the Faithful Reinstatement, minimizing its environmental impact through energy-efficient design and material selection. It will serve as an educational example for the wider construction industry on how to blend heritage preservation with modern sustainability goals.

Approach to Sustainability

Fabric First

Ranald Lawrence notes in his essay *The internal environment of the Glasgow School of Art by Charles Rennie Mackintosh*:

'It is striking that the accepted range of comfort conditions in the school, between approximately 15° - 18°C in the regular studios in February/March 1910, is around 4°C lower than that which would be accepted today.'

The Mackintosh Building was originally constructed without insulation, and its windows and rooflights were single-glazed. The building was heated using a coal fired mechanical heating and ventilation system. Reinstating the building offers opportunities to significantly improve the thermal performance of the building fabric, reducing energy costs and meeting sustainability goals. The following elements have been investigated:

External Walls

The east, west and north elevations are of solid stone construction and the south walls are of solid brick with cement render over. Walls that used to be lined with lath and plaster or timber paneling on battens present opportunities to introduce insulation between the inner face of the existing masonry and the new finished face of the interior.

Roofs

All of the original roofs were constructed of timber with either slate, lead or asphalt coverings. The original roofs were completely uninsulated. As all of the roof will be of a new construction, there are opportunities to introduce significant levels of insulation into the construction build-up. However, it will be important not to introduce insulation thicknesses that would be to the detriment of the original roof profiles, verges, kerbs and ridges.

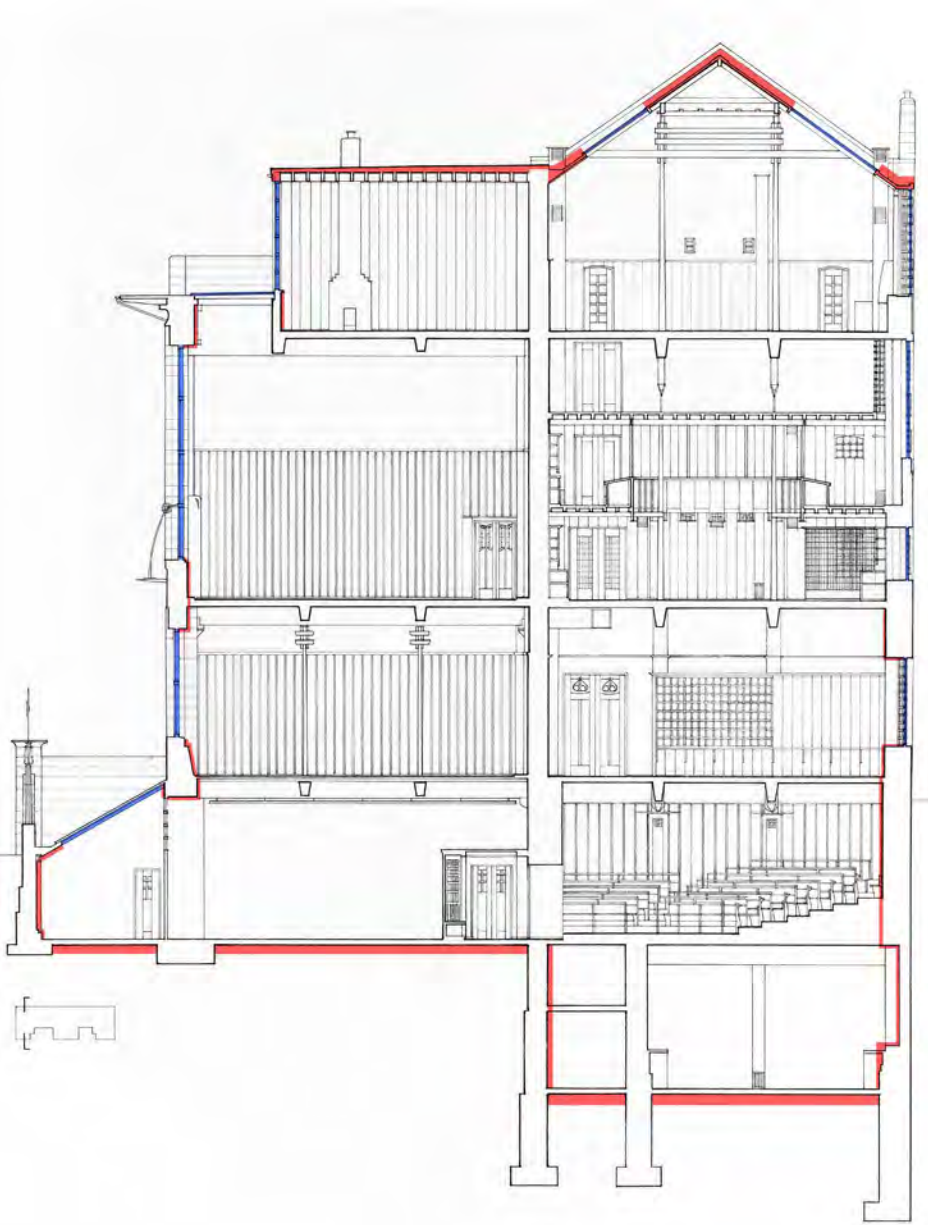
Floors

The ground bearing floors at basement and sub-basement level are of concrete and have been damaged by falling debris from the 2018 fire. Consequently, they all need to be replaced, thus providing an opportunity to provide generous thicknesses of new insulation below the slabs without affecting the original floor levels.

Windows and Rooflights

Whilst a few of the original window frames and small handful of glazing features survived the fire, they have been deformed by the heat of the 2018 fire. There is now an opportunity to double glaze all of the windows, whilst retaining the original profiles, of the reinstated building. Some of the larger windows could possibly be triple glazed.

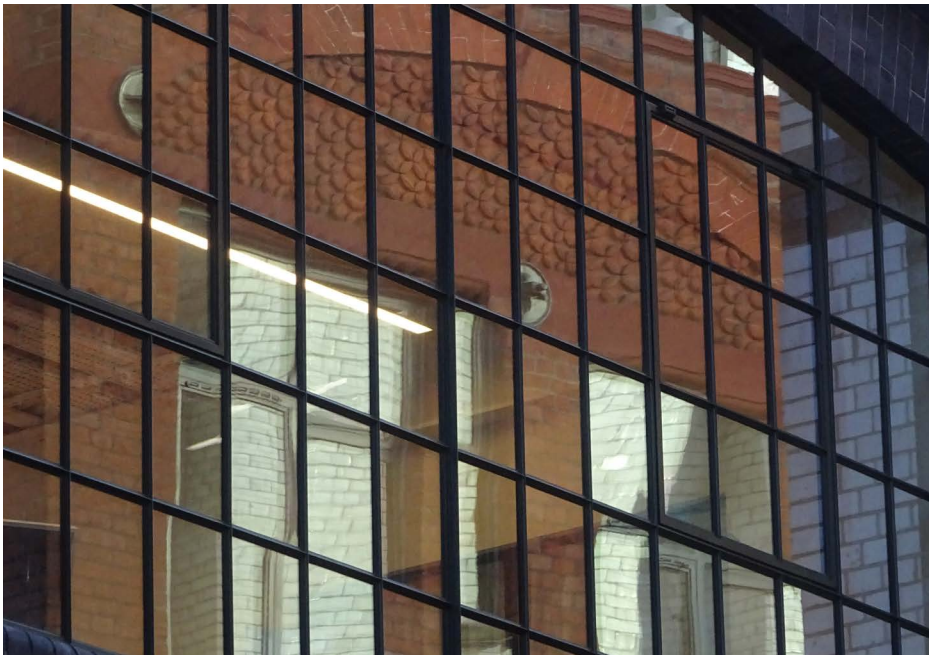
In assessing appropriate levels of insulation to introduce in to the reconstruction project, it is important to balance the needs for improved thermal performance with the heritage significance of particular spaces and building elements. Wherever possible new interventions should be designed in such a way that minimises the impact on the original designs. A full condensation analysis will also be required to enable an appropriate balance of insulation values between individual elements of the building.



Section highlighting proposed lines of improved thermal insulation



Double glazed patent glazing at the V&A Kensington



Double glazed windows at Voysey House, Chiswick

Approach to Sustainability

Building Fabric Insulation

This table expands on the strategy for each part of the external envelope, for easier comparison to the original.

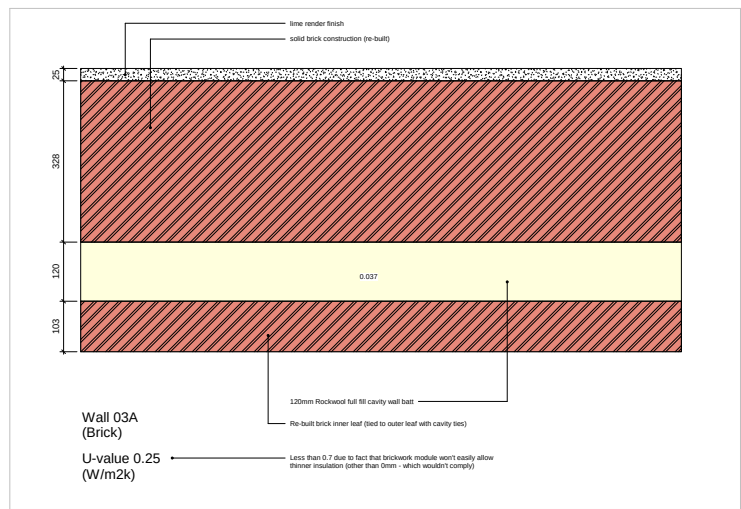
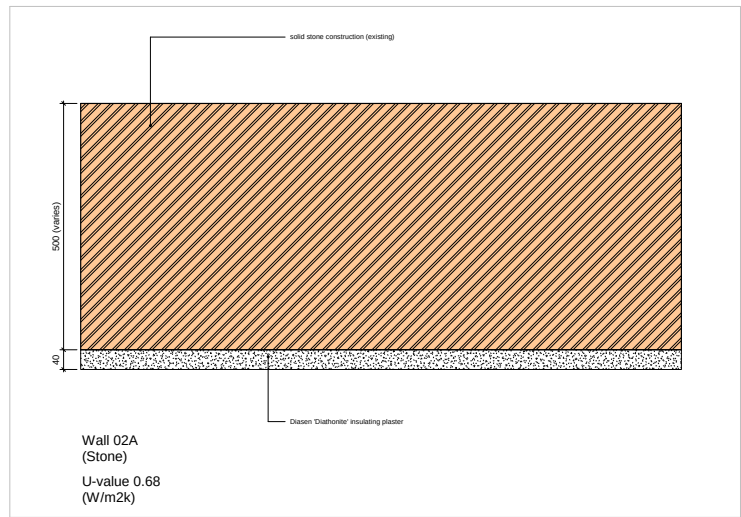
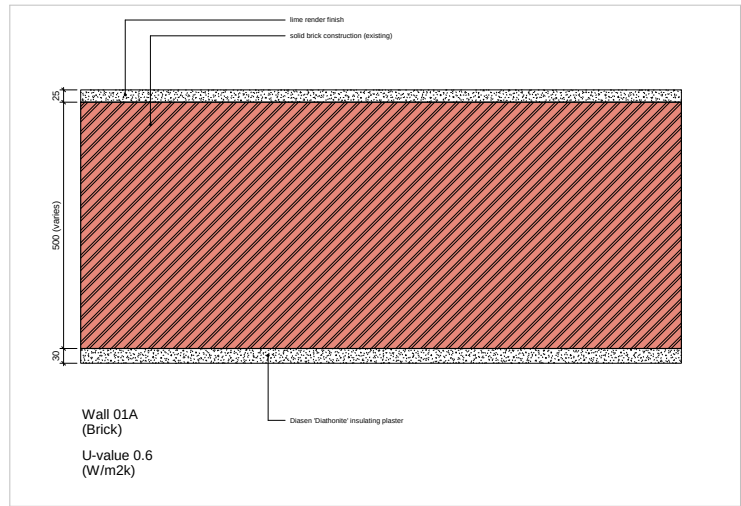
The following pages contain diagrams of potential wall build-ups. They show three different levels of insulation, ranging from least to most intensive. The diagrams show these different levels on the walls, roofs and floors.

1.
- The **first column** shows the 'backstop' or minimum requirement for insulation as defined by the Scottish Technical Standards.
2.
- The **second column** shows potential solutions that would make minimal impact on the appearance of the building as originally designed.
3.
- The **third column** shows insulation thicknesses that would be required to meet the 'notional' u-values required by the Standards.

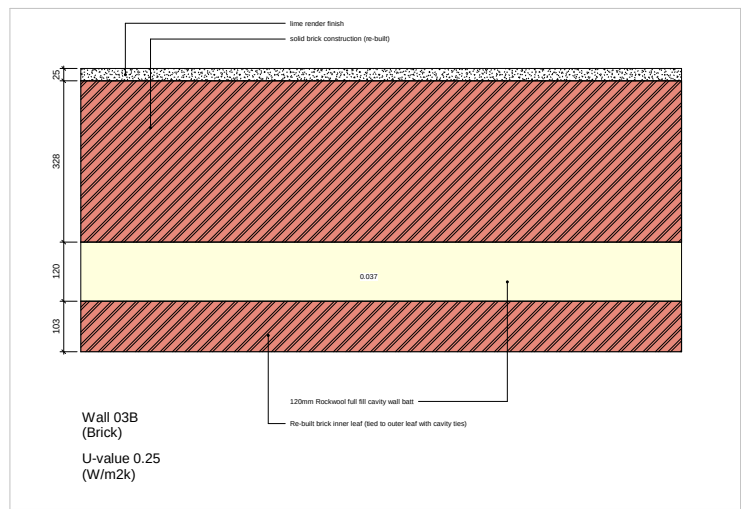
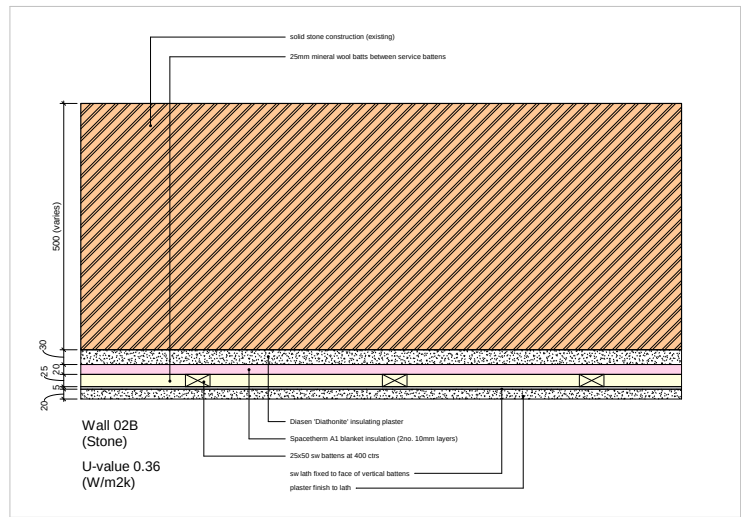
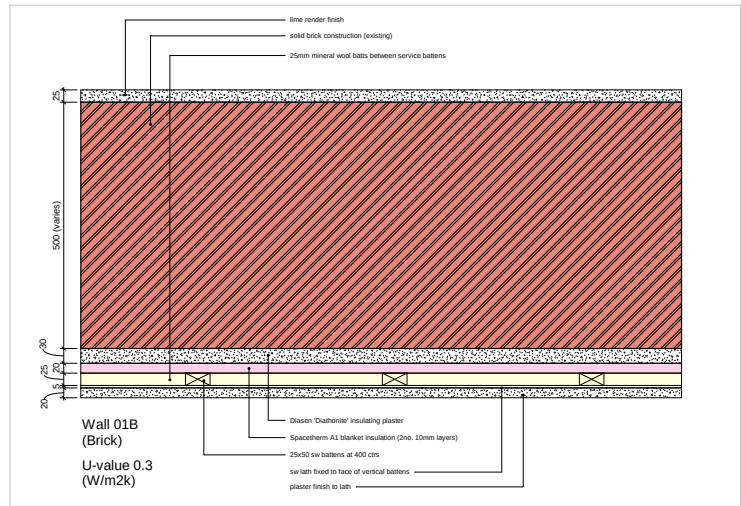
Element	Original Construction	Proposed Improvements
External Walls	East Elevation – Solid Stone Masonry of varying thicknesses up to 825mm. Sometimes lined internally with lath and plaster and sometimes with exposed, dressed masonry interior face. North Elevation – Solid Stone Masonry of varying thicknesses up to 825mm. Lined internally with lath and plaster. West Elevation – Solid Stone Masonry of varying thicknesses up to 825mm. Sometimes lined internally with lath and plaster and sometimes with exposed, dressed masonry interior face. South Elevations – Solid brickwork varying in thickness up to 914mm. The external faces of the walls are harled with impermeable cement harling. The internal faces of the walls are either exposed brick work (at basement levels and second floor levels) or lath and plaster.	The walls that used to be lined with lath and plaster or timber panelling on battens present opportunities to introduce insulation between the inner face of the existing masonry and the new finished face of the interior. To enable a meaningful level of thermal performance to be achieved, it may be necessary to encroach minimally (approx. 15-25mm) on the floor area of some of the rooms. The majority of the spaces in the basement and sub-basement had exposed or painted finishes – ie exposed stone or brick. Introducing insulation in the basement areas would affect the character of the spaces. There is potential to develop removable wall linings that improve thermal performance while being easily removed from the historic fabric, similarly to how temporary wall linings for student exhibitions were traditionally used.
Roofs	All of the original roofs were lost in the 2018. There are generally three types of roof: Slated pitched roofs, often with in-line glazed lights. Scotch slates nailed directly to sarking board over rafters supported on purlins and trusses. Flat roofs covered with asphalt on board supported on roof joists. Flat roofs covered with lead on board supported on roof joists.	As all of the roof will be new constructions, there are opportunities to introduce significant levels of insulation into their construction build-ups. However, it will be important not to introduce insulation thicknesses that would be to the detriment of the original roof profiles, verges, kerbs and ridges.
Floors	Upper floors were either suspended concrete slabs or suspended timber joists. Both tended to be covered with hardwood T&G floorboards. The suspended concrete slabs are composite floors consisting of steel beams at close centres and concrete infill between. The suspended timber floors consisted of timber joists. Both the timber and concrete floors were supported by the masonry/brick walls around their perimeter and by cast steel or cast iron beams where required across their spans. The floors to the basement had exposed structure to their undersides. The underside of upper level floors were lath and plastered or plaster on mesh. Ground bearing floors at the Basement and Sub-basement levels were entirely concrete.	The existing basement floors have been damaged by falling debris from the 2018 fire, and in the northwestern studio block are uneven. The subbasement floors have not been damaged, but there are obvious signs of damp ingress along their southern edge. The Basement and Sub-basement floors can be replaced with new concrete floors. The removal and replacement of the slabs presents a number of opportunities to improve the performance of the building: - Damp proofing can be introduced - Thermal insulation can be introduced - The below ground drainage can be checked and repaired. - The new slabs can be installed at the same structural floor levels as the existing slabs.

Approach to Sustainability: External Walls

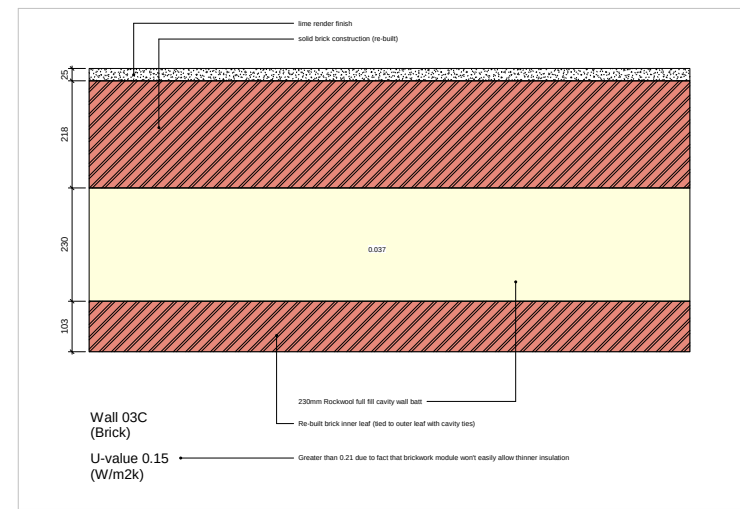
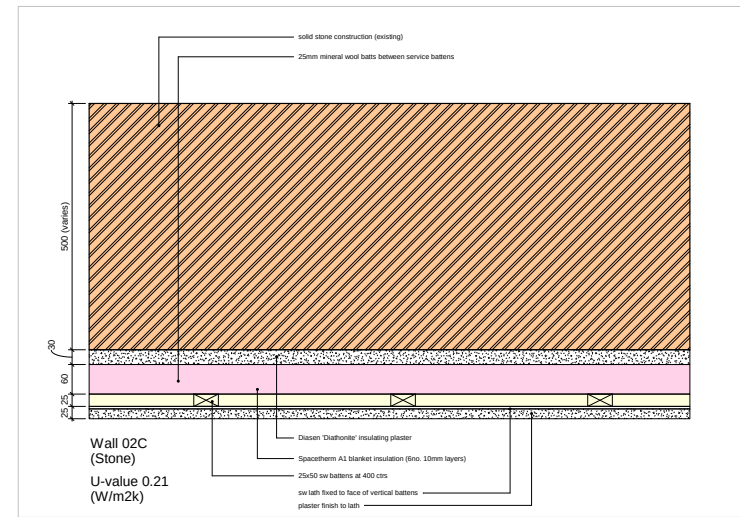
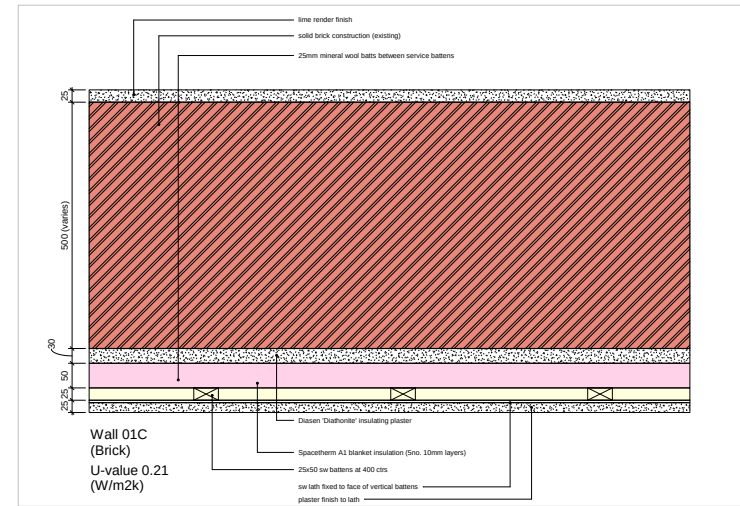
BACK-STOP DESIGN



OPTIMISED DESIGN

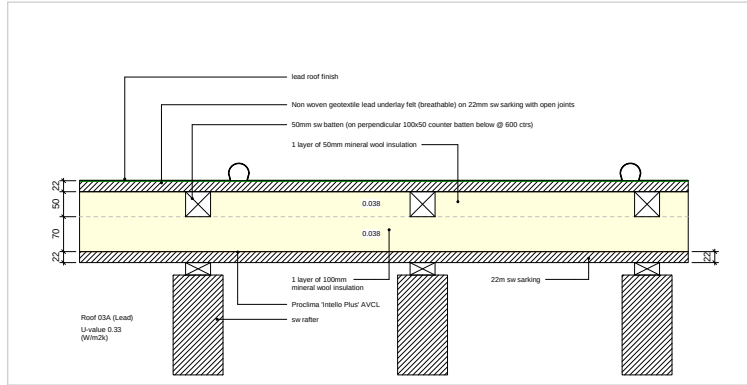
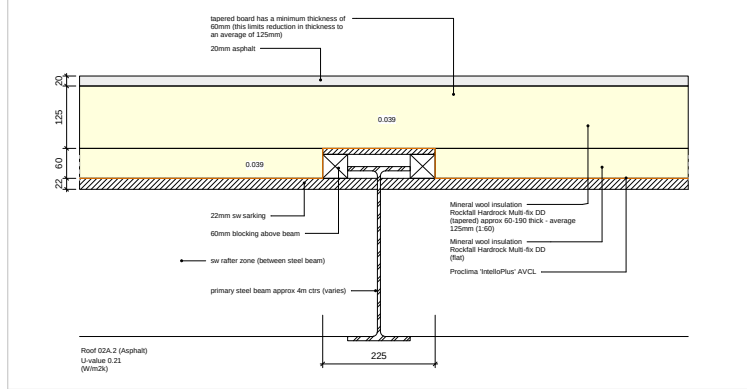
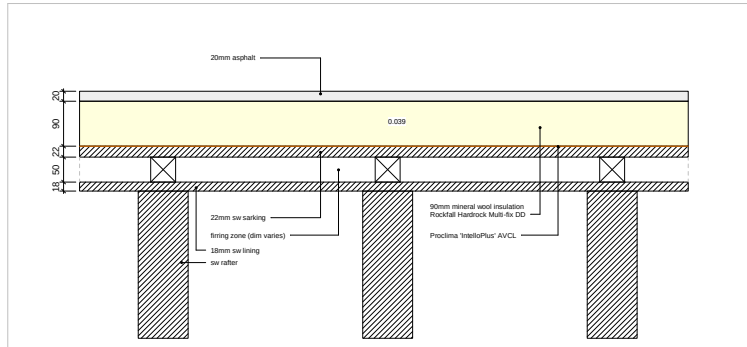
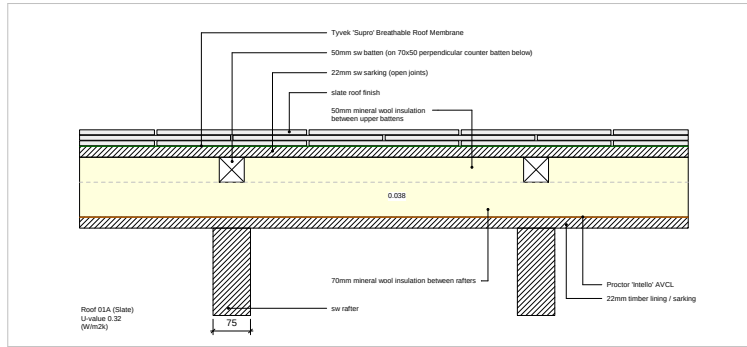


NEW REGS - COMPLIANCE

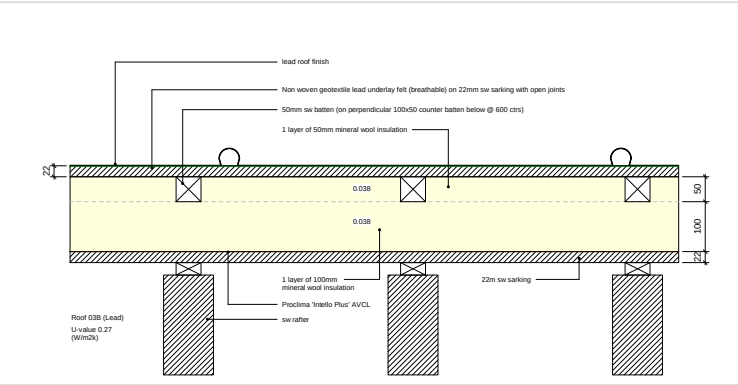
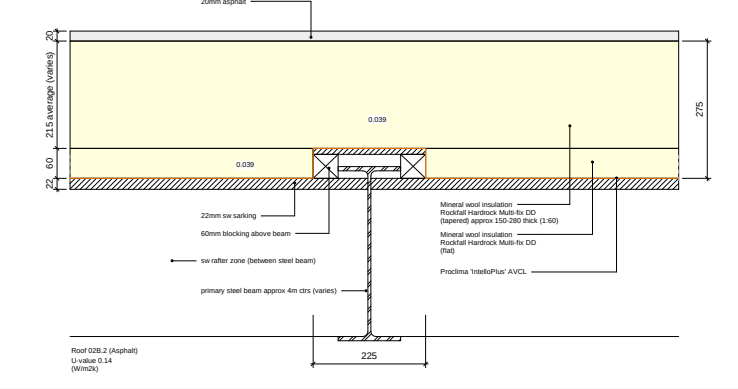
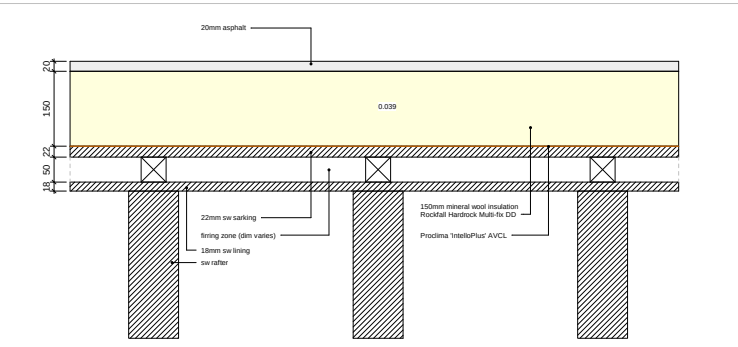
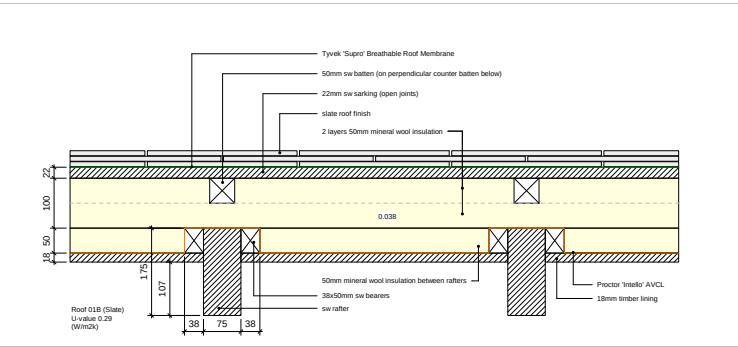


Approach to Sustainability: Roofs

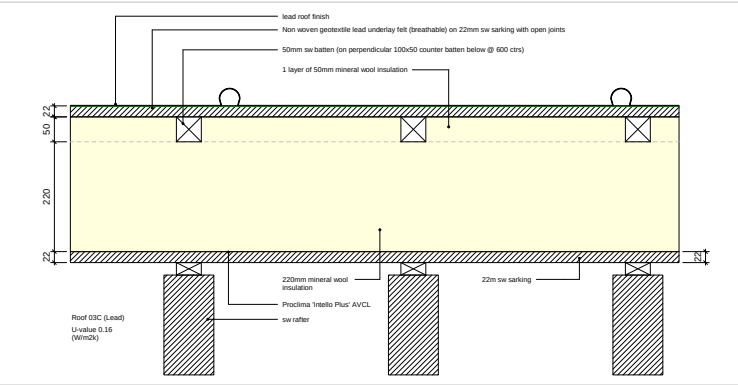
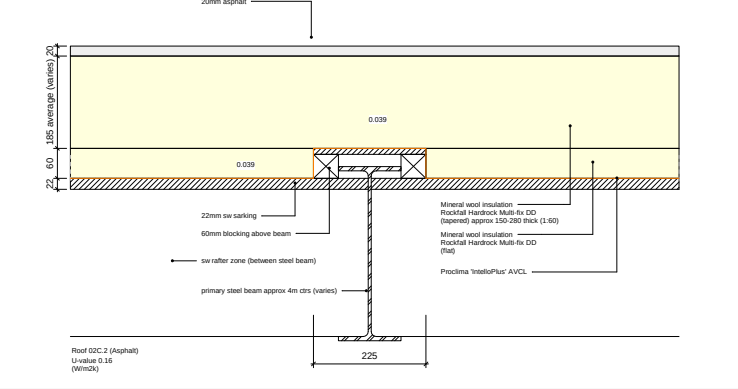
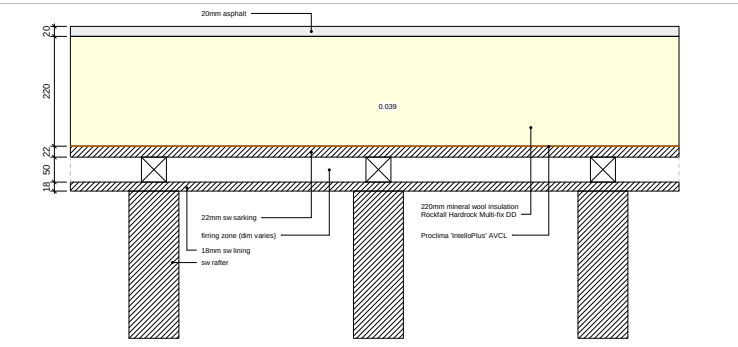
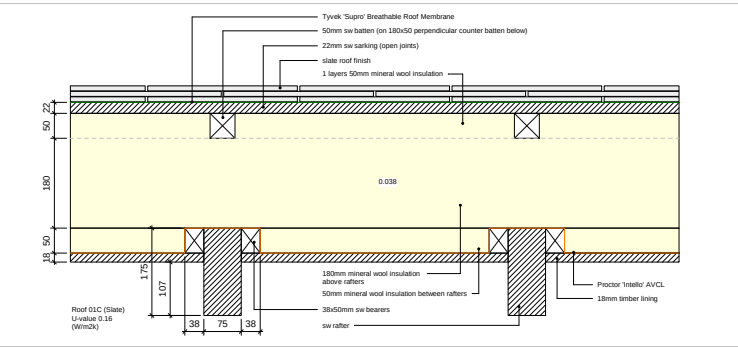
BACK-STOP DESIGN



OPTIMISED DESIGN

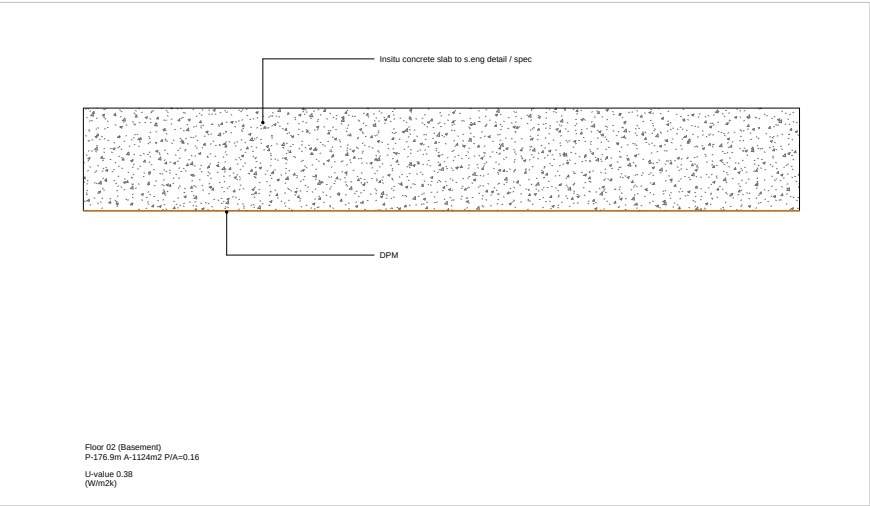
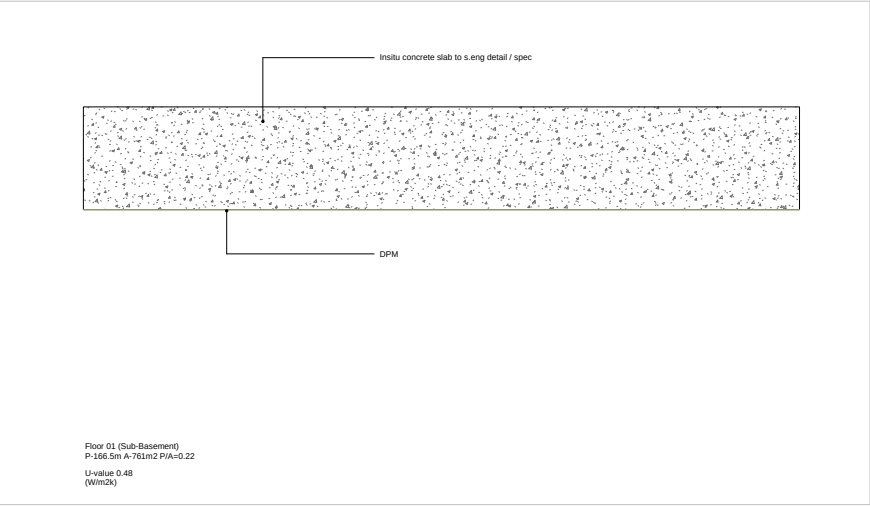


NEW REGS - COMPLIANCE

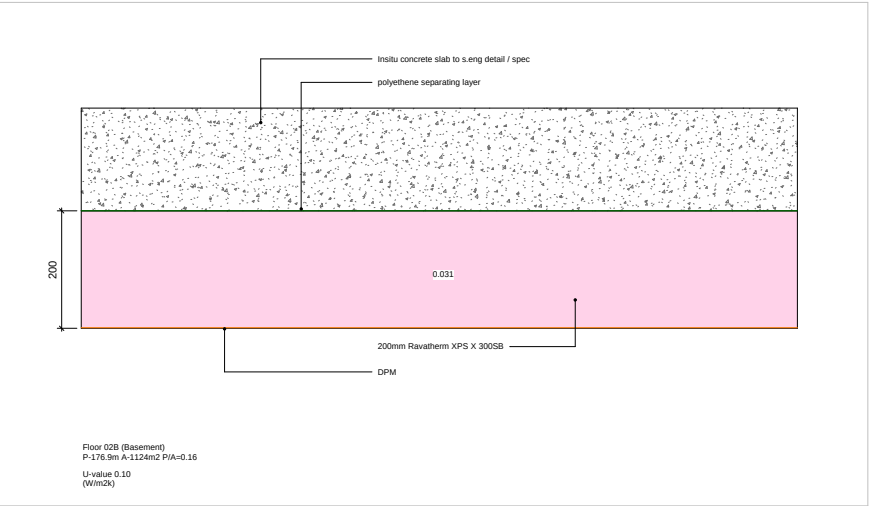
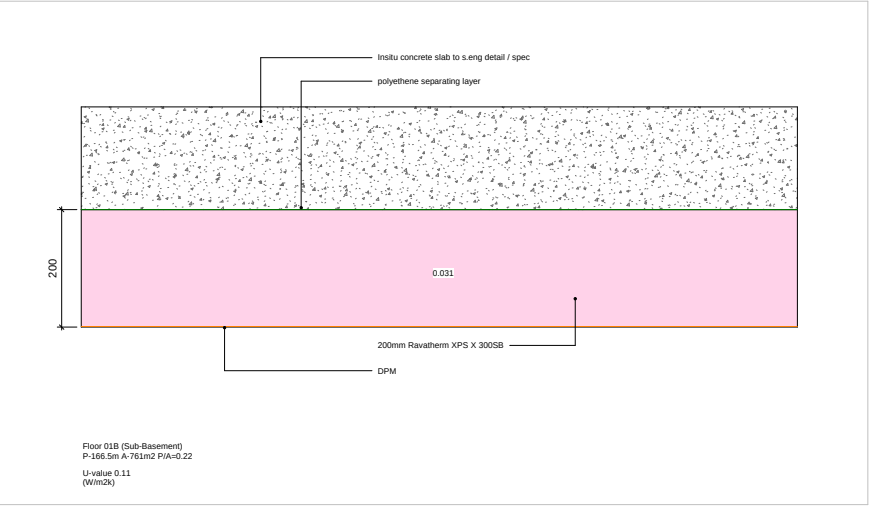


Approach to Sustainability: Ground Bearing Floors

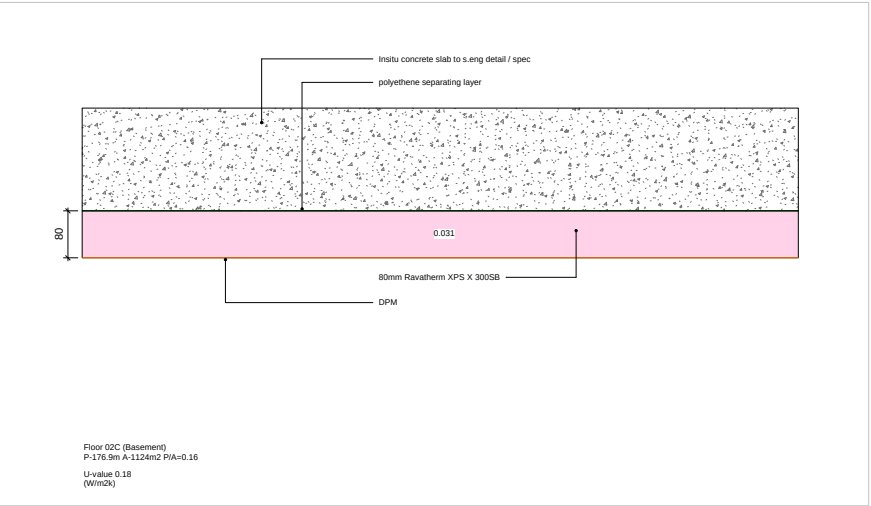
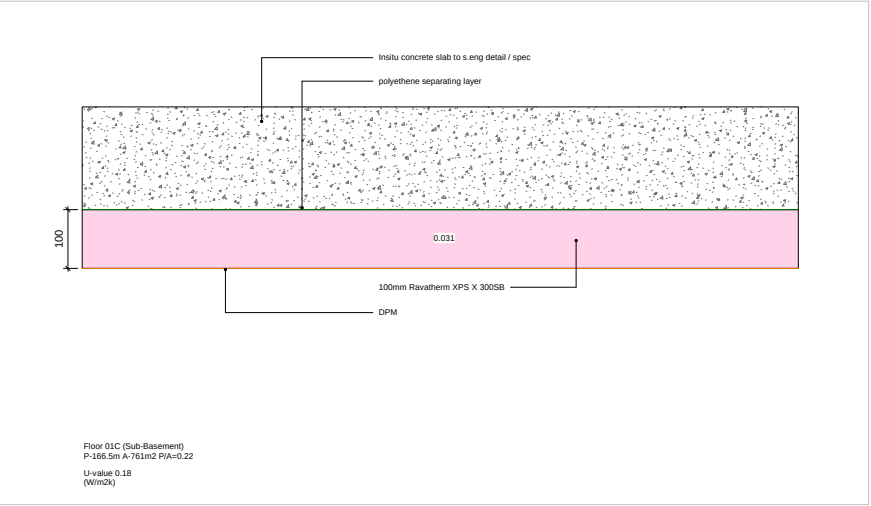
BACK-STOP DESIGN



OPTIMISED DESIGN

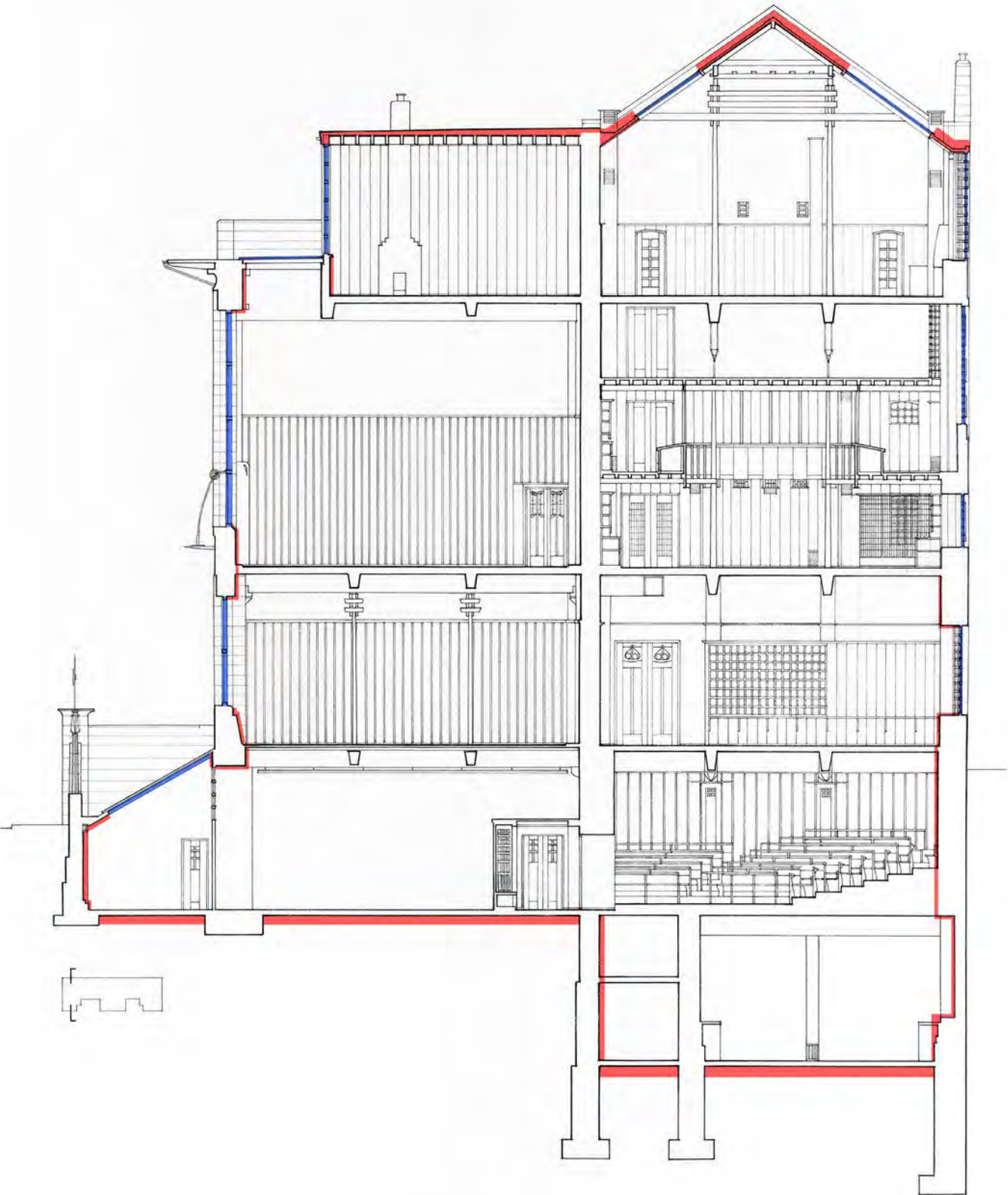
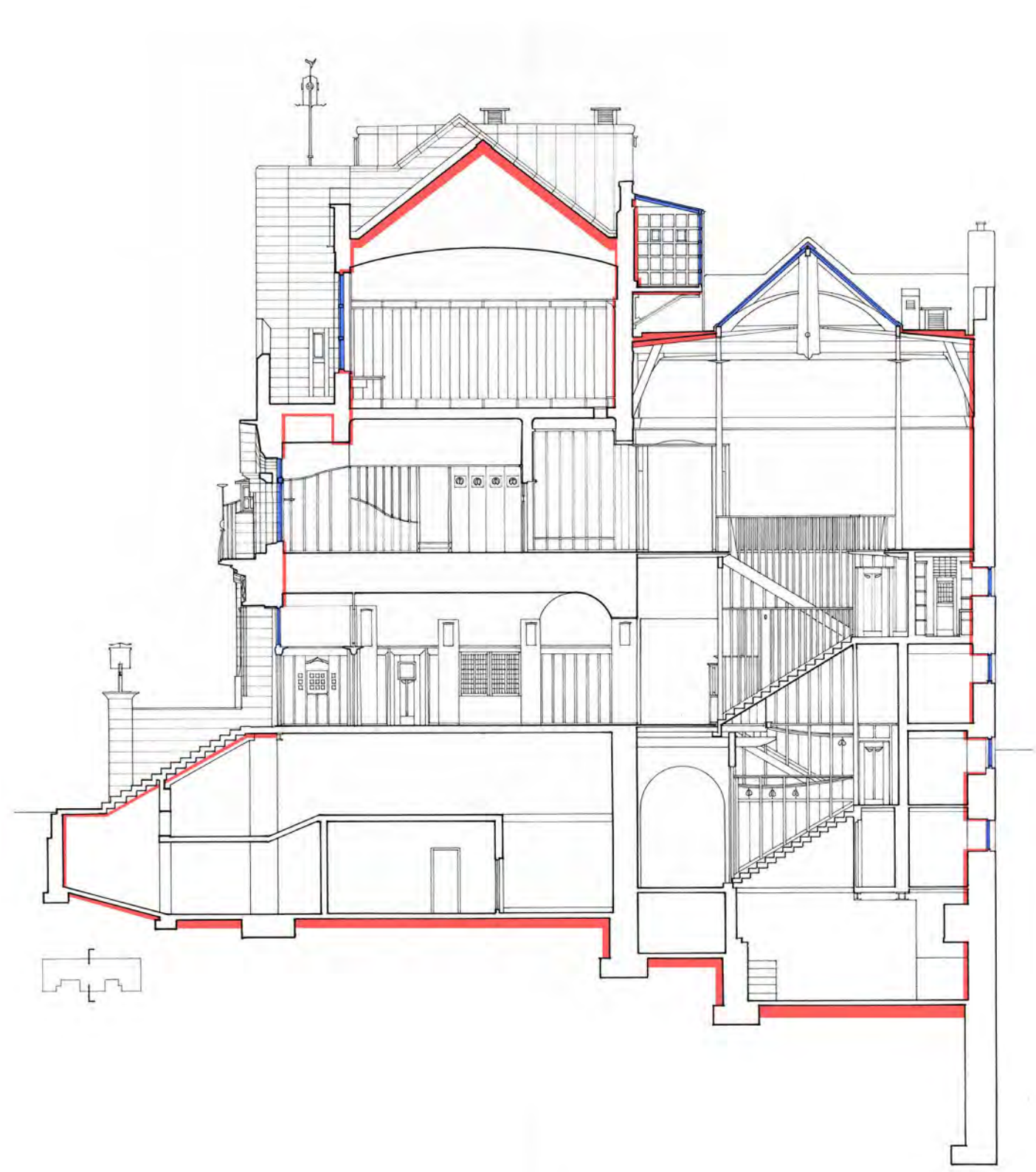


NEW REGS - COMPLIANCE



Approach to Sustainability: Insulation Extents

These drawings outline where new thermal insulation would be located. The drawings on the following pages 'unwrap' the external walls of the building to measure the maximum area which may be insulated. Future detailed studies will have to define what extent of insulation can be achieved in each space while protecting the original design intent of heritage spaces.



Potential areas to be insulated. red = insulation, blue = upgraded glazing

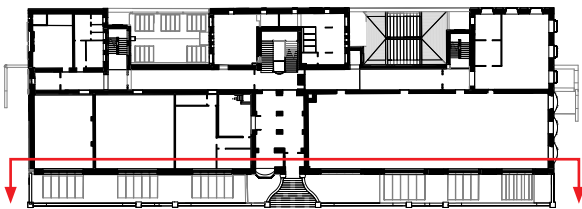
Approach to Sustainability: Insulation Extents

External Walls - North Elevation



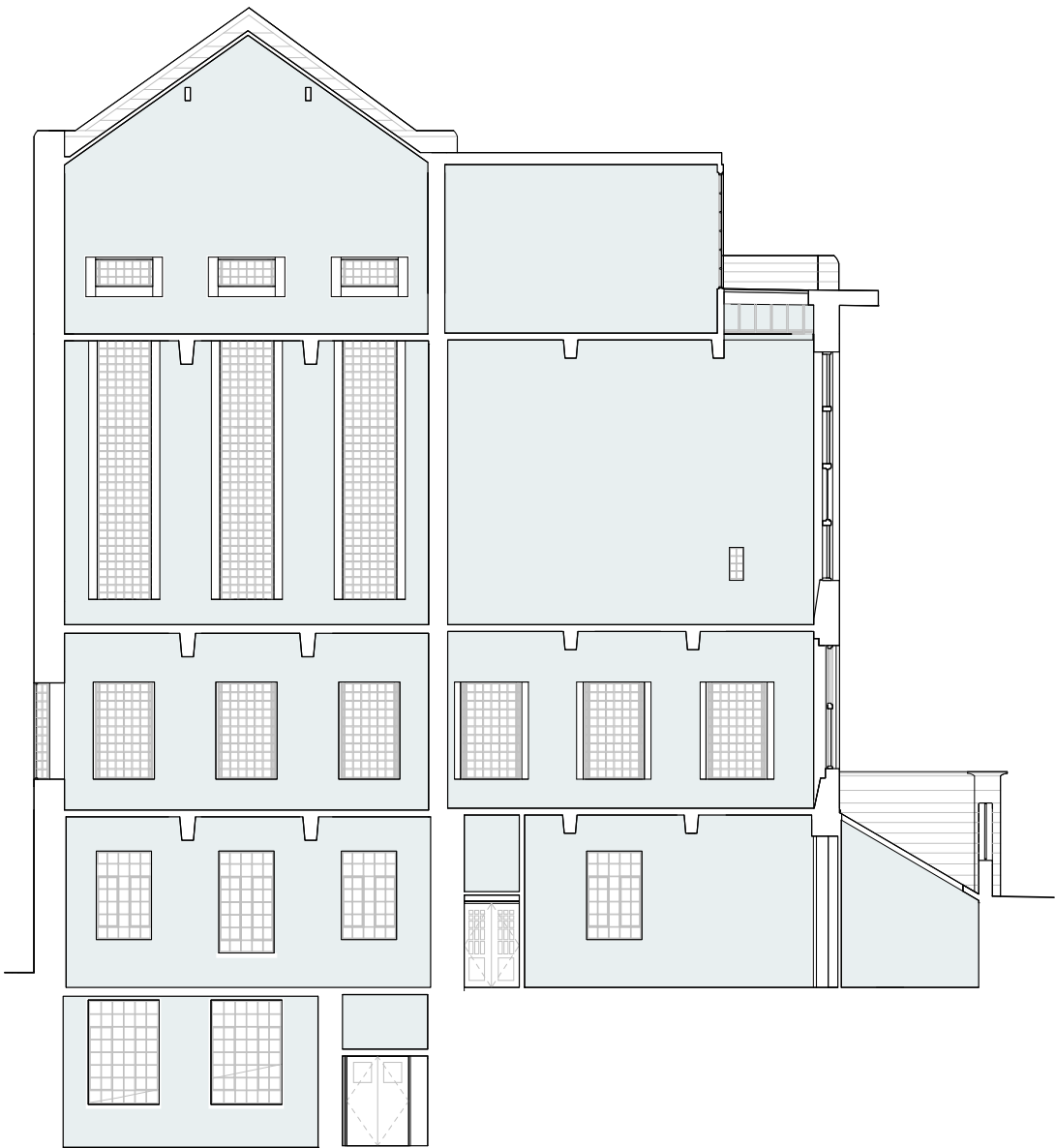
Insulation Area: 783 m²

1	2	4	6	10	1:100
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Approach to Sustainability: Insulation Extents

External Walls - West and East Elevations

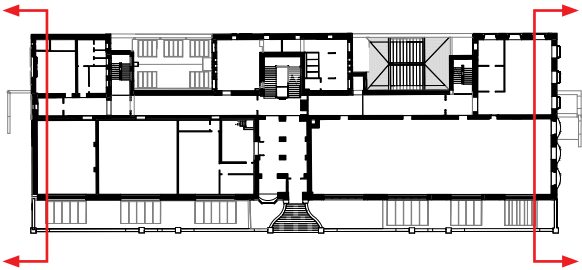


Insulation Area: 432 m²

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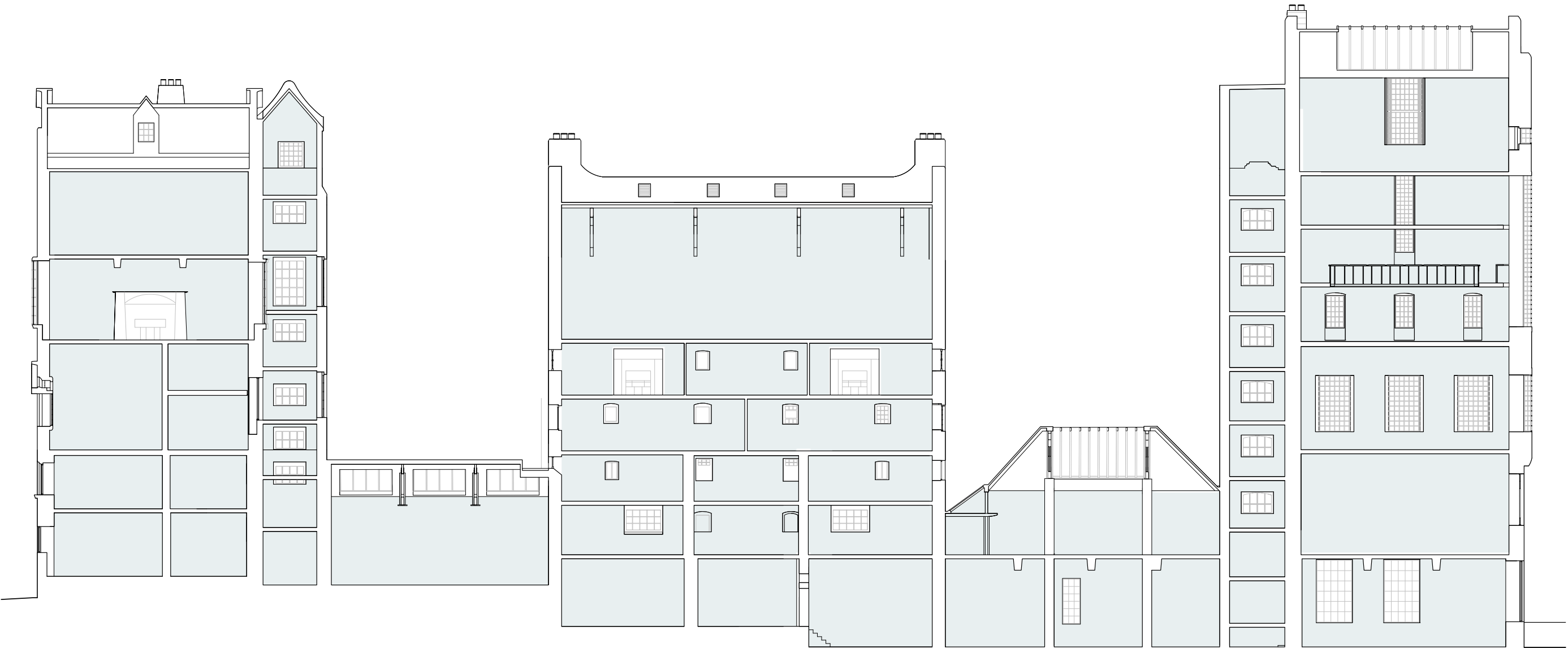


Insulation Area: 421 m²



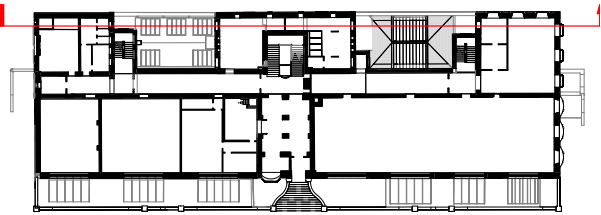
Approach to Sustainability: Insulation Extents

External Walls - South Elevation



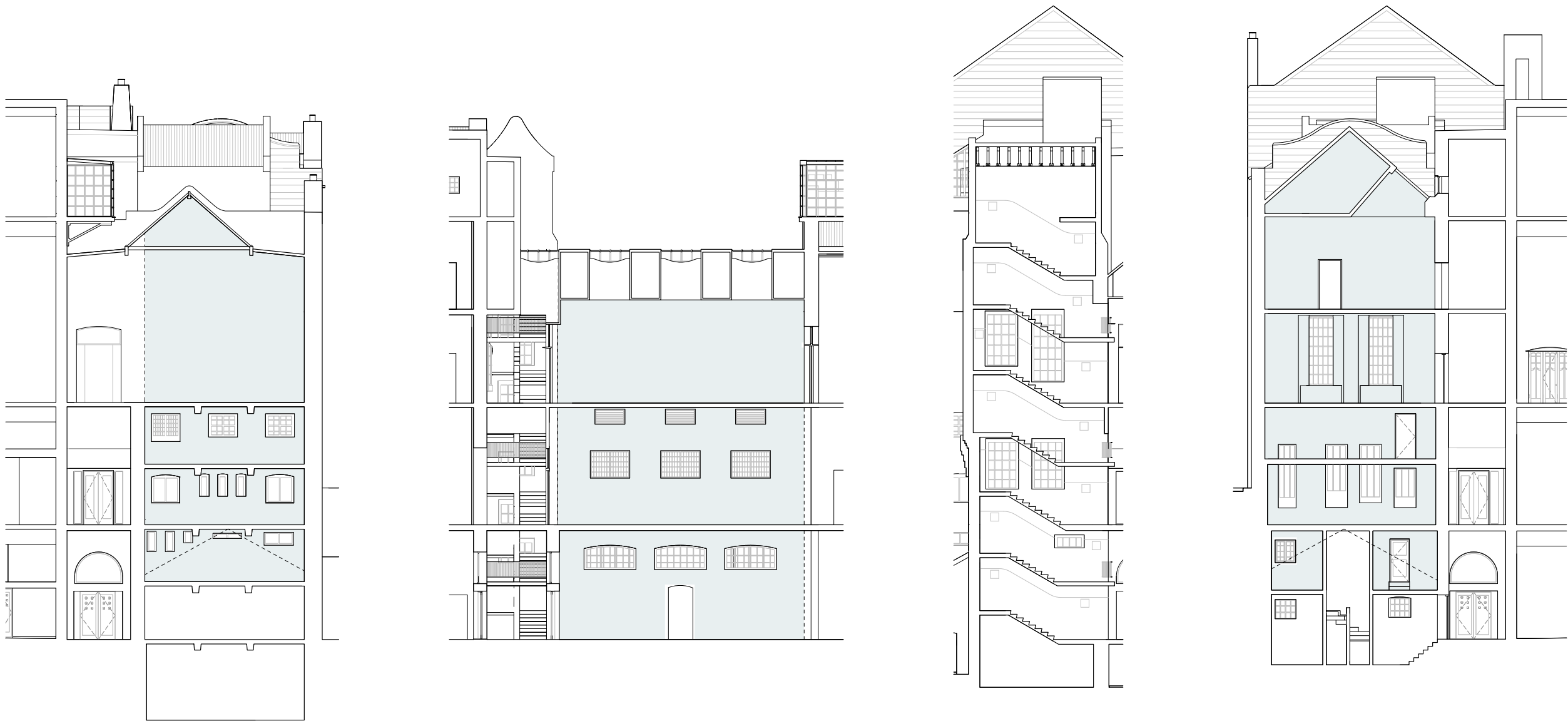
Insulation Area: 1012 m²

1	2	4	6	10	1:100
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Approach to Sustainability: Insulation Extents

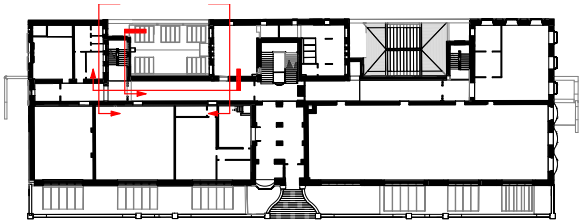
External Walls - South Elevation, East Setback



Insulation Area: 98 m², 146 m²

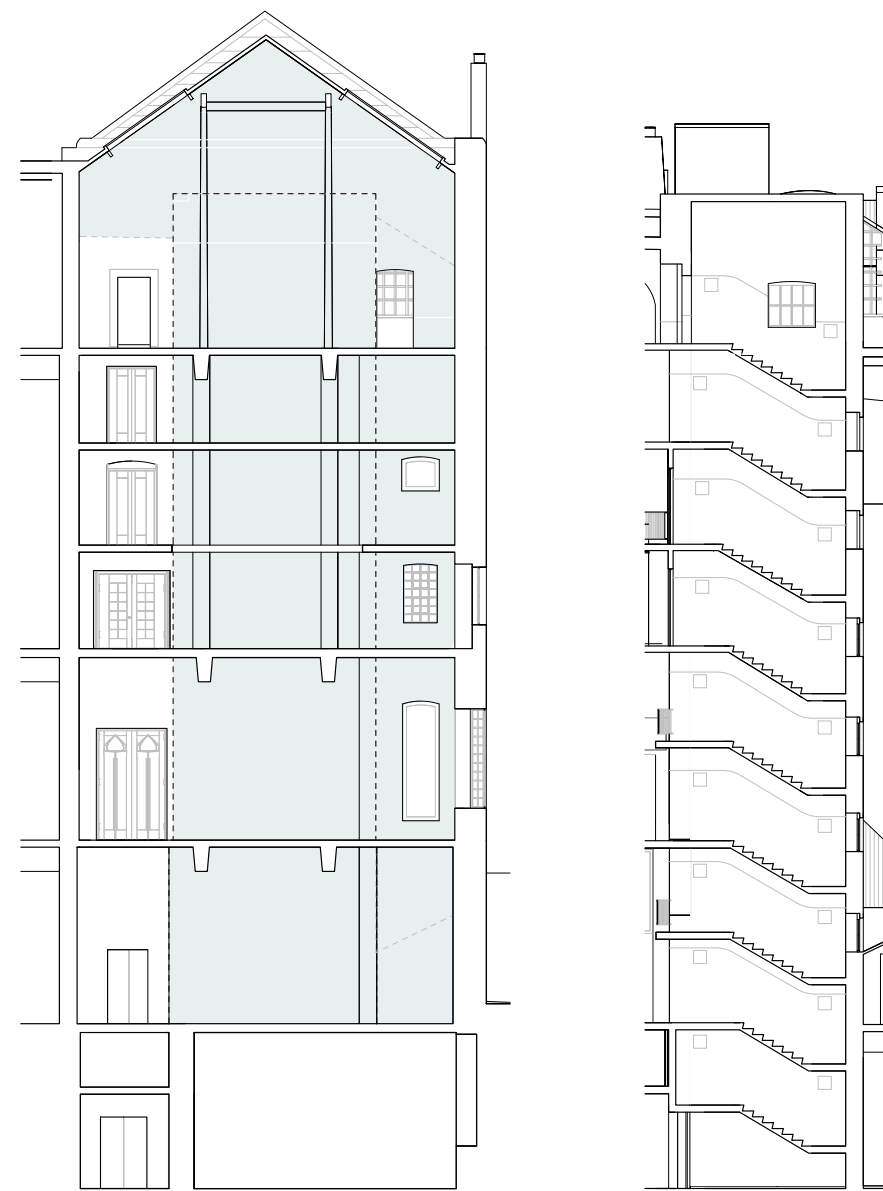
1	2	4	6	10	1:100
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Insulation Area: 0 m², 109 m²



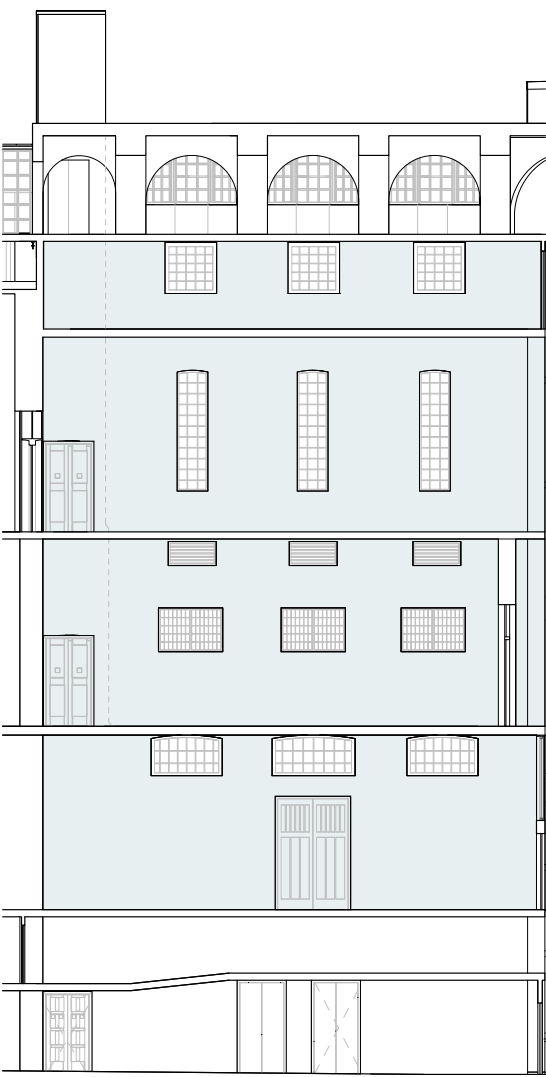
Approach to Sustainability: Insulation Extents

External Walls - South Elevation, West Setback

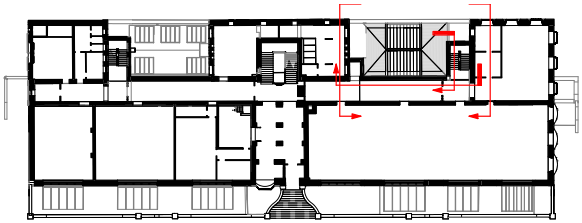
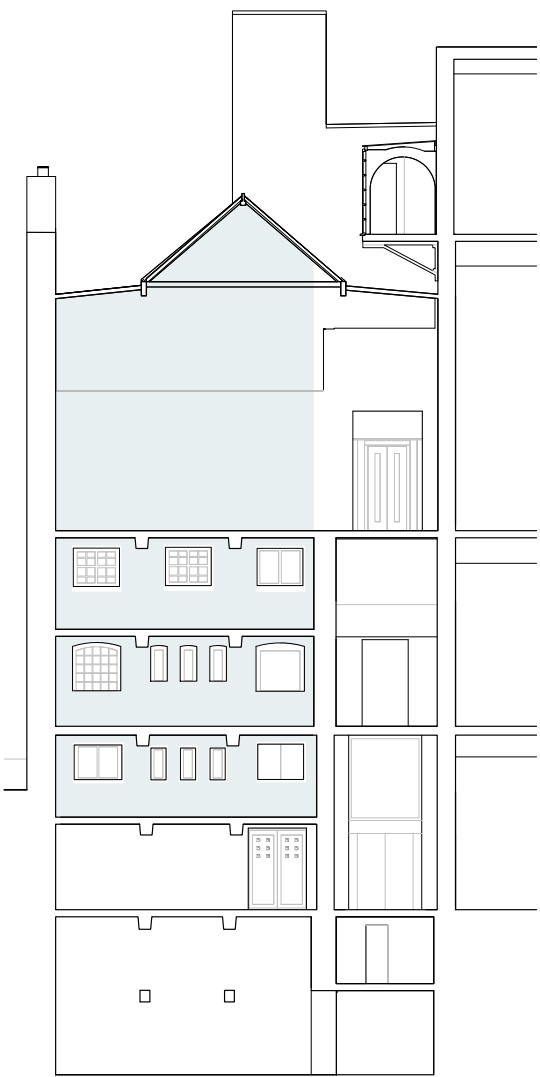


Insulation Area: 198 m², 0 m²

1	2	4	6	10	1:100
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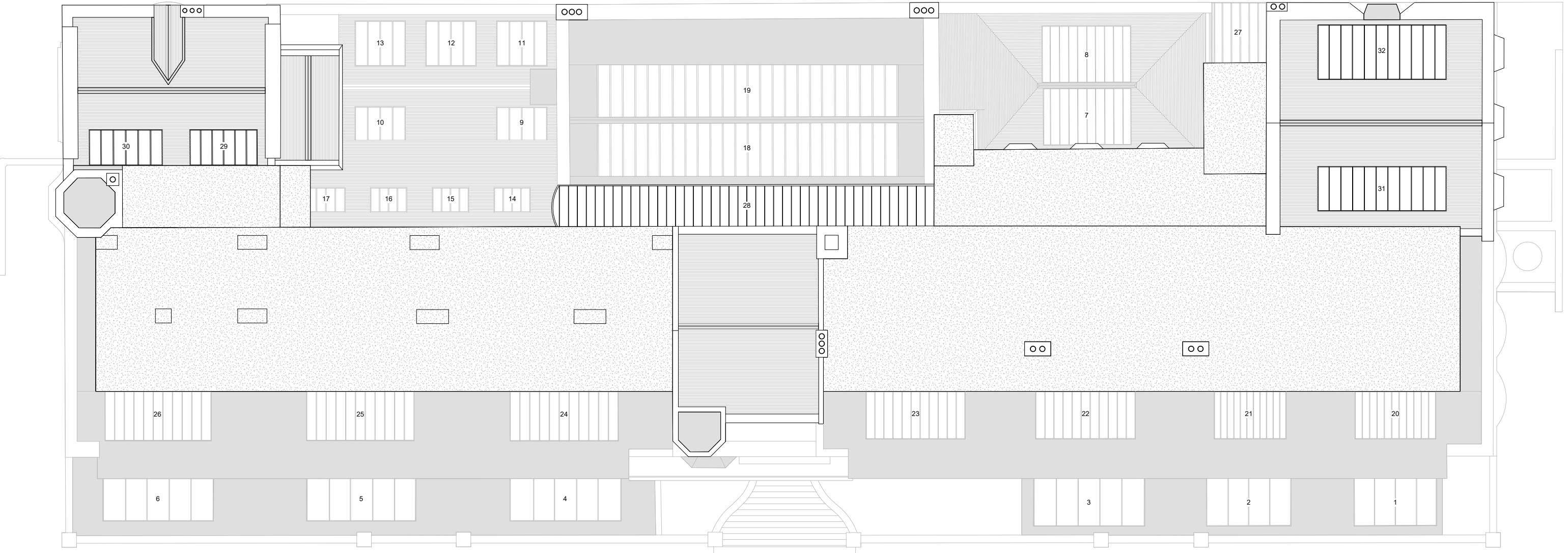


Insulation Area: 227 m², 98 m²



Approach to Sustainability: Insulation Extents

Roof and Rooflights



Roof Key			Individual Rooflight Areas:							
Material:		Total Area:	No.							
	Slate	450.2m²	1	17.3m²	11	7m²	21	9.2m²	31	18.9m²
			2	17.7m²	12	7m²	22	12.7m²	32	23.2m²
	Lead	548.5m²	3	23.2m²	13	7m²	23	12.7m²		
			4	20.2m²	14	3.2m²	24	15m²		
	Asphalt	653m²	5	20.2m²	15	3.2m²	25	15m²		
			6	20.2m²	16	3.2m²	26	15m²		
	Rooflight	544.8m²	7	24.5m²	17	3.2m²	27	10.5m²		
			8	24.5m²	18	55.9m²	28	42.1m²		
<i>Note that areas shown are surface areas, not the areas in plan.</i>			9	7m²	19	55.9m²	29	7.4m²		
			10	7m²	20	10.4m²	30	8m²		

Approach to Sustainability: Insulation Extents

Visual Comparison - Studios (West) Looking East



First Floor studio with internal wall insulation



Second floor studio with internal wall insulation

Approach to Sustainability: Insulation Extents

Visual Comparison - Embroidery Studio (Second Floor, East) Looking East



Photograph, 1909



Visual with internal wall insulation

Approach to Sustainability: Insulation Extents



Photograph of corridor (first floor, East) leading to museum, 1909



Visual with internal wall insulation, before linings are installed

Approach to Sustainability: Insulation Extents



Photograph of corridor (first floor, West) leading to library, 1909



Visual with internal wall insulation before linings or furniture are installed

Approach to Sustainability: Windows

Key Precedent - Voysey House, Chiswick

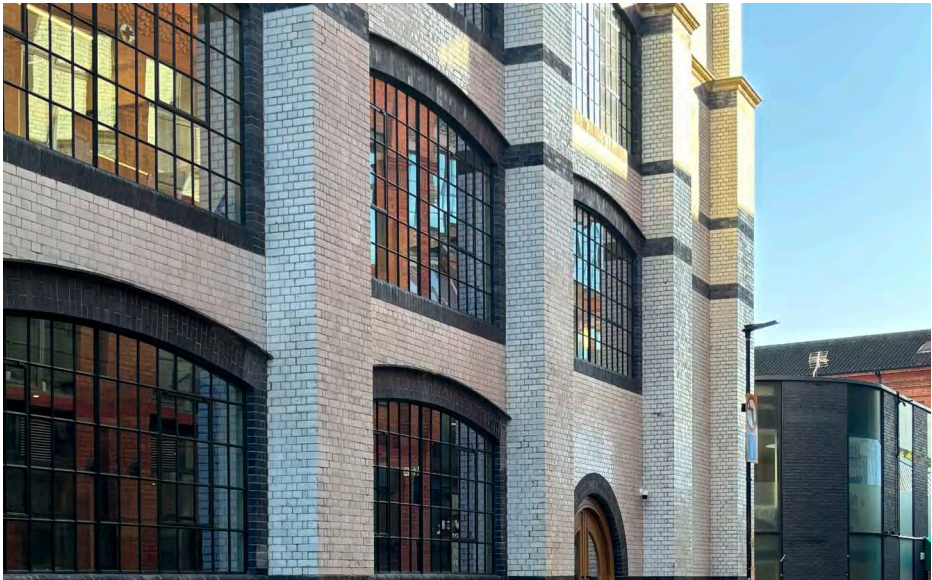
Voysey House was CFA Voysey's only commercial building and was constructed in 1902. Designed to have steel framed windows with small panes, the building had been altered numerous times over the 20th century and its windows had been replaced with larger format glazing. In 2024, the building was refurbished and smaller paned windows were re-installed.

According to an article published in the RIBA Journal on 28 August 2024, the glazing; "utilises 7.7mm thick Fineo vacuum double glazing, by West Leigh, with steel frames reproducing the original profiles in a colour-matched 'Voysey bottle green'. The glazed unit achieves a u-value of 0.7 W/m2k though the glass, which reduced the building's U-value by over 50%, contributing to an EPC rating of A."

Glass is held in place using a gasket instead of putty which looks non-original. Reflections on glass suitably varied on some windows, but not all.



Facade



Glazing reflections



Street view



Glazing close-up

Approach to Sustainability: Windows

Remaining Windows



Type 5 - male cloakroom - steel framed standard



Type 5 - cleaners - basement - steel framed standard



Type 5 - lavatory - sub-basement - steel framed standard



Type 5 - animal room - steel framed standard (this window was installed against Mackintosh's wishes)



Type 1 - Caretaker's house - leaded, steel framed (image shows alter added frame of secondary glazing inside)



Type 1 - Caretaker's house - leaded, steel framed (handle remains)

Approach to Sustainability: Windows

Historic Photographs



Type 2 - director's office - leaded in metal frame



Type 4 - loggia - timber framed



Type 1 - studio - timber framed



Type 4 - loggia - timber framed



Type 4 - design room - curved timber frame



Type 3 - second floor studio - hardwood framed



Type 5 (lower) and 6 (Upper) metal framed



Type 6 - library - steel framed bespoke

Approach to Sustainability: Windows

Original and Potential Types

Mackintosh employed a wide variety of window shapes, sizes, scales, configurations and types as was summed up by Andy Macmillan in “Invention and Identity: A Reappraisal of Mackintosh’s School of Art” in Global Architecture 49, Japan 1979:

“The whole section in fact conditioned by the exploitation of the special kinds of light available, even north light for the studios, dynamic changing sunlight for the circulation spaces.....and everywhere the utilisation of the possibility of roof lighting.;glass, in windows, sometimes polished plate, sometimes leaded, sometimes in, or on, or even beyond the wall, sometimes flat, sometimes in framed iron bays, sometimes transparent, sometimes reflecting white on black, black on white, always creating awareness of light.”

There are no hard and fast rules relating to the use of particular types of window in particular situations. The windows are one of the elements Mackintosh used to make each space within the building a unique event. There are themes – the Studios are flooded with light from large windows, the leaded lights - almost Elizabethan in appearance - are utilised at the more ‘homely’ spaces of the Caretakers House and the Director’s Room. Utilitarian spaces such as stores, cloakrooms and kitchen utilised standard steel framed windows, special events - Studio 58, the Library, Senior Architecture, utilised bespoke metal frames.

There are many different scales of glazing:

Very small – steel framed with leaded panes to the Caretakers House (100x200mm) and the Masters Room (130x250mm) on the East Elevation, the Director’s Room on the North Elevation, the Ground Floor Corridors on the South Elevation, the Board Room’s internal windows and the fanlights above the inner entrance lobby doors.

Small - Steel framed with steel astragals to the cloakrooms and stores on the south elevation (approx. 200-222mm panes)

Small - Timber framed to head of East Stair and windows to rear of the Embroidery Room on the South Elevation (less than 200mm panes)

Medium – the Library (240mm), Architecture Studios on the West and South Elevations

Medium – Hardwood Framed Screen the Hen Run (350x430mm), the Loggia Windows (310X360mm).

Medium – Timber framed windows to East Stair (460x370mm) and Second Floor Studios (545X480mm) on the North Elevation

Large – Timber framed window to the Directors Studio (690x1025mm)

Very Large – the windows to the studios (1130X1670mm)

The windows are grouped into seven general types shown in the table above. It should be noted that within some of the groups there is a wide variety of sizes and configurations. For example, there are in fact fifteen different window types on the South Elevations.

The first column in the table describes the window type identifying number.

The second column describes the windows as originally built.

The third column describes potential alternatives/upgrades for the future.

The following pages show the window type codes on the elevations.

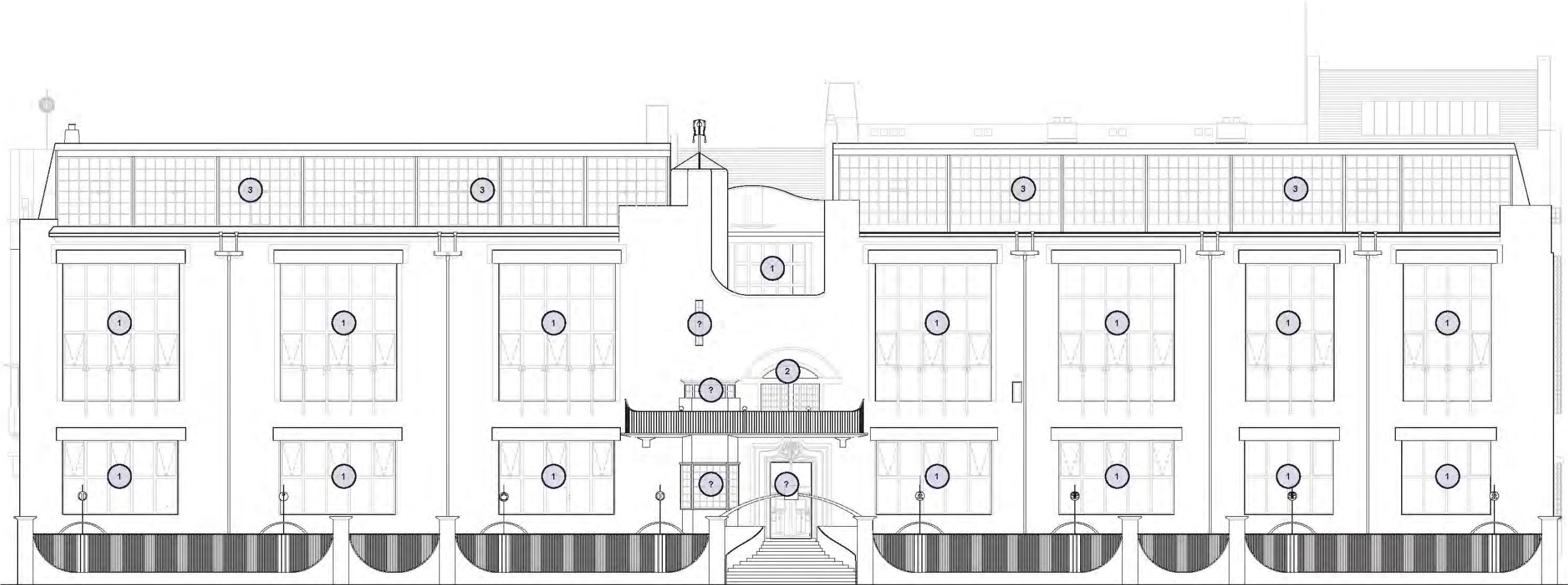
Note on the Loss of Daylight through the Introduction of Double Glazing:

Double glazing has approximately 10% less light transmittance than single glazing and its introduction will inevitably result in a reduction in the amount of daylight entering the Mackintosh Building. Historically, in the Victorian era, the major industrial cities of the northern UK could see an average loss of light due to smoke pollution of up to 45% (exacerbated in cold and humid weather conditions). By the beginning of the twentieth century, one study identified the annual soot fall in the centre of Glasgow as 820 tons per square mile, in comparison with 426 tons in London. This, relatively speaking, means that the introduction of double glazing will still result in levels of daylight greater than was experienced when the building opened in 1909 and the decades following. The need for increased thermal performance and the weakness of single glazing as an insulator, balanced with the identification of proven and aesthetically suitable glazing

Window Type	Original	Proposed Potential
1. Large Studio Window	Single glazed, timber framed	Double glazed, timber framed
2. Leaded Window	Lead astragals, single glazed, metal frame	Lead astragals, single gazed, secondary glazed with slimline aluminium sliding framed system or bespoke double glazed with clear inner pane.
3. Level 2 Studio Screen	Hardwood framed single glazed.	Hardwood framed double glazed with slim vacuum double glazed units
4. Hen Run	Hardwood framed single glazed screen or window.	Hardwood framed double glazed with slim vacuum double glazed units
5. Steel Framed Standard	Standard framed single glazed.	Standard framed (if available) double glazed with slim vacuum double glazed units
6. Steel Framed Bespoke	Bespoke framed single glazed.	Bespoke framed double glazed with slim vacuum double glazed units
7. Timber Framed Window	Hardwood or Redwood Framed, Single Glazed	Hardwood framed double glazed with slim vacuum double glazed units

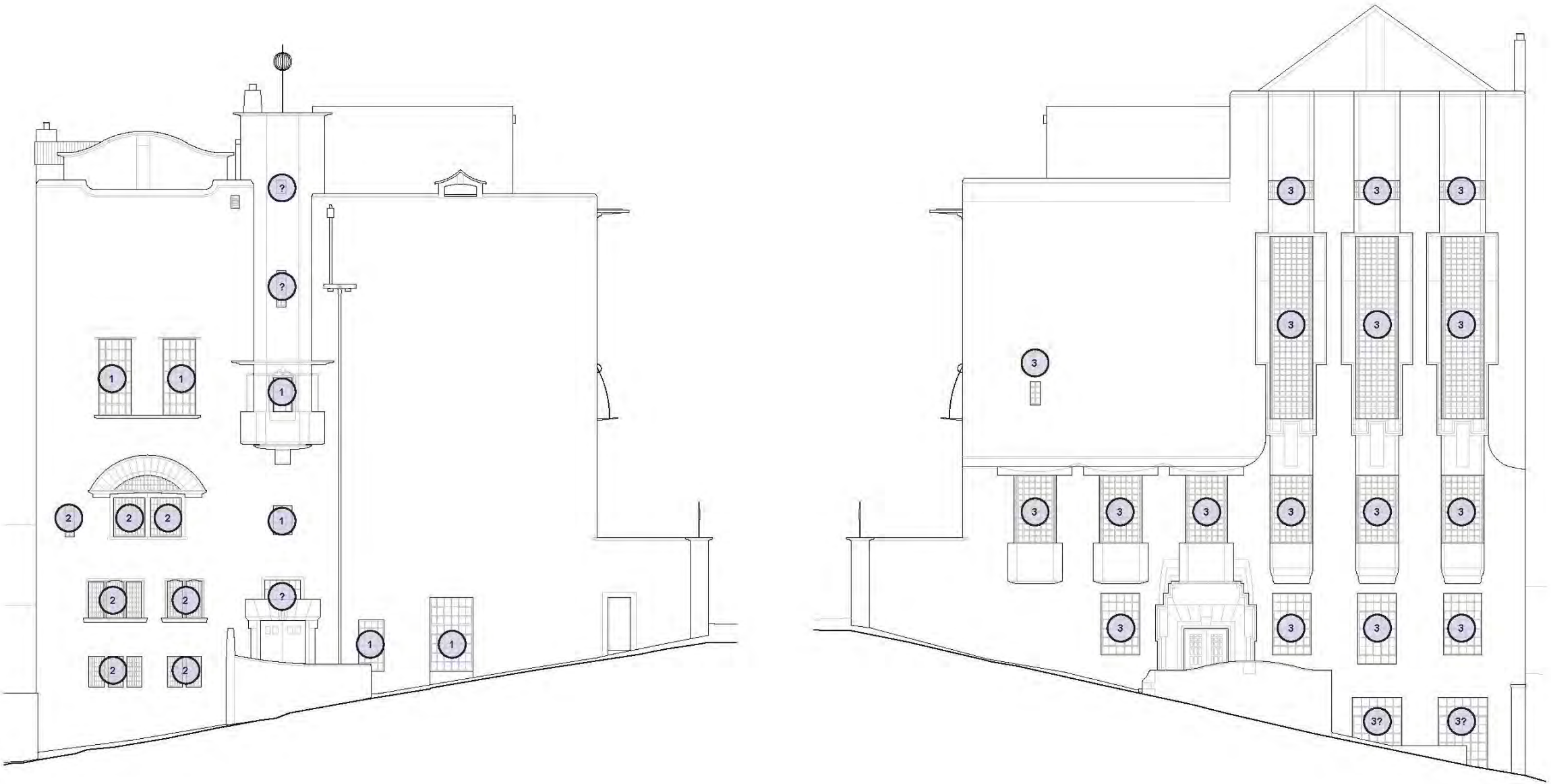
Approach to Sustainability: Windows

North Elevation



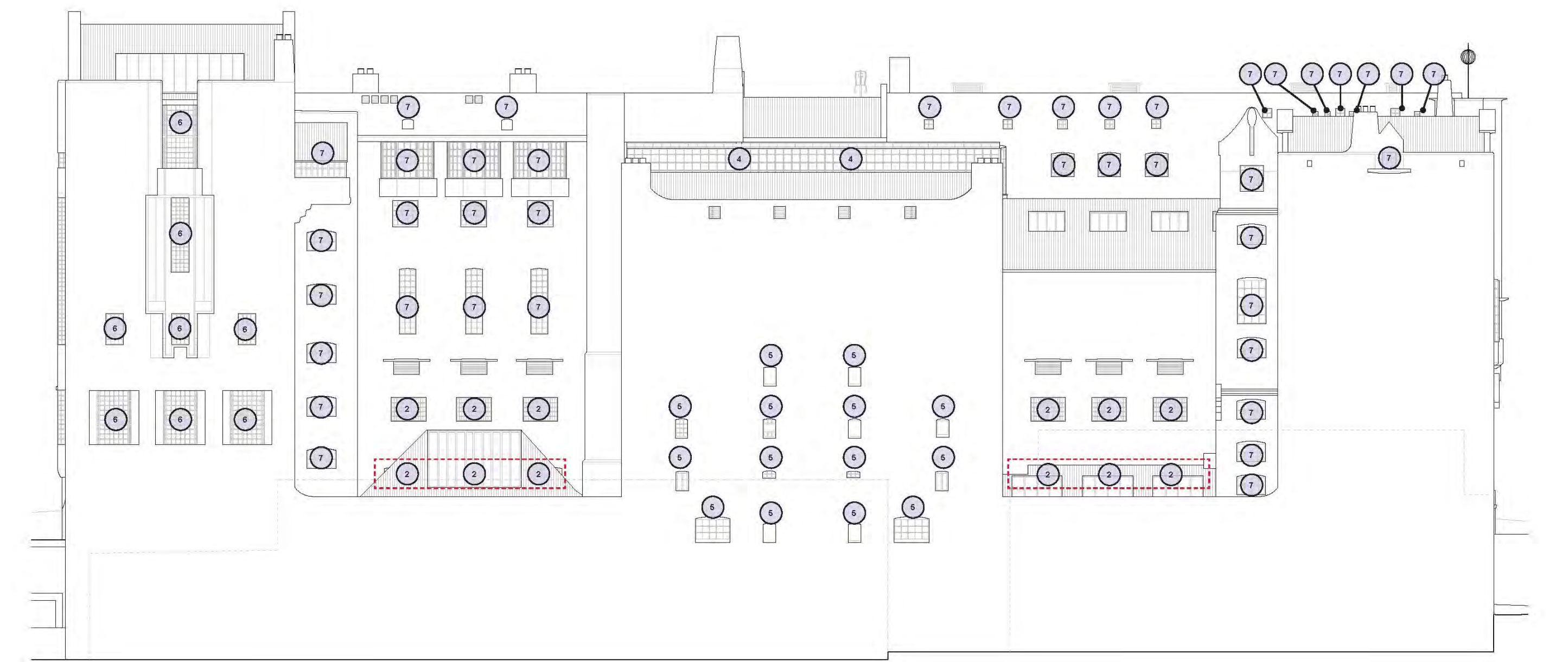
Approach to Sustainability: Windows

East and West Elevations



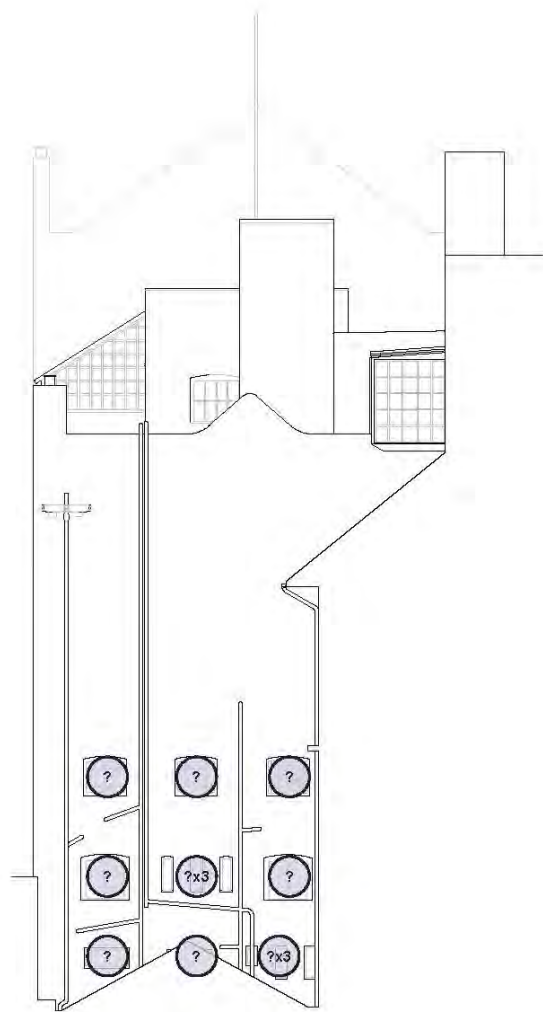
Approach to Sustainability: Windows

South Elevations

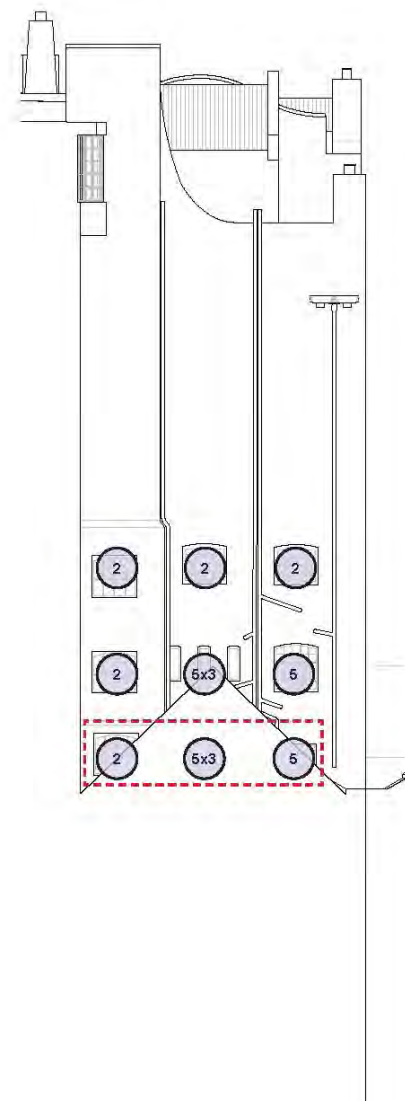
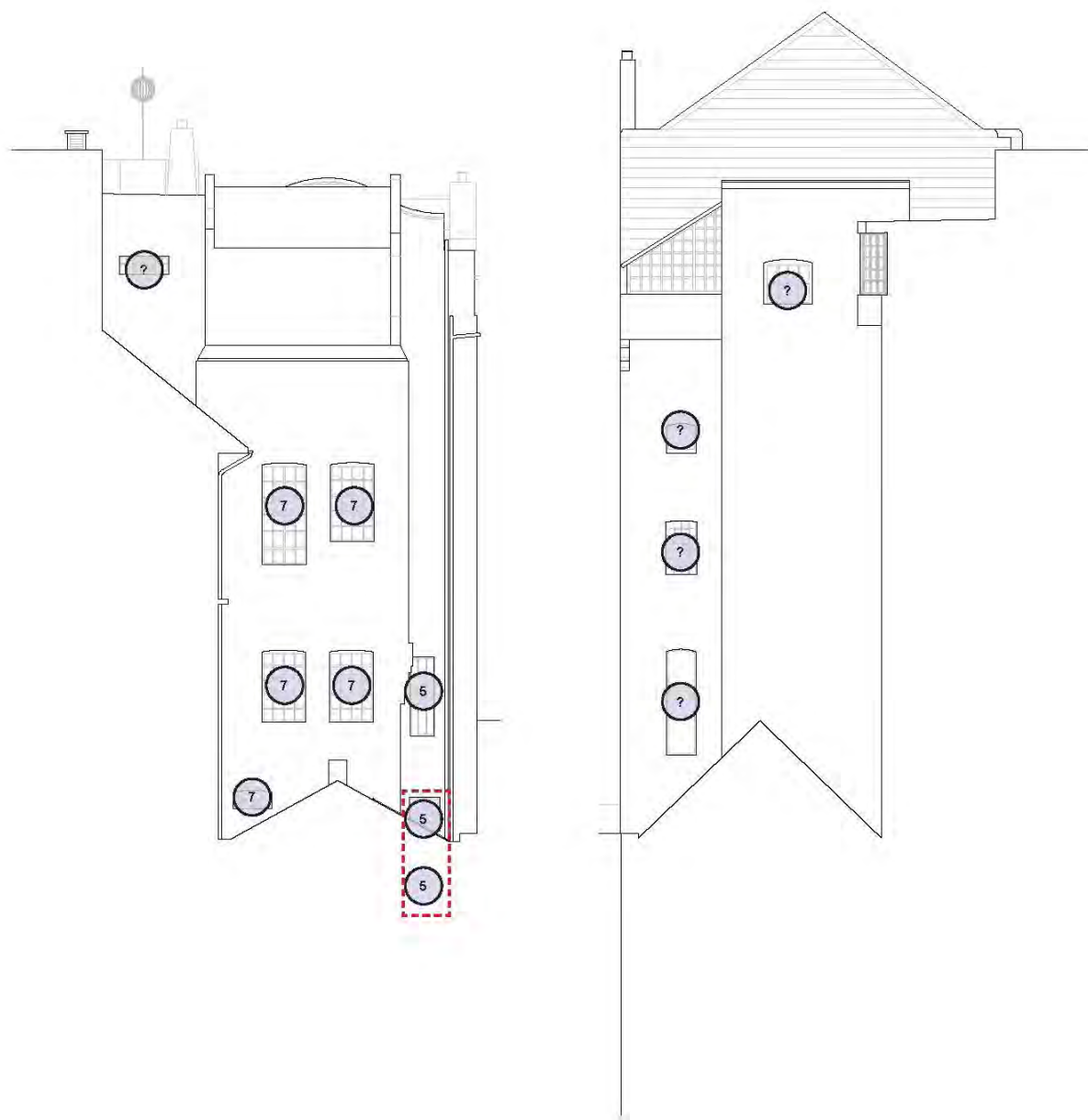


Approach to Sustainability: Windows

East Setback



West Setback



Approach to Sustainability: Rooflights

Original and Potential Types

The Mackintosh Building contained various configurations of patent glazing as described in the table opposite.

Until the late 1940's when extruded aluminium glazing bars were introduced, all patent glazing bars were manufactured from steel. The bars were generally clad over with lead. The glazing was single glazed. After World War 2 extruded aluminium glazing bars became available.

For the purposes of this SOBC addendum costing exercise we have allowed for steel glazing bars and double glazed units as per The Heritage Patent Glazing System provided by The Standard Patent Glazing Company.

During the next design stage of the project, it may be acceptable to use alternative methods of specifying and detailing some of the rooflights, particularly where they cannot be viewed at close range.

Glazing generally:

- Outer pane should have self-cleaning coating.
- Inner pane should be acid etched opalised glass or patterned obscured glass.
- Inner pane should have low-e coating to outer face.
- Space between glass should be should be a vacuum.
- The inner pane should be laminated safety glass.

Structure:

- The impact of introducing additional weight through the use of double glazing has not been developed during this exercise. A full structural analysis and design will be required during the next design stage.

Ventilation:

- An allowance should be made for openable areas in all rooflights. The openable units are likely to be bespoke manufactured.

Rooflight Location	Original	Proposed Potential
Life Modelling Room	Glazing Bars direct on to individual timber rafters. Overlapped single glazed sheets. Protective wire mesh either overlaid or within glass.	Double glazed. Glazing Bars direct on to individual timber rafters.
Anatomy Room	Self Supporting Glazing Bars spanning between timber purlins at head and base. Single glazed. Protective mesh laid over.	Double glazed. Glazing Bars self-supporting and spanning onto timber purlins at head and base.
Museum	Glazing Bars direct on to individual thin timber rafters. Overlapped single glazed sheets. Possibly Georgian Wired Glass.	Double glazed. Glazing Bars direct on to individual thin timber rafters.
Composition Room (Studio 58)	Glazing Bars direct on to individual timber rafters. Overlapped single glazed sheets. Possibly Georgian Wired Glass.	Double glazed. Glazing Bars direct on to individual timber rafters.
First Floor Studios	Glazing Bars direct on to individual timber rafters. Possibly Georgian Wired Glass.	Double glazed. Glazing Bars direct on to individual timber rafters.
Life Room (First Floor Mezzanine East)	Glazing Bars direct on to individual thin timber rafters. Overlapped single glazed sheets. Possibly Georgian Wired Glass.	Double glazed. Glazing Bars direct on to individual thin timber rafters.
Conservatory	Self-Supporting Glazing Bars spanning between timber wallplate at head and top of glazed wall screen at base. Single glazed. Georgian Wired Glass.	Self-Supporting Glazing Bars spanning between timber wall plate at head and top of glazed wall screen at base. Single glazed. Georgian Wired Glass.
Basement at North Facade	Glazing Bars direct on to individual timber rafters. Single Glazed Georgian Wired Glass.	Double glazed. Glazing Bars direct on to individual timber rafters.
First Floor Corridor East	Self-Supporting Glazing Bars spanning between timber wall plate at head and top of glazed wall screen at base. Single glazed. Possibly Georgian Wired Glass.	Double glazed. Glazing Bars self-supporting and spanning onto timber purlins at head and base.

Approach to Sustainability: Rooflights

Original Rooflights

In 1910 the photographer, Harry Bedford Lemere, took many photographs of the recently completed Art School. Alongside Mackintosh's 1909 drawings, the photographs show the design that the restoration will aim to replicate as far as is practical within the context of modern regulatory requirements.

Where older historical information is not available more recent photographic and drawing records have been used to gather information about the building's historical fabric.

The original rooflights were single glazed and appear to have been opalised or textured and wired glass, although it is possible that the wire mesh visible in some photographs was laid over the top of the glass. It is understood that all of the rooflights in the building were replaced in the 1980's and 1990's.

There were many companies manufacturing patent glazing in the late 19th/early 20th centuries including companies central Scotland. Henry Hope and Sons Ltd, who had a Glasgow office at 134 St Vincent Street and may have manufactured some of the original windows used in the Mackintosh building also manufactured patent glazing as illustrated in both their 1904 and 1912 catalogues which are available online. Another local company was Pennycook Patent Glazing and Engineering, then based in Bishopbriggs, who have re-emerged as a manufacturer in 2013 and are now based in Clydebank.



Composition room / studio 58 (1910)



Museum (1910)



Life Modelling Room (1910)



Anatomy Room (2004)

Approach to Sustainability: Rooflights

Contemporary Rooflights

The photographs opposite show recently completed patent glazing replacement projects where new, double glazed patent glazing has been installed on listed, historic buildings. Category B Listed Govanhill Baths in Calder Street in Glasgow has had over 800m2 of replacement patent glazing installed using a double-glazed ‘heritage’ system.

Ingestre Orangery, a grade 2 listed building in Staffordshire also recently successfully utilised a double glazed ‘heritage’ system of patent glazing.



Double glazed heritage patent glazing at Govanhill Baths, Glasgow



Ingestre Orangery after restoration



Ingestre Orangery before restoration



Ingestre Orangery after restoration

Appendix A

2.0 Precedent Projects



Drawing of Fyvie Castle, MacGibbon and Ross

Introduction

Introduction

In defining a future for the Mackintosh Building at the Glasgow School of Art it is prudent to explore other relevant projects recently completed within the marketplace, appraising their approaches, understanding their challenges, and drawing lessons that will inform project next steps.

Here a range of precedent projects are explored under key themes:

- Restoration After Fire
- Large Scale Conservation
- Access and Environmental Sustainability
- Art Schools

Other projects have also been appraised which showcase approaches to key challenges which will be relevant to the faithful reinstatement of the Mackintosh building, including achieving inclusive access within historic listed buildings and delivering environmental sustainability in balance with preservation of heritage authenticity.



Uppark House



Cobham Dairy



Hampton Court Palace



Koldinghus



Astley Castle



Manchester Town Hall



Stowe House School



Voysey House



National Portrait Gallery



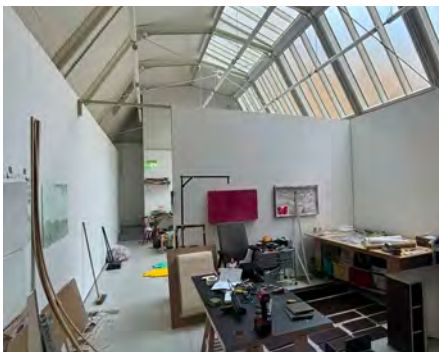
Central St Martins



Manchester School of Art



Birmingham School of Art



Royal Academy, Studio



Central St Martins, Studio



Manchester School of Art, Studio



Birmingham School of Art, Studio

Art Schools

Art Schools

As the Glasgow School of Art considers the faithful reinstatement of the Mackintosh building it is crucial to ensure that the vision for a sustainable and world leading Art School is defined through a clear brief for the facilities it will need to incorporate. Exploring precedent projects has helped define a benchmark for what excellence looks like in leading Art Schools today.

Precedents have been explored in two key sets:

1. Redevelopment projects to leading art schools in London to establish understanding of the provision at potential key competitors to the Glasgow School of Art, and
2. Recent refurbishment projects to purpose built (now listed) Art Schools from the late 19th Century era in which the Mackintosh building was originally created.

Redevelopment Projects:

Central St Martins, London

The project involved the transformation of a listed, derelict Victorian Granary Building to create a new home for Central St Martins' 5000 students. New interventions combined with a sensitive handling of the historic fabric resulted in a project that served as a catalyst for the King's Cross regeneration and the formation of the King's Cross knowledge quarter.

The project brought together the college's previously dispersed departments into one place. The original building was Grade II listed and built in 1851 by Lewis Cubitt, also the architect of King's Cross station. Spaces are designed to be flexible and 'raw', to allow the different departments to develop their own identities, whilst maintaining the integrity of the buildings as a whole.

Royal College of Art, Battersea, London

The new building provides flexible floor plans that can adapt to changing programmes of teaching and research. The gross internal floor area is 15,500m2.

The project consists of a general purpose studio block of four stories, with workshops on the ground floor and studios above and a research block of eight stories. The studio block also contains a multi-purpose space called the 'hanger' which can be opened to the public directly from the street. Both buildings are concrete framed. The studios are based on a 9m planning grid and can be easily subdivided and adapted using temporary/moveable partitions and curtains. The studios receive high levels of daylighting and provide equitable distribution of space for the users.



Central St Martins, Kings Cross



Central St Martins, Kings Cross



Royal College of Art, Battersea



Royal College of Art, Battersea

Art Schools

Art Schools, cont.

RA Schools at the Royal Academy, London

The RA Schools has been a key part of the Royal Academy since its foundation in 1769. It offers a full-time, three-year programme to 10–17 postgraduate students each year. It is the longest established school of fine art in the UK and has been located on the lower ground floor at the northern end of Burlington House, the RA's historic home, since the 1870s.

The project prioritised the rationalisation of the spaces and maximisation of light while improving access, circulation, services and thermal performance. The revitalised campus has more studio space, a suite of technical workshops, a library and a canteen and opens onto the landscaped courtyard between Burlington House and 6 Burlington Gardens – the historic building that the RA expanded into in 2018.

Manchester School of Art

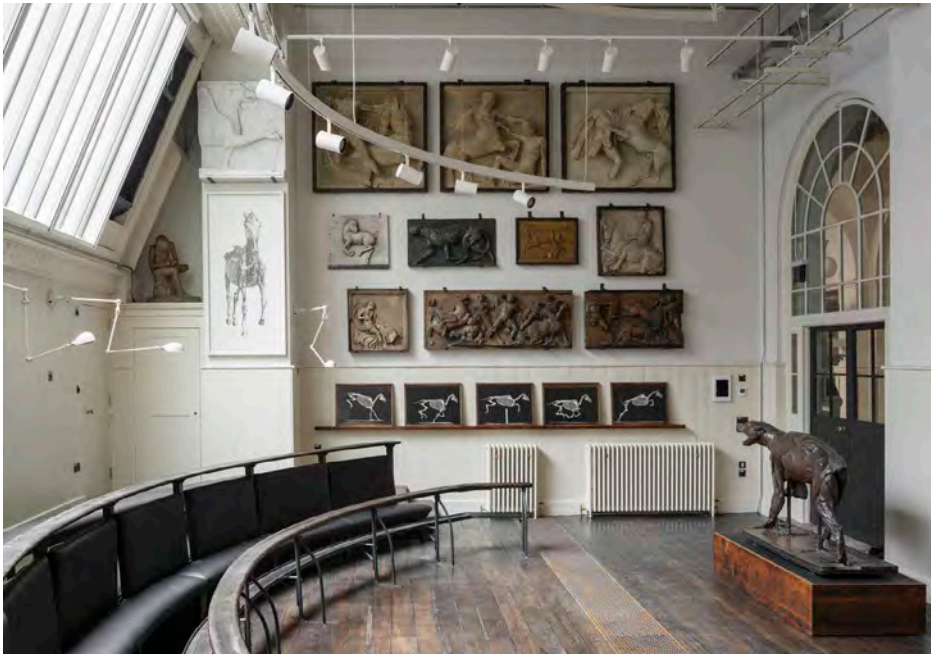
Manchester School of Design opened in 1838 in response to a growing feeling that British industries were losing markets to overseas competitors. By providing design education for the region's artisans, it was hoped to reduce the dependency on overseas firms. Extensions were made which included the exhibition hall (the present Holden Gallery) and the South Studios (1917). It is Grade II listed.

The building has recently undergone a 'life cycle' project refurbishment involving fabric repair to the exterior brick and stonework and the roof and rooflights, as well as adding secondary glazing to improve the insulation. The work also included enhancing accessibility, inclusivity, upgrading and replacing internal heating and lighting systems, and maintaining, enhancing and reintroducing the original heritage assets.

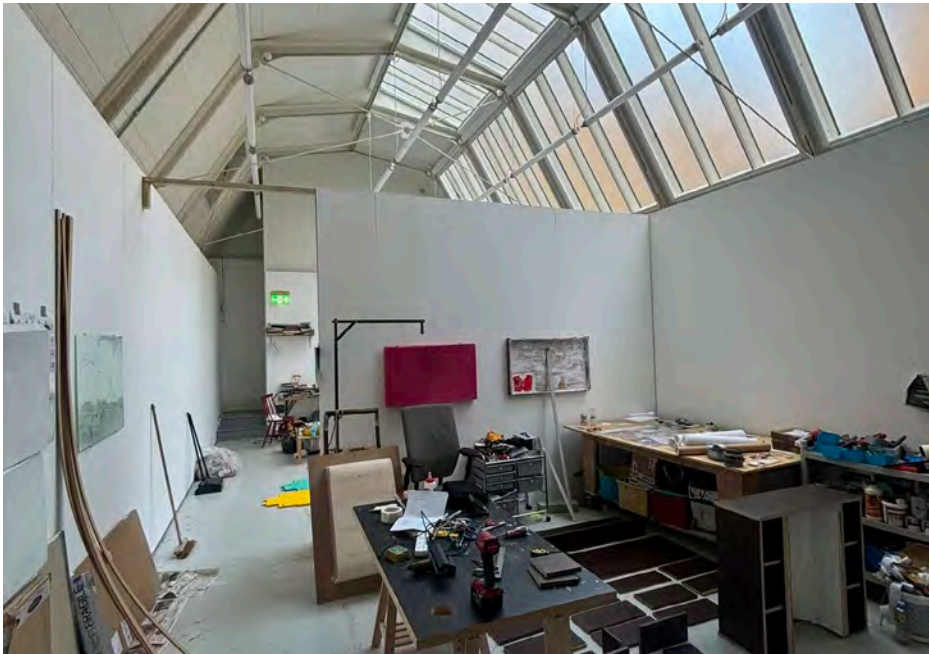
Birmingham School of Art

Birmingham School of Art is a stunning Grade I listed building in Venetian Gothic style, born from the Ruskin-inspired philosophy for art education that was flowing through the city at the time. Open since 1885, the School is the finest example of the work of architect JH Chamberlain. By the late 1980's the building had fallen into disrepair. Birmingham City University, with Associated Architects, delivered a major phased refurbishment which completed in 1995, to a cost of £6.5m.

New mechanical and electrical services and infrastructure for data networks were installed throughout, providing modern School facilities with surrounding Gothic architecture. At the second floor level a large new gallery was created for exhibitions. The building's former lightwell became home to a new passenger lift, making the School a fully accessible educational facility for the first time.



RA Schools at the Royal Academy



RA Schools at the Royal Academy



Manchester School of Art



Birmingham School of Art

Art Schools

Photographs from Precedent Visits

Central St Martins



Top floor studio



Lower level studio



Circulation bridge



Workshop



Ceramics studio



Covered street

The Royal College of Art



Cafe/exhibition space



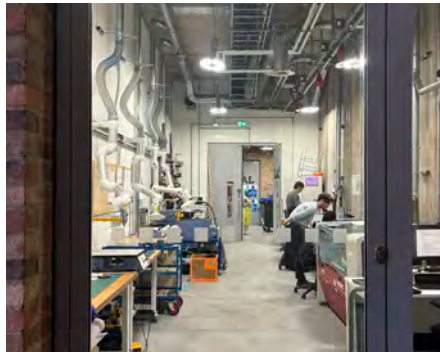
Lower level studios



Top floor studios



Lower level studios



Ground floor workshops



'Multi-function' space

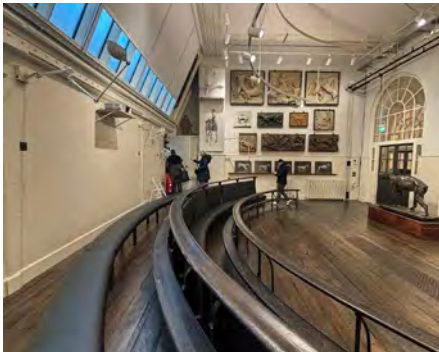
The Royal Academy



Stair and passage refurbished



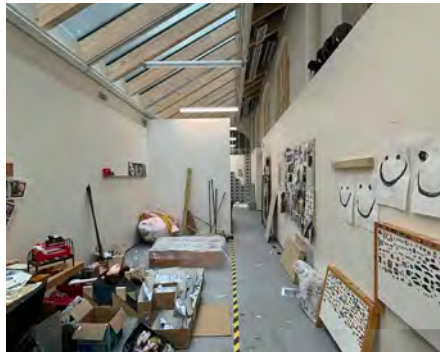
Primary circulation to studios



Lecture theatre



Refurbished studio



New studios



Workshops

Art Schools

Photographs from Precedent Visits

Manchester School of Art, Grosvenor Building



Exterior



First floor studio



The Holden gallery



Top floor studios exhibition setup



Circulation



Studio

Birmingham School of Art



Exterior



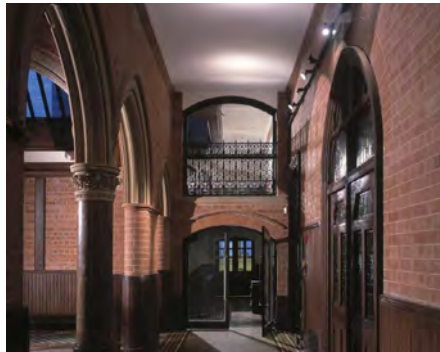
Top floor studios



Top floor studios, exhibition setup



Printing workshop



Circulation



Central gallery

Restoration After Fire

Restoration After Fire

Within our generation several highly significant historic and listed buildings have suffered devastating fires, in the UK and across the globe. Major projects have followed completing the restoration of these historic places, often in very different ways. Many of these projects have taken an approach focused on full reinstatement or scholarly restoration, returning the buildings to a design closely replicating their pre-fire state.

When *Uppark*, a Grade I listed 17th Century country house in Sussex, England suffered a fire in 1989 it galvanised the largest conservation exercise ever undertaken at that time by the National Trust, its property owners. The project delivered painstaking conservation and restoration focused on retaining what was found and returning the lost fabric and the atmosphere of the house to exactly the day before the fire. The project took six years to complete and cost an approx. £20m, equivalent to roughly £50m today.

In 1986 when fire severely damaged the Kings Apartments in the wing of Grade I listed Scheduled Monument *Hampton Court Palace* built by Sir Christopher Wren in 1689-91, a restoration immediately followed which took six years and approx. £10m (at the time) returning the roofs and interiors that had been lost to as close to their original design as could be achieved.

More recently, *Cobham Dairy* has been one of The Landmark Trust's most transformative restorations". Cobham Dairy in Kent returned a devastated Grade I building designed by one of the most influential British architects of the 18th Century, James Wyatt, to its original highly ornamental neo-Gothic design of 1794. Prior to the project the building had been fire damaged and was derelict for decades. Through careful scholarly research into historic drawings and documents, and engagement of uniquely skilled craftspeople, the exquisite plasterwork, joinery and stained-glass detailing of the original design were returned in a three-year restoration project costing £1m. The scheme, delivered by architects Purcell, won two RIBA awards in 2021, and featured on Channel 4 TV's Restoration: Historic House Rescue.



Uppark House, fire damaged



Uppark House, reinstated



Hampton Court Palace, fire damaged



Hampton Court Palace, reinstated



Cobham Dairy, derelict



Cobham Dairy, reinstated

Restoration After Fire

Restoration After Fire, cont.

Outside the UK, Notre Dame Cathedral in Paris, France (a Historic Monument and UNESCO World Heritage Site) suffered a major fire in 2019 – a year after the second fire at Glasgow School of Art. Fire damage restoration focused on returning the Cathedral to its pre-fire design commenced immediately and completed in December 2024 at an expected cost of around 850 million Euro.

Other projects have taken a different approach to bringing use back in to fire damaged structures delivering projects which include a designed layer of change alongside considered conservation, or restoration, of historic fabric. Often such approaches acknowledge a new significance acquired by the event of the fire, or in hitherto concealed built fabric revealed by its impact. These multi-layered approaches are employed particularly where the proposed use of the building will be substantively different to the original purpose of the building, where evidence is too limited to enable a scholarly restoration, or where budgetary constraints are considerable for the property owners.

Sometimes done with an apparent intention that interventions can one day be reversed or undone, should future generations seek to take a different approach to the building's rescue, considering their work as only in a moment in the life of the historic building or place – a life which has now been enabled to continue potentially beyond the design life of the new interventions made in a restoration project.

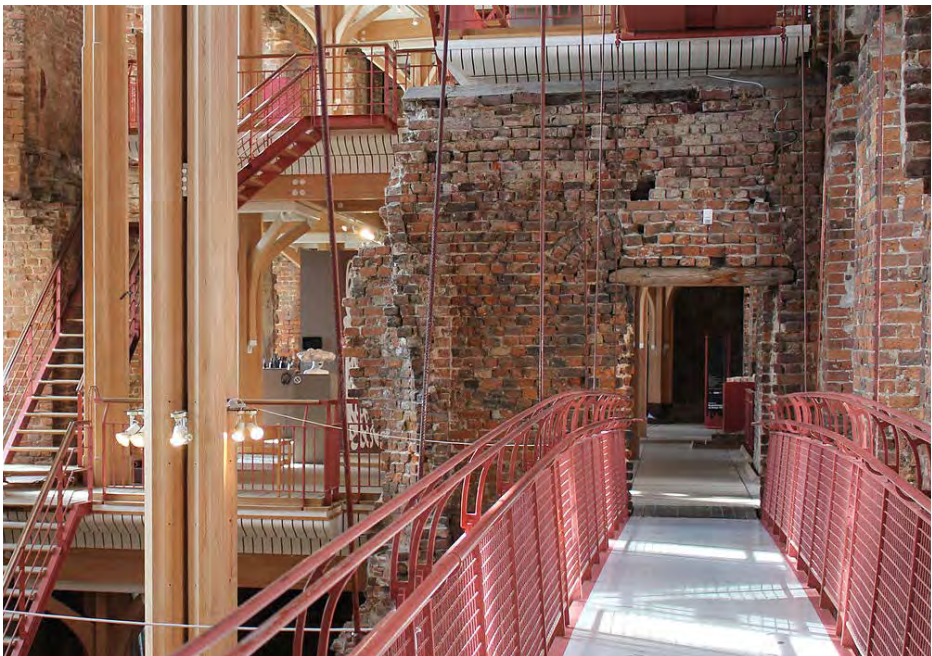
The Grade II* listed 16th Century **Astley Castle** in North Warwickshire, England was once the home of an aristocratic English family, but has stood as a ruin since the 1970s, when a devastating fire wiped out the hotel that occupied the building at that time. Without a budget to restore the building, architectural charity The Landmark Trust commissioned architects Witherford Watson Mann to create a holiday house delivered for a £2.5m project cost, executed in contemporary detailing within the decaying structure where old and new are visually distinct. The scheme was delivered to exceptional quality standards and won the RIBA Stirling Prize in 2013.

The project at Astley Castle had followed similar principles to the restoration of **Koldinghus**, one of Denmark's most significant royal castles founded in the 13th Century. In 1972, architects Inger and Johannes Exner were commissioned to renovate Koldinghus, which had remained a burnt-out ruin for more than 150 years. The goal of the renovation was not to restore the castle to its former appearance before the fire in 1808, since it would never again be a royal residence. Instead, the ruin was retained largely intact, as visible illustration of a dramatic period in the castle's and the kingdom's history. A new architectural structure was installed to protect the ruin, whilst highlighting its storytelling potential in its new use as a museum and visitor attraction. The Ruin Hall received the 1993 Europa Nostra Heritage Award.

After the devastating fire in 1992 which caused extensive damage and major loss to **Windsor Castle**, its restoration was a complex major project costing £36.5m when completed in 1997, exactly five years after the fire (which equates to more than double that sum today). Windsor Castle is a Grade I listed building and Scheduled Monument, it is also the largest inhabited castle in Europe and one of the official residences of the British monarchy. Nine principal state rooms were destroyed and at least 100 more were severely damaged, accounting for one fifth of the castle (9,000 square metres).

Over half the damaged and destroyed rooms, including the State and Octagon dining rooms, were to be restored as original. New designs were evolved for the St George's Hall ceiling and roof, East Screen, the Queen's Private Chapel, Stuart and Holbein Rooms – in a decision which focused on using the restoration as an opportunity to advance traditional building skills in the UK market. Designed by architect Giles Downes, the new roof for St George's Hall is a hammer-beam ceiling and largest green-oak structure built since the Middle Ages.

Closer to home in Scotland recent projects to address fire damaged historic buildings of course include the 2016 project to restore the Mackintosh building following the first fire in 2014. As Robyne Calvert identifies in her 2024 publication *"The Mack": "we arguably know more about this building than we ever have, from previous scholarship and the vast amount research generated from this 2014-2018 restoration project, and even through current post-fire stabilisation efforts."*



Koldinghus



Astley Castle



Koldinghus

Restoration After Fire

Restoration After Fire, cont.

Indicating that some of the right skills can be found locally to deliver excellence in reinstatement projects, Scotland has also seen an award-winning post-fire restoration at *Garrison House* in Millport on the Isle of Cumbrae. Costing £4m in 2010 the project saw refurbishment and redevelopment of a Category B listed 17th Century Garrison building for the island community. Dating from the mid-eighteenth century the building was in constant use until 2001, when it was almost destroyed by fire. The National Lottery Heritage funded project concerned the full restoration and rejuvenation of the building including stabilisation and repair of the surviving walls and introduction of new contemporary internal spaces for a diverse range of community uses.

Clandon Park

One of the most prominent current projects to a significant listed fire damaged building is underway at Clandon Park, a National Trust owned Grade I listed property in Surrey, England which suffered an extensive and devastating fire in 2015.

A Grade I listed 18th century Palladian mansion in Surrey, England designed by Giacomo Leoni, decorated by leading European sculptors, and built to impress. Many of the highly significant interiors were lost or substantially damaged in the fire, leaving its brick and stone-built structure open to the skies. The unique circumstances at Clandon Park as a result of fire gave the National Trust opportunity to take a new direction rather than a straightforward restoration, which would be a modern replication given the extent of loss.

In recognition that the fire had transformed Clandon's heritage significance its potential to come to life once more has focused on evolving its story to create a place which can teach visitors how great houses were designed, built and crafted.

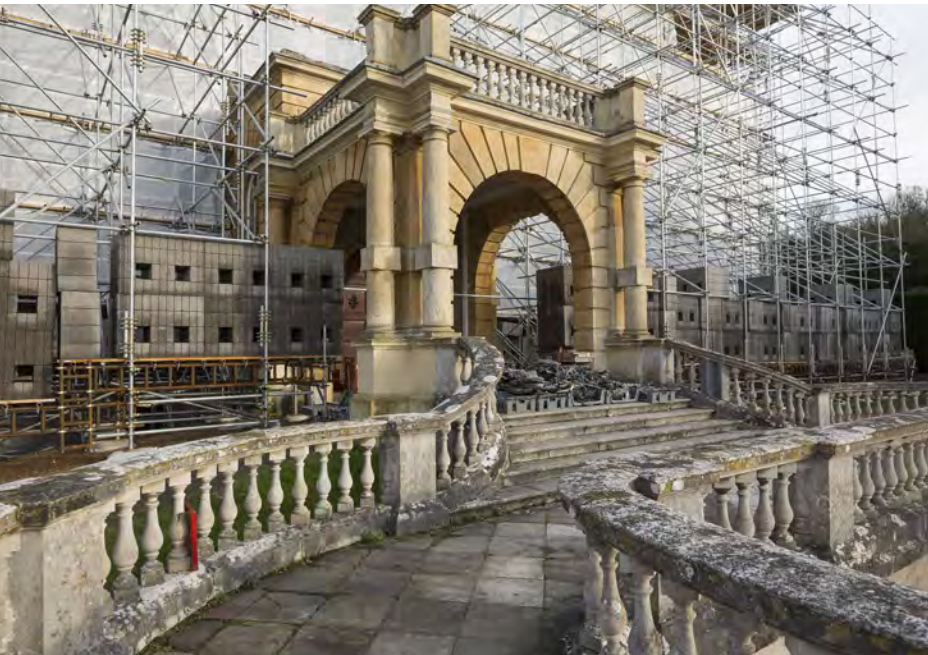
The National Trust welcomed over 70,000 people to experience the fire-damaged house, and their responses have taught us how powerful and evocative Clandon Park is in its laid bare state. They reported "We've seen artists, scientists, engineers, designers, tradespeople and young children, all gasping in awe. Our vision builds on these responses to celebrate what survives and makes Clandon Park unique today."

Within the project the brick and stone skeleton of the house will be repaired and stabilised. Most of the interior will be conserved, made usable, and presented in a version of its new laid-bare condition, offering people an insight into how country houses were made. The introduction of new staircases, a lift, and wide walkways at different levels will allow visitors to fully explore the house including new public access to a roof terrace. Elements of historic fabric which survived the fire will be conserved and restored, creating a counterpoint to other rooms.

The project cost is confidential with estimated completion late 2027-2028, delivered through Construction Management. The project team includes architects Allies and Morrison with a wider design team including Purcell heritage architects.



Clandon Park State dining room, before Fire



Clandon Park stabilisation works



Clandon Park fire



Clandon Park, post fire

Large Scale Conservation

Large Scale Conservation

Major construction projects are often fraught with complexity and challenge, and rarely more so than when delivered within the unique contexts of highly significant historic and listed buildings, where discoverables within condition of building fabric often pose risk to programme and cost.

Conservation and restoration projects recently delivered or currently underway in the UK face design challenges of upgrading historic fabric to meet modern building regulations, as well as key challenges in project procurement and delivery posed by a widely acknowledged shortage of skills in specialist areas of heritage conservation and crafts trades.

Two of the largest recent heritage projects in the UK are appraised here outlining the impacts of these challenges, and how schemes are currently working to overcome them:

Manchester Town Hall

The “Our Town Hall” project, currently underway at Manchester Town Hall since 2018, is the largest and most complex heritage project taking place anywhere in the UK, and the largest heritage project in the UK in living memory.

The project is a major renovation of Manchester Town Hall, a Grade I-listed neo-Gothic building built in 1877 by Sir Alfred Waterhouse, to restore it and bring it up to modern standards. Purcell are Lead Architects, working with a broad team including Lend Lease as Management Contractors, who are leading the work of over 80 contractors on over 22,000 specialist packages and activities across the building.

The project involves repairing and restoring the building external envelope and internal spaces throughout, including key historic features and highly decorative interiors. It also includes improving the building’s safety and accessibility, such as adding new lifts and welfare facilities ensuring office, ceremonial and civic accommodation fit for the 21st Century. Currently planned to complete in 2026, areas of the building are now opening to the public in phases.

Beset with a series of challenges including hyperinflation in the construction industry, major external events such as the war in the Ukraine and the effects of the global COVID -19 pandemic, as well as other unpredictable factors including discoveries in the building fabric, challenges with long-lead times and limited market supply of heritage materials for repairs such as cast iron, and the arrival of nesting falcons within the enormous scaffold that has shrouded the building. The current forecast project cost is £430m.

Timescales have been affected by more stringent fire safety standards post-Grenfell compounded by a backlog of certified fire-performance tests on materials in the market. To address these challenges the project has adopted some highly innovative approaches to collaborative working, including a Fire Safe Design working group of designers, Building Control and Fire Officers, contractors and suppliers, external advisors, and client legal representatives to evolve and verify designs for FR upgrades to historic building fabric, and over 150 historic doors and joinery.



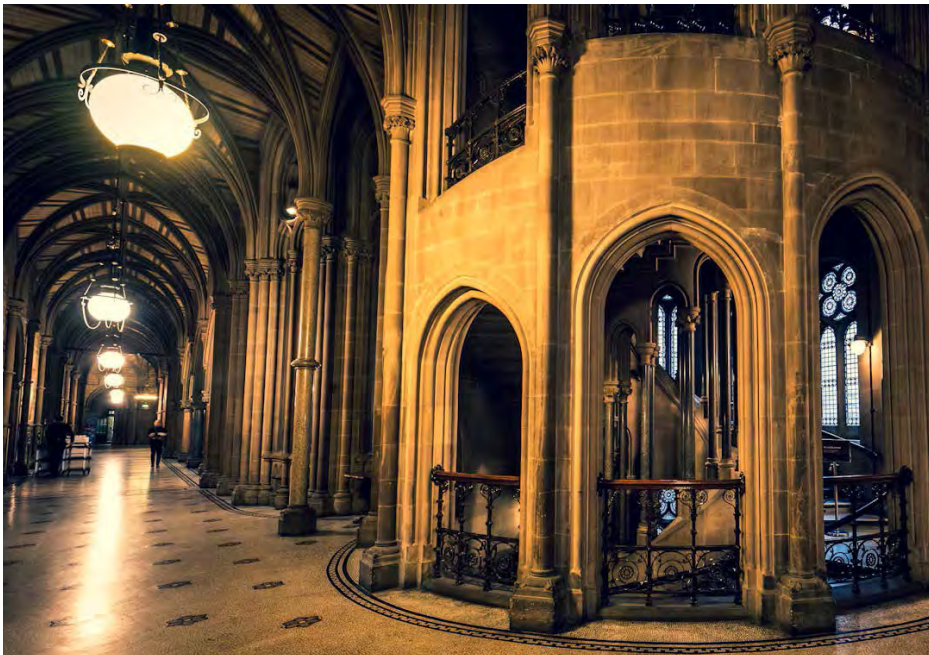
Manchester Town Hall, exterior



Manchester Town Hall, interior



Manchester Town Hall, restoration



Manchester Town Hall, interior

Large Scale Conservation

Large Scale Conservation, cont.

Throughout its design and delivery, the project has focused on achieving social value closely measured from the outset, and now calculated to have generated £16.5m in benefit for the city with over 300 jobs and 172 apprenticeships created by the project.

Stowe House School

The Historic Houses Foundation have described the epic restoration of Stowe as “one of the most significant restoration projects of our era.”

Featuring designs by many preeminent architects including Vanburgh, Sir James Gibbs, William Kent, Robert Adam and Sir John Soane, Stowe is one of the finest country house estates in Europe. Today it is a Grade I listed building set within exquisite landscape gardens in Buckinghamshire, England which are also a Grade I Registered Park & Garden. In 1923 Stowe became a school, and is one of the world’s most prestigious independent public boarding schools. However, by the late 20th Century the building had fallen into a ruinous state of dereliction and was on the Historic England Heritage at Risk Register.

Since 1999 a phased £52m restoration delivered through individual traditionally procured contracts has been underway, led by architects Purcell. The programme was specifically designed in phases to address urgent work to safeguard the external envelope first with budget available, and then deliver restoration to interiors as the derelict building dried out once re-roofed and as budget became available through continued fundraising effort. The phased strategy also helped the project navigate the challenges of procuring large-scale conservation, enabling broader market engagement with contractors and craftspeople.

The exemplary quality standard of conservation and restoration delivered at Stowe has earned the project several prestigious awards, including RICS, RIBA, British Construction Industry Awards, and a highly coveted prize as Country Life Restoration of the Century. In 2023 the project’s completion saw it win The Georgian Group’s Restoration of a Country House Award.

The project has balanced scholarly conservation and restoration returning the building to its former glory with ensuring the School meets modern Building Regulations, improving MEP services to enable digitally enabled world class learning and teaching spaces, and enhancing environmental performance of the historic building fabric to reducing long-term energy use for the school. Conservation repairs have included relaying of roofs in Westmorland and local stone slates on restored timber roof structures including new thermal insulation and roof void fire dampers to achieve modern building standards.

A key challenge bought about by the phasing strategy was ensuring that phases of construction which were implemented once the School had reoccupied ensured that the logistical and practical needs of the school teaching staff and pupils were met, and not impacted by ongoing restoration works. Phased delivery meant smaller overall project timescales, and works could be extended over holidays where possible to avoid disruption during term time, including detailing innovative scaffolds and site logistics to ensure teaching can run concurrent with restoration works.



Stowe House School, exterior



Stowe House School, exterior



Stowe House School, interior

Access and Environmental Sustainability

Access and Environmental Sustainability

National Portrait Gallery, London

This precedent has been selected as it features transformational changes for inclusive access to listed buildings. Designed by Ewan Christian, the National Portrait Gallery was the first portrait gallery in the world when it opened in 1896. In a £42m NLHF funded project led by Jamie Fobert Architects and Purcell, the Grade I listed building has now been revitalised to achieve an enhanced visitor experience through improved inclusive physical and intellectual access to the building and its collection, redefining the gallery’s relationship with the city.

The project, completed in July 2023, is transformative yet respectful, taking cues from the original Victorian design to inform the new interventions. A key move is the creation of a new main entrance and forecourt to the north elevation where there had never previously been an entrance. This was achieved through bold yet sensitive changes turning three windows into bronze doorways, featuring artwork by Tracy Emin, and adding an entrance bridge for a generous and inclusive visitor entrance.

Genuinely focused on enhancing physical and intellectual access for everyone in its design interventions, in the six months since it opened in July 2023 the National Portrait Gallery welcomed a record 1.4m visitors including a 66% increase in first-time visitors who hadn't previously considered the gallery for them, a 61% increase in families, and an impressive 357% increase in disabled visitors.

Across the rest of the building a thorough re-think of underused space has created 18% more public space. Sustainable design was conservation-led, creating only 42m² of new build but transforming an underused 950m² across the listed building into public space through restoration of galleries in spaces which had latterly become staff offices the Weston Wing, and the creation of an enhanced lower-ground-floor learning centre. All galleries are restored with particular emphasis on careful reintroduction of natural light.

Described by the RIBA Journal July 2024 as “Unshowy and assured, this forensic reworking gives a much-loved institution a fresh way forward.” The scheme, which underlines how creative change can sensitively transform historic buildings to sustainably meet user needs into the future, was one of six projects on the RIBA Stirling Prize Shortlist in 2024.

Voysey House, London

This project is included for its environmental sustainability improvements, achieved while remaining in-keeping with its listed status. Voysey House is a Grade II* listed building in Chiswick, London originally built in 1902. It is notable as the only non-domestic building designed by Arts and Crafts Architect CF Voysey - whose work Charles Rennie Mackintosh is acknowledged to have admired.

The restoration of CFA Voysey’s only commercial building has revealed lost design details in a sensitive retrofit that also significantly enhances energy efficiency of the listed building. The scheme, designed by dMFK architects is reported to have costed approx. £2m.

From the outside, the building once again looks as it did when first built. Consent was achieved from Historic England and Local Conservation Officers to replace non-original existing windows with huge newly made steel-framed windows as replicas of Voysey’s design, painted to match the original colour scheme but incorporating ultra-thin 7.7m Fineo vacuum double glazing for thermal efficiency. The steel framed windows were made by West Leigh a bespoke products reproducing the original profiles in a colour-matched ‘Voysey bottle green’. This outcome reduced the building’s U-value by over 50%, contributing to an EPC rating of A.



National Portrait Gallery, exterior



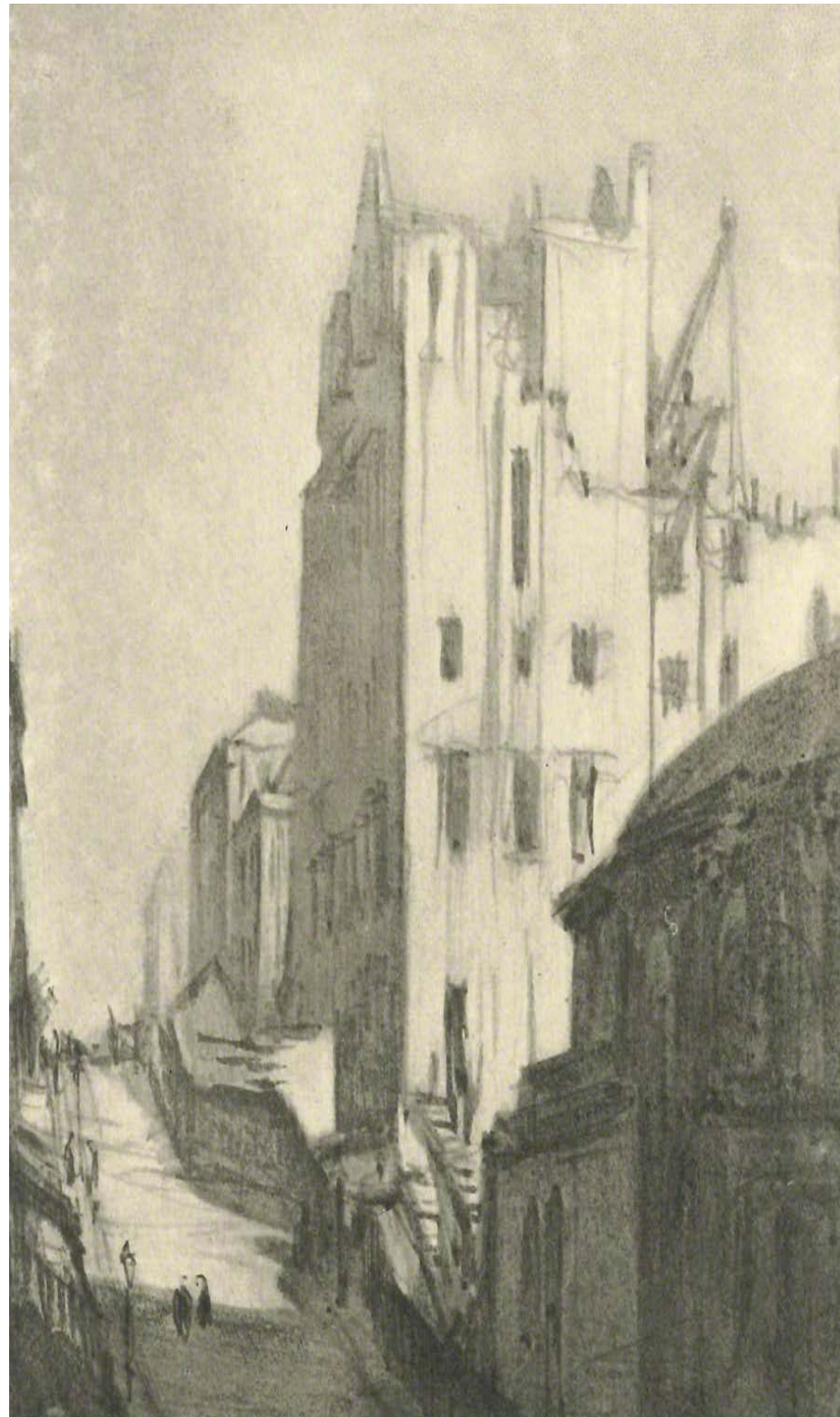
Voysey House



National Portrait Gallery, interior

Appendix A

3.0 Delivery Scenarios



Etching of Southwest corner under construction (1911)

The Mackintosh Building Divided into Zones

Introduction

The Mackintosh building can be interpreted as being a series of spaces that have been arranged and grouped vertically and unified by a central core wall that provides the services distribution and circulation through the building.

During the initial competition to design the building in 1896, it became apparent the budget of £14,000 assigned to the building works was inadequate. The competing architects were consequently asked;

“To mark on their plans by shading or other means such portion of their design as can be carried out for the Sum of £14,000..”

Mackintosh and Keppie proposed that the central section of the building including the entrance should be built first. This can be concluded from the recommendation made by local judges in a letter to the School’s directors in 1896:

“... in our opinion it would be advantageous, as well as economical, if (in carrying out the design) instead of erecting at present the dark shaded Central Block...., the design should be modified as to begin the present building at Dalhousie Street and carry it westwards as far as the able funds will allow thus leaving only one end to be built at a later date.”

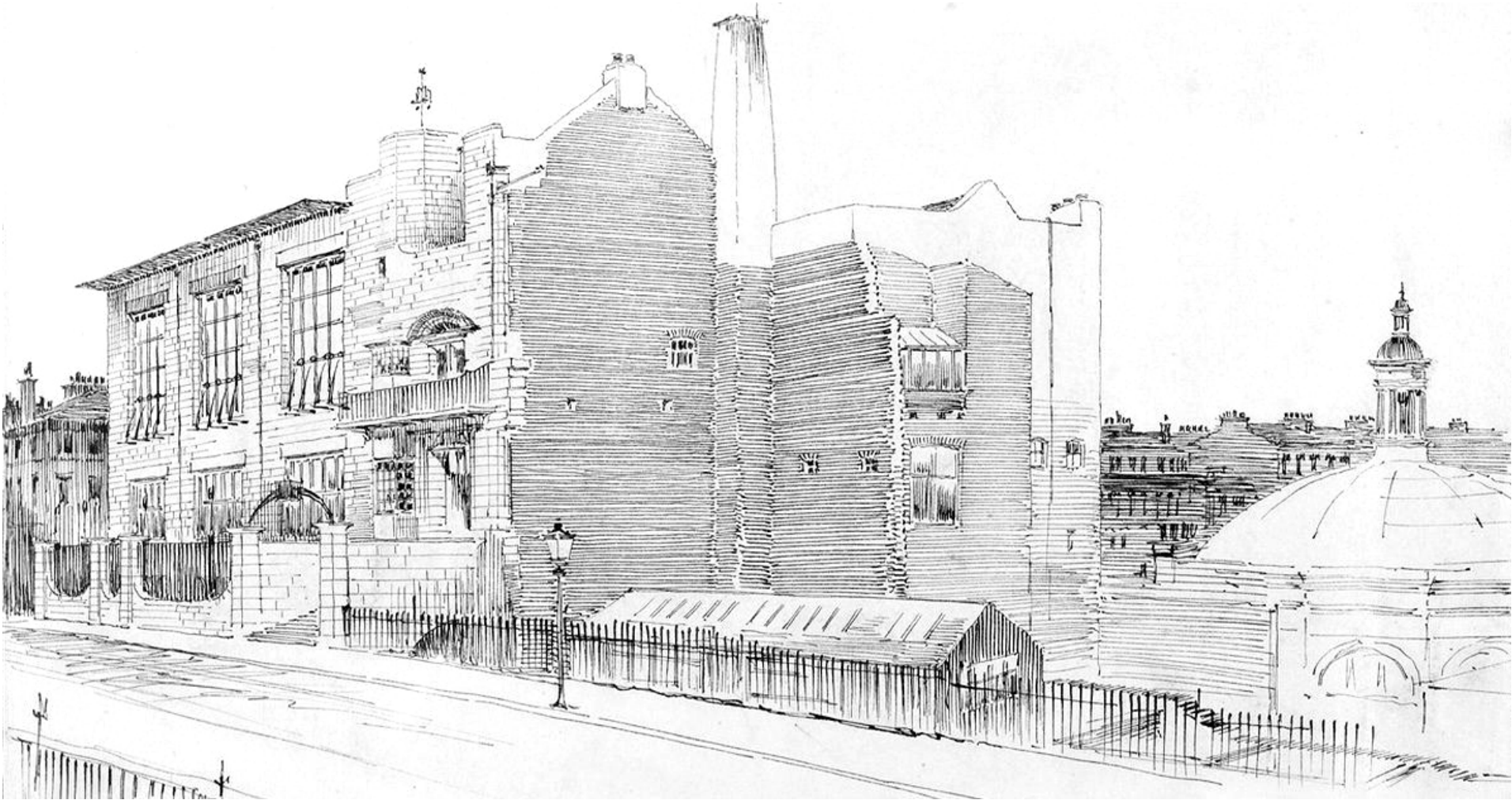
- Letter to Directors from James King and Renny Watson 1896 - quoted in The Mack, Robyne Calvert.

Their advice seems to have been followed and in 1899 the first phase of the building was completed which included the eastern half of the building and the entrance and the museum. The second phase, the western half plus additional stairs and attic studios, started in 1906 and was complete by 1909.

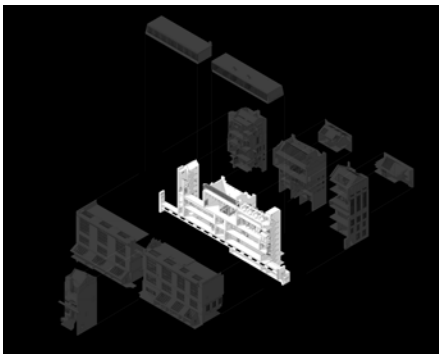
Current Assessment

A phased reconstruction of the Mackintosh Building has been considered as a part of the SOBC Addendum. Reinstating the entrance, main stair, east and west stairs, a new fire core, and connecting circulation routes would establish a central spine facilitating access, escape, services, and the pivotal experience of entering, traversing the hall, ascending the stairs, and reaching the top-lit museum. Subsequently, either the western or eastern half of the building could be completed and integrated into this core structure. Scenarios 1a and 1b on the following pages illustrate the completion of the Core alongside either the Western or Eastern Half, respectively.

Phasing the reinstatement of the Mackintosh Building presents significant challenges compared to the original phased construction between 1896 and 1909. Initially, the entire structure—east, west, and core sections—must be stabilised and repaired before proceeding with further restoration. Additionally, replicating the 1899 design would not meet current building regulations and safety standards. Therefore, any phased approach should prioritise restoring the building’s central spine and circulation areas, along with essential life-support infrastructure. However, the short term financial saving that would be achieved by building in phases would be a significantly lesser proportion of the overall cost than was achieved in 1899. Consequently, an east/west phased approach has been discounted.



First phase, 1897-1899



The central spine of horizontal circulation and services, and the two stair cores



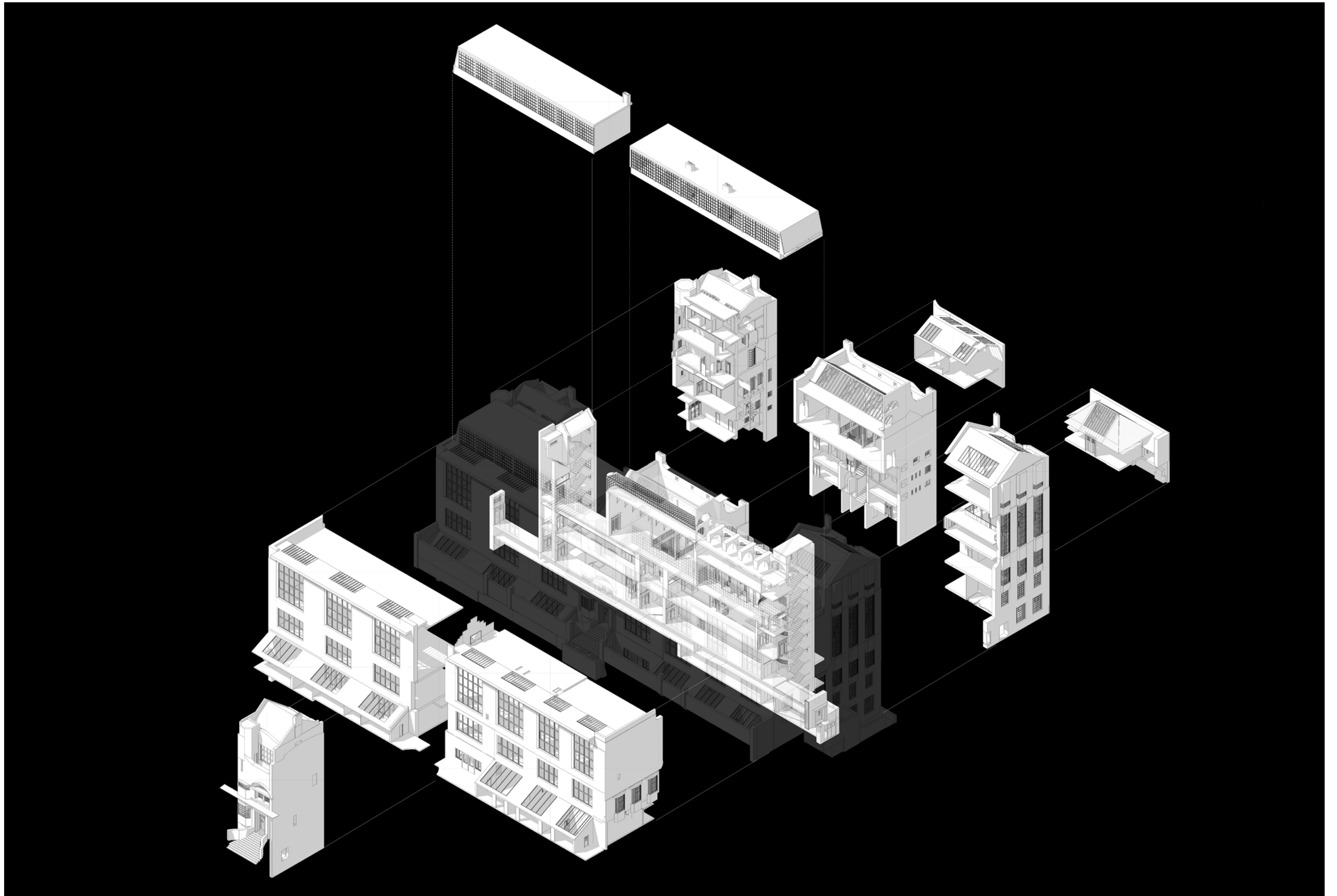
The entrance and museum, with director's rooms above, comprise the main arrival sequence



The brick spine wall defines the northern side of the circulation and houses vertical services



The building as a whole



The Mackintosh Building can be viewed as a set of vertically defined groups of spaces that connect to the central spine

Delivery Scenario Summaries

Summary of Delivery Scenarios

The full reinstatement of the Mackintosh Building presents substantial challenges for the Glasgow School of Art. Securing funding is crucial to the project's success, and it is important to acknowledge that full funding may not be available at the outset. The following section explores delivery scenarios that were developed working with key stakeholders, designers and interaction with the Project Development Board. The extensive discussions resulted in eight potential scenarios being produced which are illustrated in this section of the SOBC Addendum. It should be noted that this section focuses on the architectural, heritage and engineering requirements.

Eight delivery scenarios are outlined in the following pages:

1. Full Reinstatement
- 1a. Full Reinstatement of West Wing and Core
- 1b. Full Reinstatement of East Wing and Core
2. Mackintosh Studio (Faithful Studio)
3. Full Stabilisation and Repair
4. Consolidation/High Level
5. Consolidation Low Level
6. Status Quo

While many other scenarios and variations have been considered, these eight were selected to provide clear insights into potential stepping stones toward the faithful reinstatement of the building. Note that all of the scenarios except number 6 will require some degree of road closure and disruption during their realisation. The extent of disruption will be clarified as the scenarios are further developed.

Scenarios 1, 1a, 1b, and 2 result in a usable building, albeit at varying levels of completion. A key focus is Scenario 3, which involves the full stabilisation and repair of the building's remaining structure. Any scenario that renders the building partially or fully usable depends on Scenario 3 being completed first.

Scenarios 4 and 5 illustrate options where temporary structural support incurs minimal rental costs. These scenarios provide stabilised ruins that could be left for extended periods until further funding allows for progress. While the building would not be habitable, limited access to view the remains may be possible. These scenarios are conceptual and not fully designed.

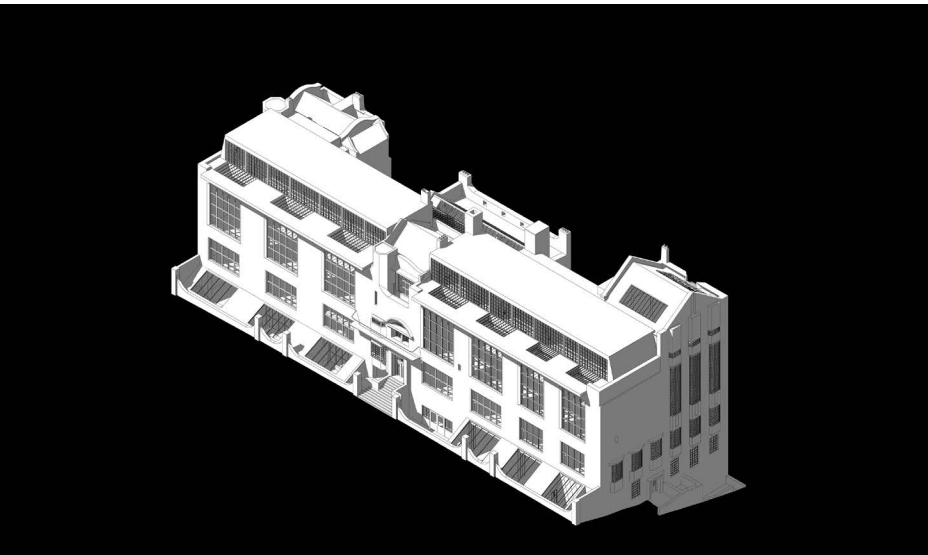
Following discussion with members of the Project Development Board, Senior staff from the Estates Department and the design team consultants, the following scenarios were shortlisted for further consideration: Scenarios 1, 2, 3 and 5, which are described in greater detail in this section of the report. Scenarios 1a, 1b (phased approaches) and 4 were excluded as they offered no clear benefit to the faithful reinstatement of the building and were consequently discounted.

Scenario 6, the Status Quo, Business As Usual (BAU) is included for information, but it is recognised that it is not a sustainable long-term solution. The building's remains are currently extensively supported by temporary bracing, shoring and scaffolding, incurring significant monthly rental costs.

Scenario 1 - Full Reinstatement

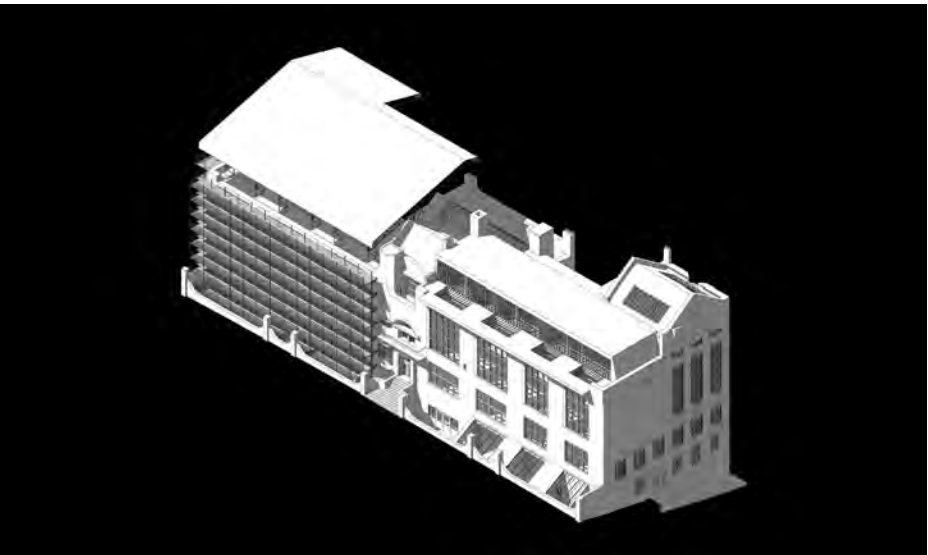
The building is fully reinstated to its original configuration, whilst complying with current Regulatory requirements as far as possible.

Requires Scenario 3 to be completed first.



Scenario 1a / 1b - Full Reinstatement of West/East and Core

Either the West or the East Wing is completed first (*1a shown below*). The remaining wing follows at a later stage. The option requires Scenario 3 to be completed in full and for the Central Service Core and Stairs to be installed. Either scenario would deliver 60-70% of the building.



Delivery Scenario Summaries

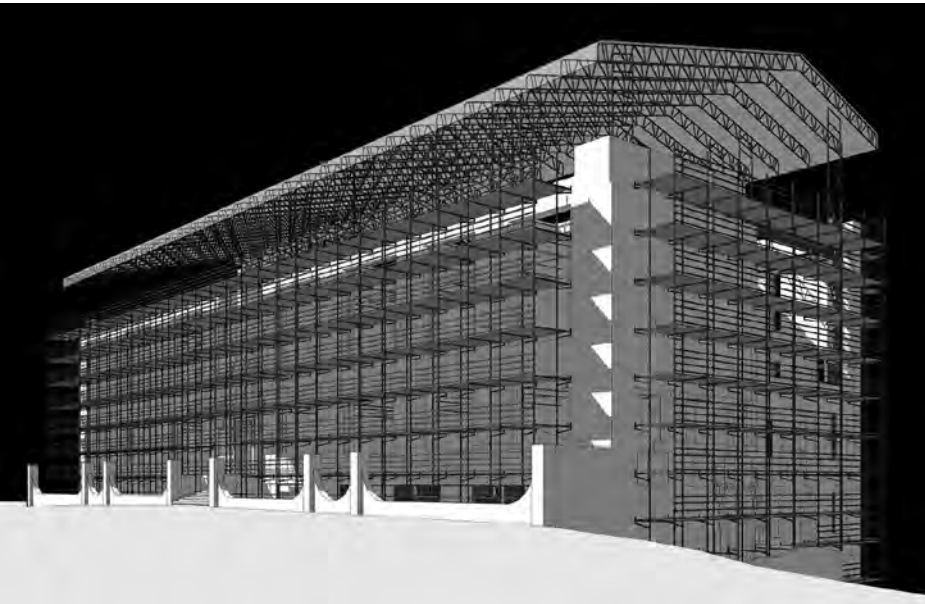
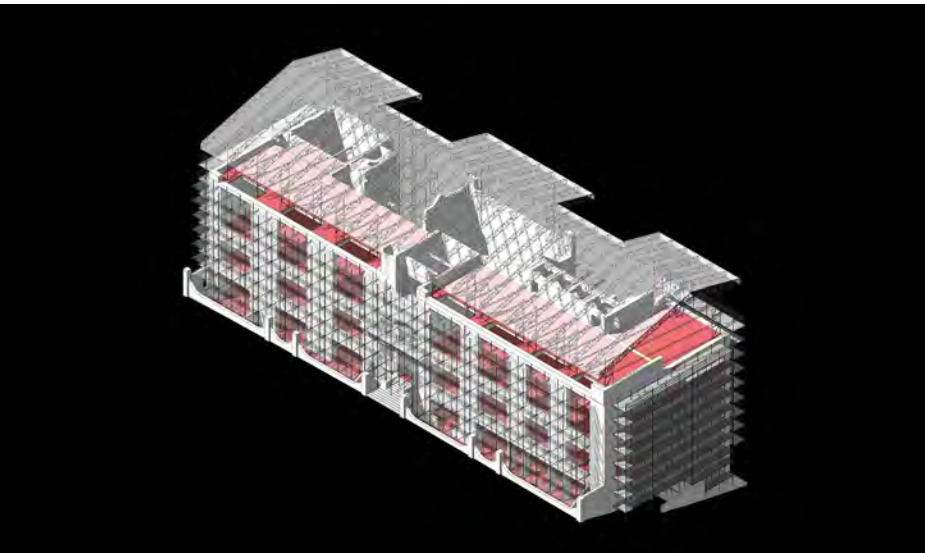
Scenario 2 - Faithful Studio

A scenario providing a fully occupiable building. The external walls, windows, roofs, floor slabs, stairs, toilets, fire doors, primary plant would be constructed. Interior timber linings to walls, plaster finishes to interior walls, floorboards, plastered ceilings, non-loadbearing partitions, fitted furniture, the library joiner work and balcony would all be excluded. All spaces within the building would be useable.



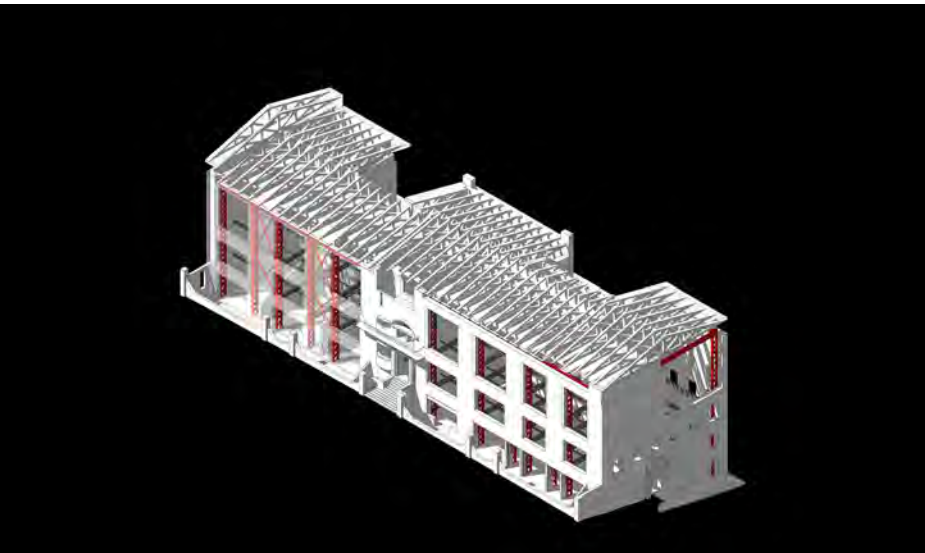
Scenario 3 - Full Stabilisation and Repair

Concrete floor slabs installed, the floors bring stability and fire compartmentation, walls repaired structurally only, the interior structural support scaffolding is removed. The external structural scaffolding is removed but external access scaffold is adjusted and retained. The external access scaffolding is extended in height to raise the existing roof to facilitate the main works under Option 1. The protective wrap is retained.



Scenario 4 - High Level Consolidation

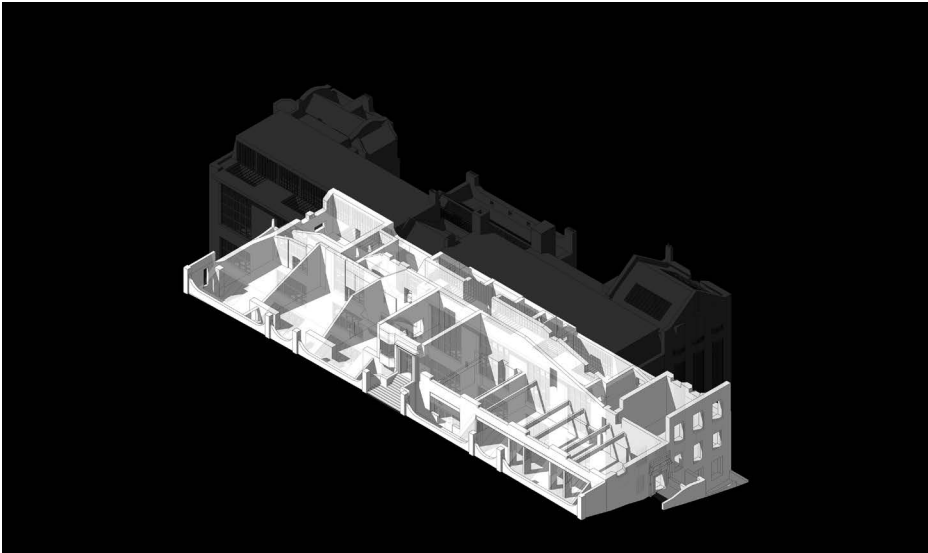
Similar to Scenario 3 but only essential stabilisation works are carried out. Concrete floors and some temporary steelwork inserted to facilitate the removal of the internal scaffolding and bracing and also to allow for the removal of the external scaffolding. Temporary roof over, installed with lightweight support structure and no wrapping to protect the internal spaces but provide views of the building.



Delivery Scenario Summaries

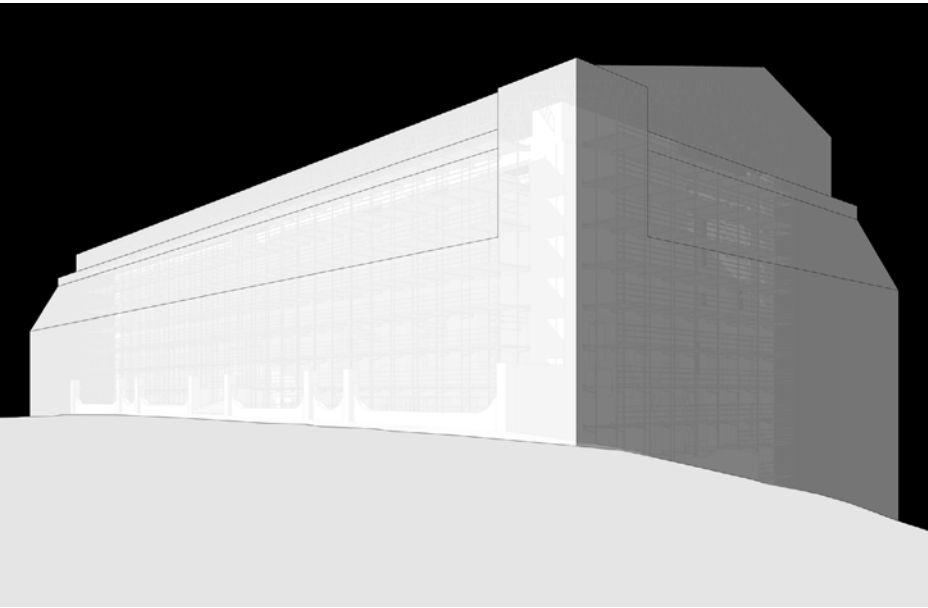
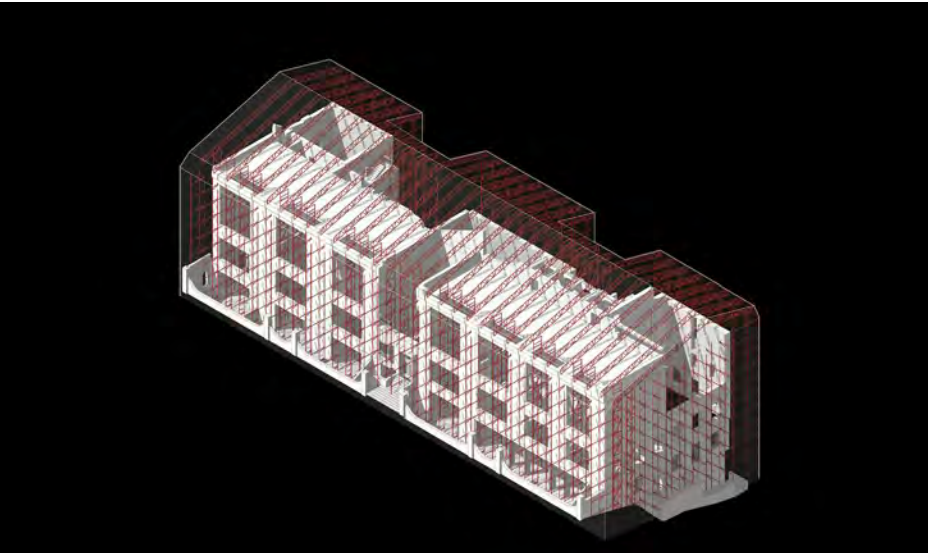
Scenario 5 - *Low Level Consolidation*

The support scaffolding/temporary structure is removed. The walls are taken down to a self-supporting level – typically from basement level up to ground floor level. Some walls at the entrance could rise several metres from ground floor level. The entrance doorway stonework is stabilised. Public access could be formed into a small area at the entrance, although The building is left unroofed.



Scenario 6 - *Status Quo*

The building and current temporary support structure and scaffolding are left in place. The building remains hidden from public view. Due to ongoing costs, Scenario 6 should only be a short-term measure until an alternative scenario is adopted. (Note - the protective wrap was removed from the elevations in April 2025).



Delivery Scenario Summaries

Scenario Flow Diagrams

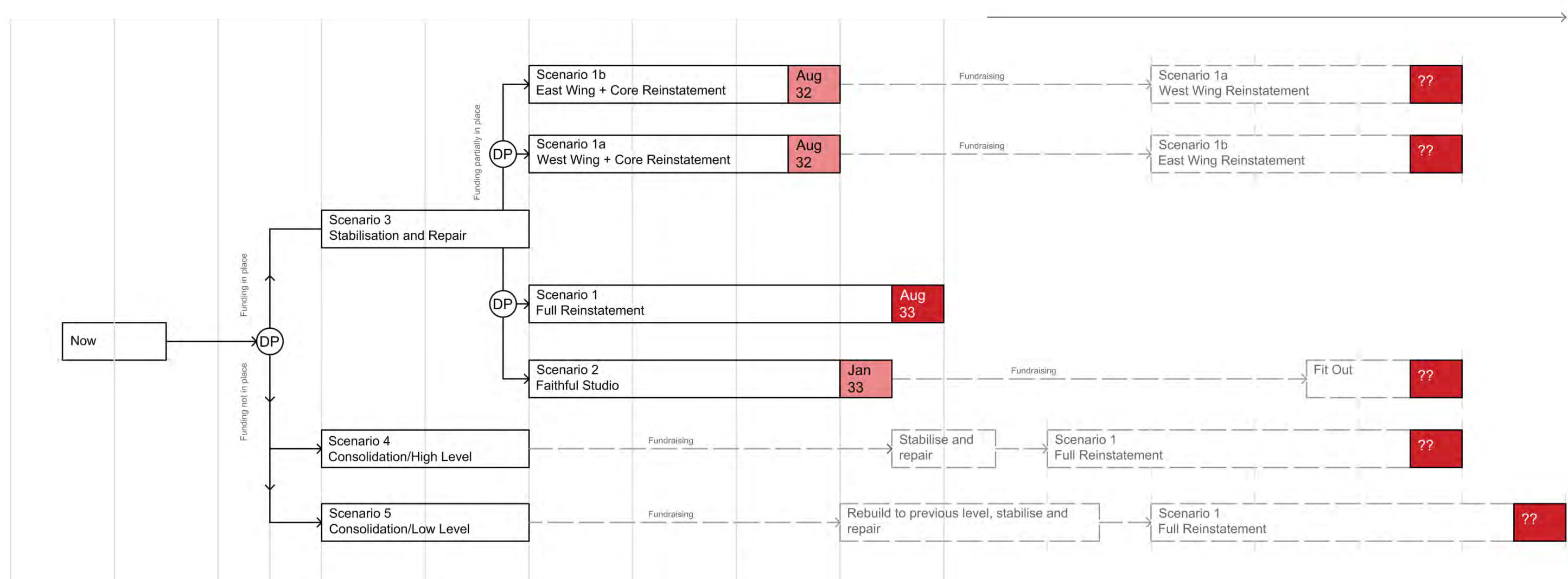
The identified scenarios will have differing variables in relation to outturn costs, funding profile, risk allocation, programme, carbon expenditure, delivering the critical success factors and usefulness.

In summary it has been identified that with the appropriate level of funding in place that the efficient path to achieve the reinstatement of the Mackintosh is to commence the Full Stabilisation and Repair works (Scenario 3) as soon as finances and governance allow, whilst simultaneously initiating the procurement of the Full Reinstatement (Scenario 1).

When the construction of stabilisation works is completed, the full reinstatement works would be ready to commence without delay. The most resource efficient path is also the one that requires the greatest financial confidence from the outset of the project

The least efficient path for delivery would be to take the building down to a low level (Scenario 5) and leave it in such a state until funding became available to allow the project to restart. Such a scenario could have the lowest initial upfront costs, but would ultimately involve costly abortive work and added time.

Flow Diagram - All Scenarios



Scenario 1 - Full Reinstatement

Summary

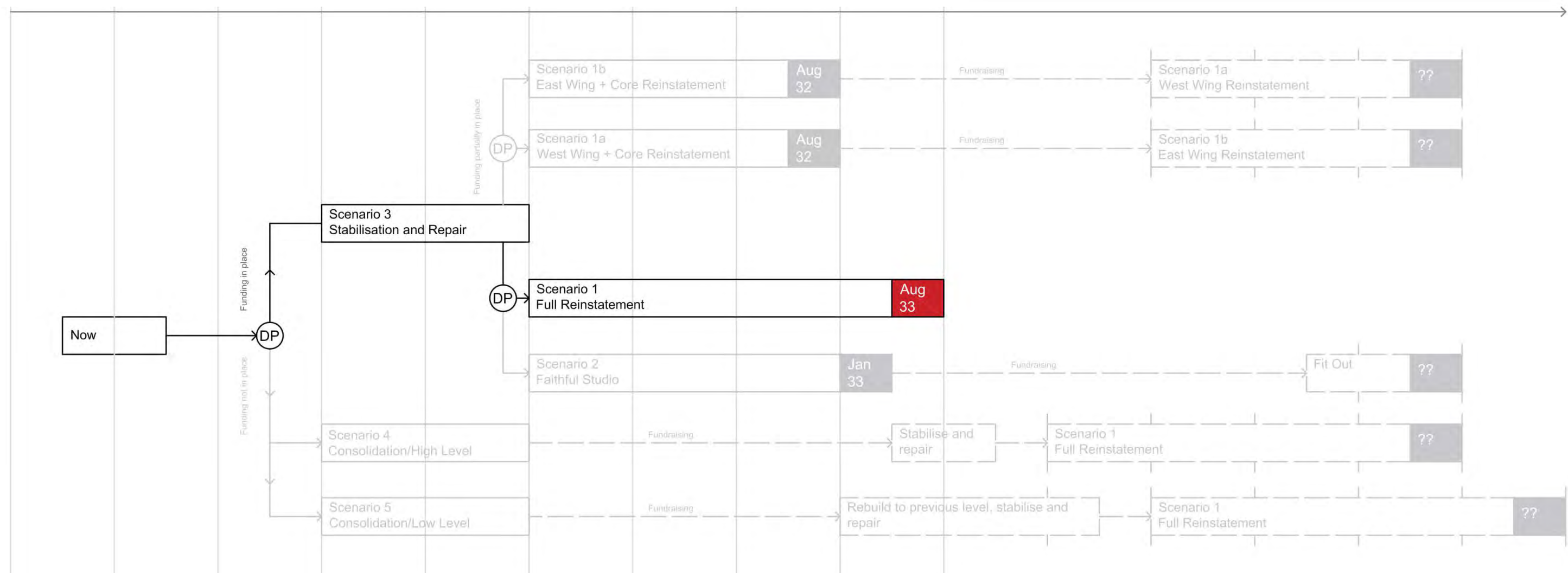
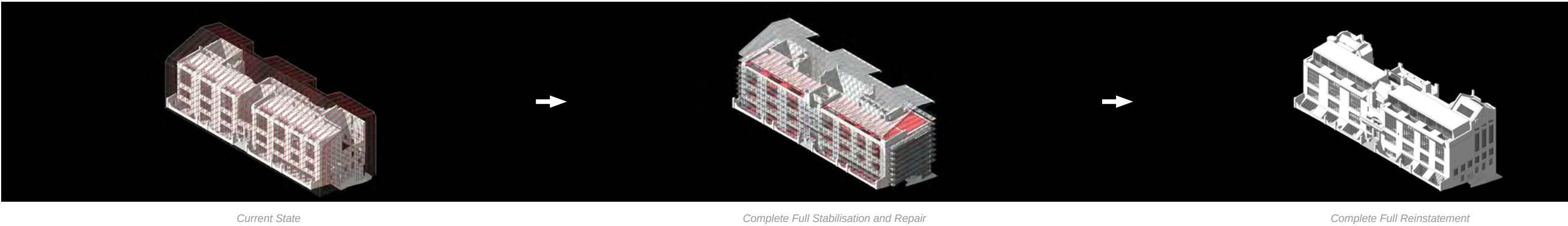
Description
The building is fully reinstated to its 1910 configuration, whilst complying with current Regulatory requirements as far as possible. This option was the identified and agreed as the preferred solution in the SOBC 2021.
General Commentary
Fully delivers a building fully capable of meeting the requirements of the critical success factors.
Critical Success Factors
Fully delivers a building fully capable of meeting the requirements of the critical success factors.
Heritage Significance
Retains and enhances heritage significance associated with original design, appearance, and use as a world leading art school. Detailed design will need to resolve complexities of balancing heritage significance with safe, healthy and functional use compliant with modern building regulations. Full reinstatement will necessitate some dismantling and rebuilding of extant fabric. Quality in detailing and craftsmanship will be paramount to supporting authenticity in this scenario.
Regulatory
Likely to receive Planning and Listed Building Consent and Building Warrant. Accessibility, sustainability and fire compliance will need to be fully addressed whilst maintaining Heritage Significance.
Costs
Requires full funding for reinstatement. It can be carried out in separate zones but doing so will add significant cost.

GIFA and NUA
GIFA - 7031m2 Total NUA - 4439m2, comprised of: • Studios - 2942m2 • Heritage Spaces - 529m2 • Other Useable Spaces - 968m2
Sustainability
Low impact if the project proceeds without interruption until completion. Validation of energy performance begins upon completion at “full occupancy”
MEP
Full Mechanical, Electrical, Public Health (MEP) and fire suppression system installations in a single phase, fully commissioned and soft landings process followed, resulting in substantially simplified process.
Structure
Likely the most structurally efficient approach, allowing for a sequence of works that can minimise abortive structural works and make the temporary works required as efficient as possible. Structurally, the works required include: Rebuilding external facades in brick and stone to their original heights Rebuilding central stair Construction of a firefighting stair to all floors Rebuilding of masonry partitions internally Reconstruction of roofs to all areas Taking down and rebuilding the lift core. Plinths and brackets for MEP equipment. Timber non-load bearing partitions where required for architectural performance. Cranage will be required for lifting of heavy stone, steel and timber elements.
Timescale
The timescale is based on a continual delivery process following completion of Scenario 3. The procurement of the restoration should commence whilst the stabilisation and repairs works are underway.



Street view from NW of Scenario 1 - The building would be complete with all elements visible (diagram note: ironwork omitted)

Sequence to Achieve Scenario 1



Scenario 2 - *Mackintosh Studio*

Summary

Description
The external walls, roofs, floor slabs, stairs, toilets, fire doors, primary plant would be constructed. Interior timber linings to walls, plaster finishes to interior walls, floorboards, plastered ceilings, non-loadbearing partitions, fitted furniture, the library joiner work and balcony would all be excluded. The Mackintosh building would appear largely reinstated from the street.
General Commentary
The option is the full reinstatement excluding the timber wall linings and timber interiors such as the Library, the Boardroom and the Mackintosh Room. Timber floorboards, stained glass door panels and fitted furniture are also excluded from scenario 2. The spaces will be fully functioning and have appropriate services and building control compliance sign off. Scenario 2 does not prevent a future full re-instatement. The omitted fit-outs, linings, decorative elements and finishes can be installed in future phases as funding allows.
Critical Success Factors
- Delivers the high-quality reinstatement of the primary heritage significance of the iconic building as a world leading Art School as seen from the surrounding streets. - Delivers functional, flexible and enjoyable spaces within the building. - Delivers an inspiring place. - Delivers a positive contribution towards the Vision and the aims of the Estate
Heritage Significance
Though focused on full reinstatement of external appearance with limited interior reinstatement, this scenario certainly retains and enhances heritage significance associated with original design, appearance, and use as a world leading art school. Reinstating building elevations will enhance heritage significance as largely reminiscent of the building originally designed by Charles Rennie Mackintosh, once again making positive contribution to local public realm in Glasgow. Functionality as an art school will be enhanced, therefore positively enhancing this aspect of its heritage significance. Balancing heritage significance with safe, healthy and functional use compliant with modern building regulations would still need to be resolved in detailed design but this scenario is likely to offer less complexity in this regard as no objective to restore interiors to pre-fire appearance. Enables a celebration of significant though originally hidden construction detail, and age value, revealed by the fires and post-fire repairs. Offers a scenario which does not preclude long-term full reinstatement
Regulatory
As a part of a phased approach, Planning and Listed Building Consent should be straightforward. Building Warrant will be more complicated than Scenario 1, if the ability to complete a full reinstatement at a later stage is maintained.
Costs
The expensive specialist fit out of historic decorative elements, linings and rooms can be delayed until funding becomes available. Fit out can be phased. Individual spaces could be fitted out as funding permitted. Costs will be less than Scenario 1 initially but cost per/m2 will be higher due to building in more than one stage/phase. The Programme extension, inflation and risk profile will increase the overall costs for the project.

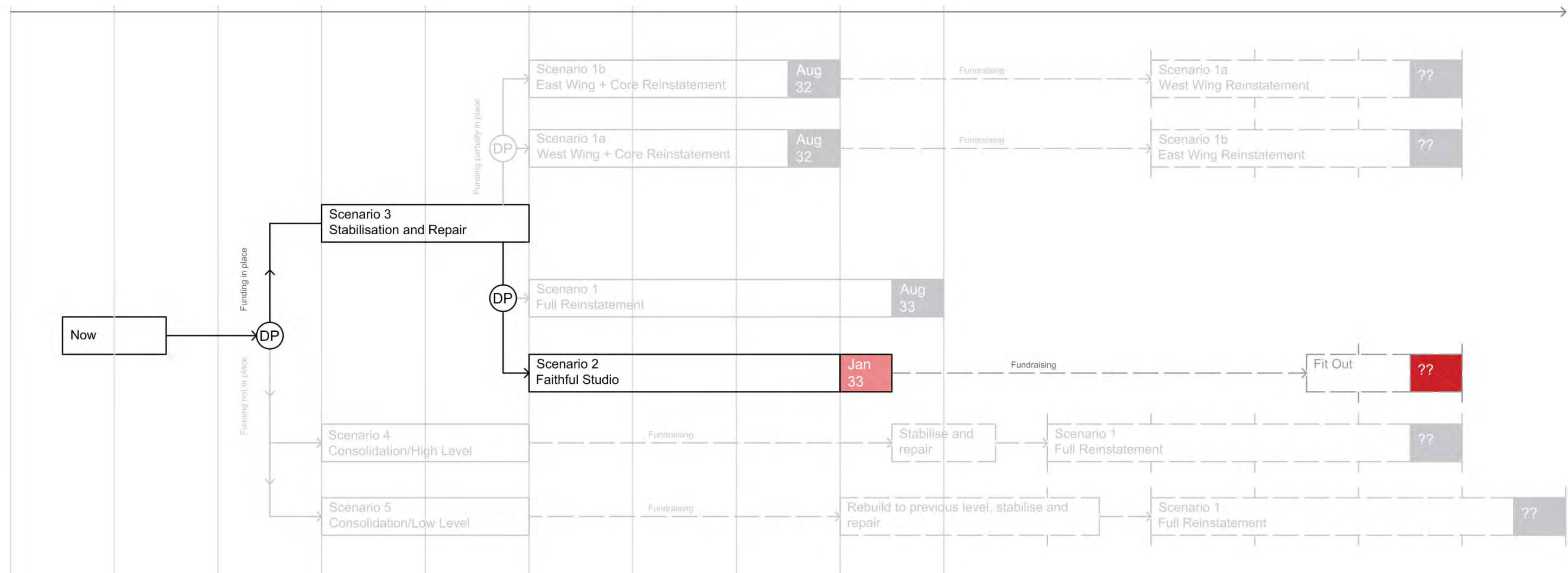
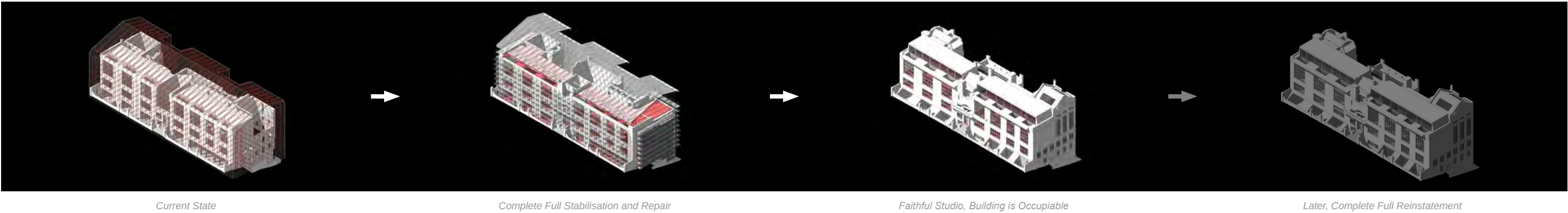
GIFA and NUA
GIFA - 6723m² Total NUA - 4327m², comprised of: - Studios - 3664m² - Other Useable Spaces - 663m²
Sustainability
Lower impact than full reinstatement until fit out is completed. Validation of Energy performance would be undertaken. Embodied Carbon be recorded and reported, expected to increase due to additional timescales and sequencing.
MEP
Includes the permanent installation of all primary MEP and fire suppression plant, includes the permanent installation of all vertical services distribution within the core risers and the installation of services out with the risers, serving all areas without finishes. All services to be fully commissioned inclusive of finishes.
Structure
Structurally, the works required include: Rebuilding external facades in brick and stone to their original heights Rebuilding central stair Construction of a firefighting stair to all floors Rebuilding of masonry partitions internally Reconstruction of roofs to all areas Taking down and rebuilding the lift core. For efficiency of costs the design of MEP, fire strategy etc. would need developed so that the structural works completed as part of the shell core work anticipate the follow on fit out work without reworking or adaptations of the finished structural works.
Timescale
The delivery timescale will be shorter than scenario 1.



Street view from NW of Scenario 2 - The exterior of the building would be complete with all elements visible, while the interiors are not yet fully reinstated

Sequence to Achieve Scenario 2

Delivers a building potentially capable of meeting the requirements of 3 of the 4 critical success factors.



Scenario 2 - Mackintosh Studio, additional images



Visual of lecture in stabilised first floor studio space, west wing

Scenario 2 - Mackintosh Studio, additional images



Visual of first floor studio space rebuilt to Scenario 2, in use by School of Fine Art

Scenario 2 - Mackintosh Studio, additional images



Visual of ground floor studio space rebuilt to Scenario 2, being used for undergraduate drawing classes

Scenario 2 - *Mackintosh Studio, additional images*



Visual of first floor studio space rebuilt to Scenario 2, in use by School of Innovation and Technology



Sectional perspective illustration looking West. Shows building inhabited after Scenario 2



Sectional perspective illustration looking North. Shows building inhabited after Scenario 2

Delivery Scenarios Areas

Delivery Scenarios Areas

The following text is a commentary on the results of the different scenarios in terms of usable areas. Scenario 1, as the scenario which meets the critical success factors, is taken as a baseline (100%) to which all other scenarios are compared.

Scenario 1 - Full Reinstatement

- NUA (4439 m²) - The usable area of the building, which excludes WC's, circulation, wall thicknesses
- Studio (2942 m²) - The amount of area that is for studio-based work i.e. subdivided into bays for students to have individual work spaces, tutorial and breakout space
- Heritage (529 m²) - Spaces with significant heritage value that are to be reinstated and used as originally designed, as far as is possible.
- Other (968 m²) - Spaces of no significant heritage value that are also not sized/ accessed/lit appropriately to become studio spaces. Likely to host functions like offices, storage, plant etc.

Scenario 1a - Full Reinstatement West Wing + Core

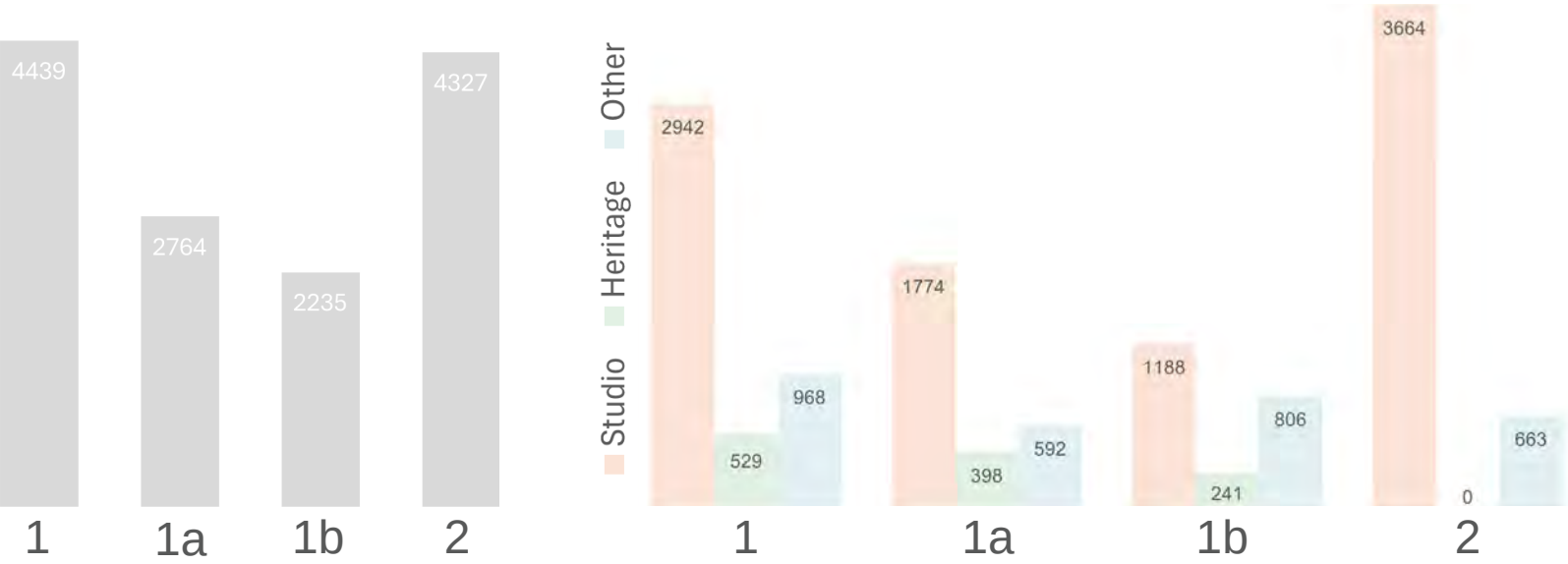
- NUA (2764 m²) - 38% less usable area delivered
- Studio (1774 m²) - 40% less studio space delivered
- Heritage (398 m²) - 25% less heritage spaces delivered (Mackintosh room and board room not reinstated)
- Other (592 m²) - 39% less

Scenario 1b - Full Reinstatement East Wing + Core

- NUA (2235 m²) - 50% less usable area delivered
- Studio (1188 m²) - 60% less studio space delivered
- Heritage (241 m²) - 54% less heritage spaces delivered (Lecture theatre and library excluded)
- Other (806 m²) - 17% less

Scenario 2 - Faithful Studio

- NUA (4327 m²) - 3% less usable area delivered (no library gallery)
- Studio (3664 m²) - 25% more gained through meanwhile use of heritage spaces
- Heritage (0 m²) - 100% less (0% reinstated). In this scenario, heritage interiors are not yet built. These spaces can be occupied as studios or other uses until reinstatement proceeds.
- Other (663 m²) - 32% less



Comparison of net usable areas (m²) gained from each scenario

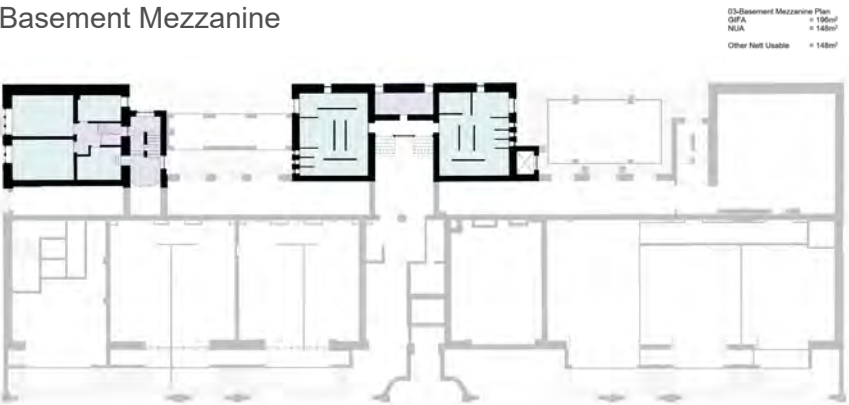
Comparison of studio, heritage and 'other' areas (m²) gained from each scenario

	Total					Levels																								
						Sub-Basement					Sub-Basement Shaft					Basement					Basement Mezzanine					Ground Floor				
	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other	Gross Internal Floor Area (GIFA)	Net Usable Area (NUA)	Net Studio	Net Heritage	Net Other
Scenario 1: Full Reinstatement (m²)	7031	4439	2942	529	968	465	178	178	0	0	184	0	0	0	0	1892	1197	966	110	121	196	148	0	0	148	1378	767	600	57	110
Scenario 1a: Full Reinstatement West Wing + Core (m²)	4811	2764	1774	398	592	465	76	76	0	0	184	0	0	0	0	1209	703	574	110	19	102	90	0	0	90	942	472	445	0	27
Scenario 1b: Full Reinstatement East Wing + Core (m²)	4308	2235	1188	241	806	118	0	0	0	0	184	0	0	0	0	1148	593	491	0	102	196	148	0	0	148	874	313	173	57	83
Scenario 2: Faithful Studio (m²)	6723	4327	3664	0	663	465	180	180	0	0	184	0	0	0	0	1892	1231	1149	0	82	102	90	0	0	90	1378	821	808	0	13
	Ground Floor Mezzanine					First Floor					First Floor Library Balcony					First Floor Mezzanine					First Floor Furniture Store					Second Floor				
Scenario 1: Full Reinstatement (m²)	212	208	0	0	208	1378	1037	619	232	186	100	70	0	70	0	228	159	77	60	22	182	150	0	0	150	816	525	502	0	23
Scenario 1a: Full Reinstatement West Wing + Core (m²)	98	97	0	0	97	942	682	338	158	186	100	70	0	70	0	64	60	0	60	0	182	150	0	0	150	523	364	341	0	23
Scenario 1b: Full Reinstatement East Wing + Core (m²)	212	208	0	0	208	874	597	287	124	186	0	0	0	0	0	228	159	77	60	22	68	41	0	0	41	406	176	160	0	16
Scenario 2: Faithful Studio (m²)	98	97	0	0	97	1378	1054	868	0	186	0	0	0	0	0	228	159	137	0	22	182	150	0	0	150	816	545	522	0	23

Table of areas, arranged by scenario, level and area usage (extracted from plans on following pages)

Delivery Scenario 1 Area Plans

Basement Mezzanine



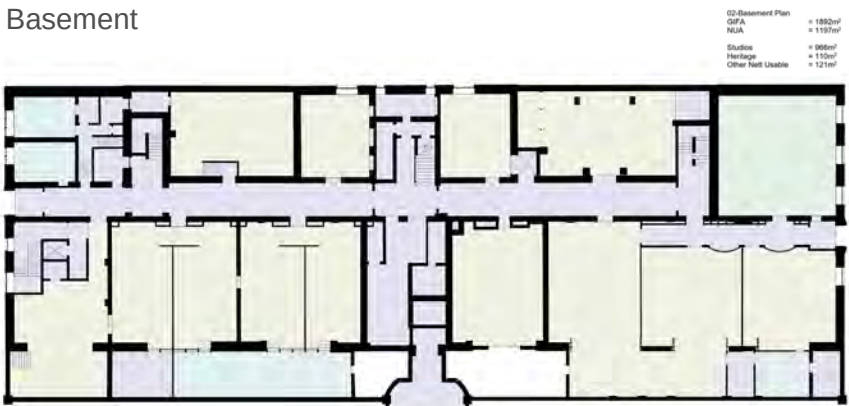
Library Gallery above First Floor



Key:

- Studio
- Heritage
- Other

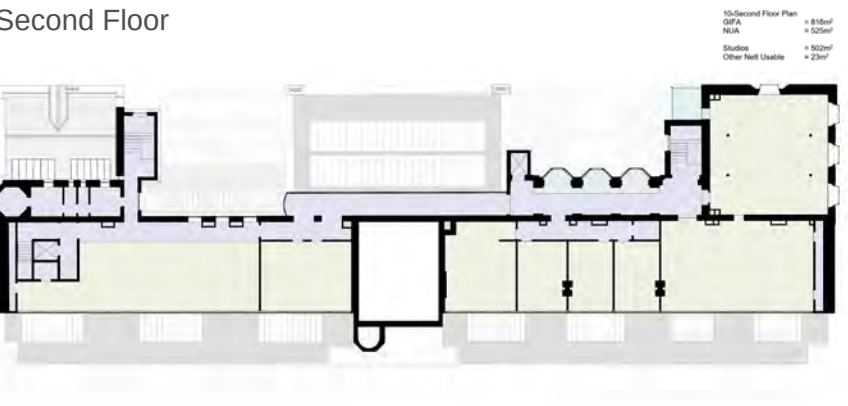
Basement



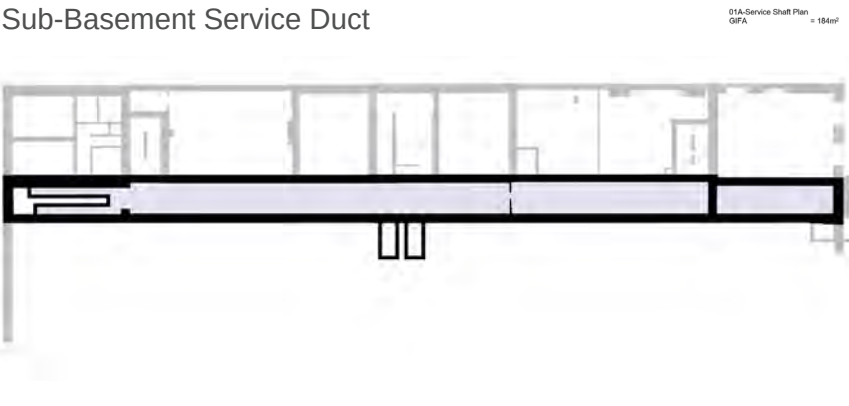
First Floor



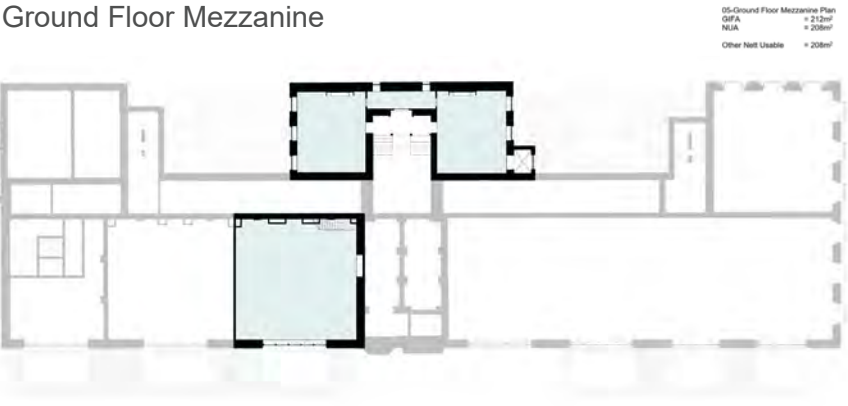
Second Floor



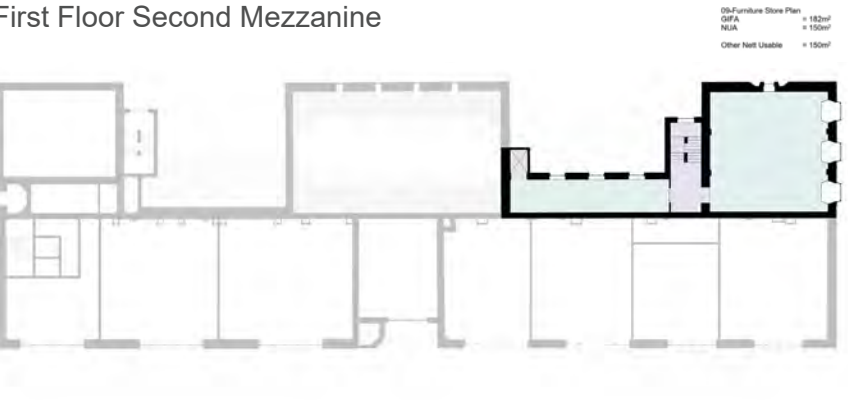
Sub-Basement Service Duct



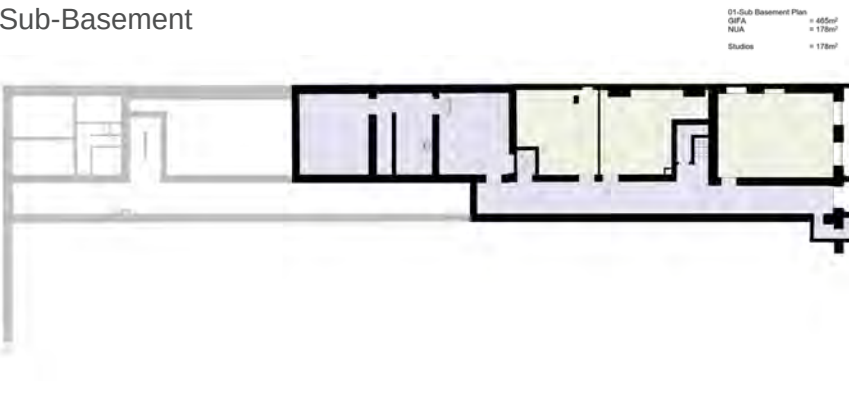
Ground Floor Mezzanine



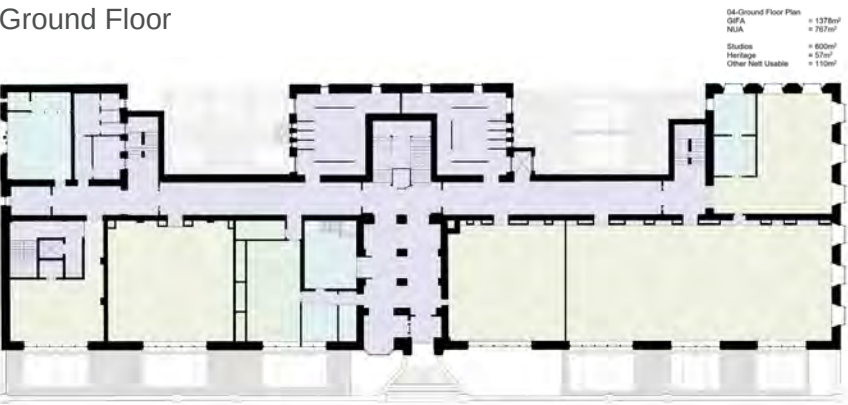
First Floor Second Mezzanine



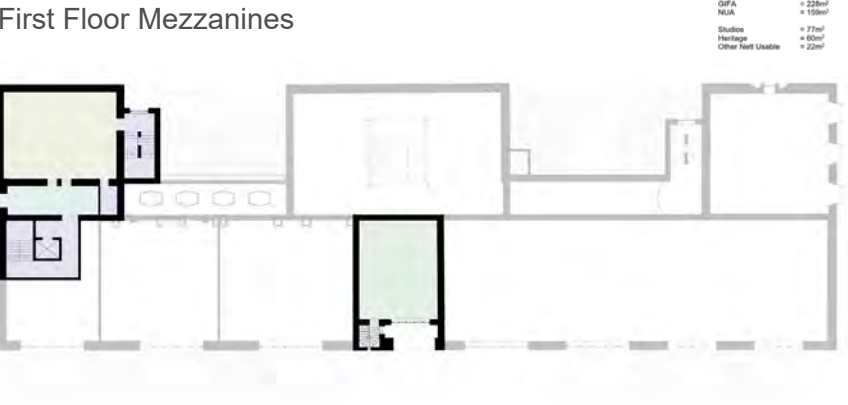
Sub-Basement



Ground Floor

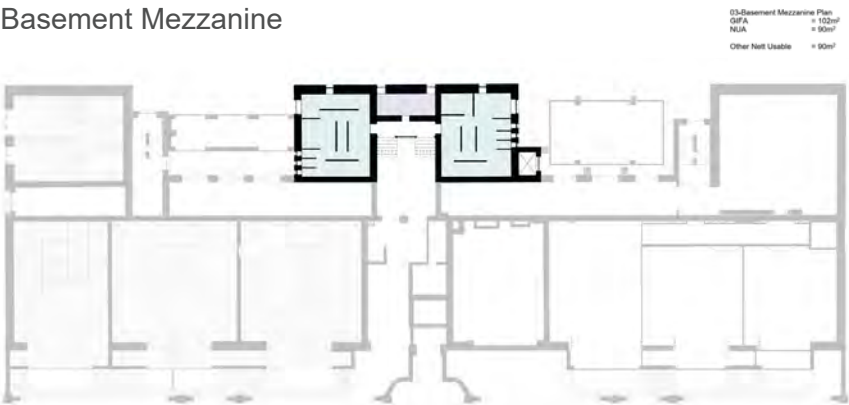


First Floor Mezzanines



Delivery Scenario 1a Area Plans

Basement Mezzanine



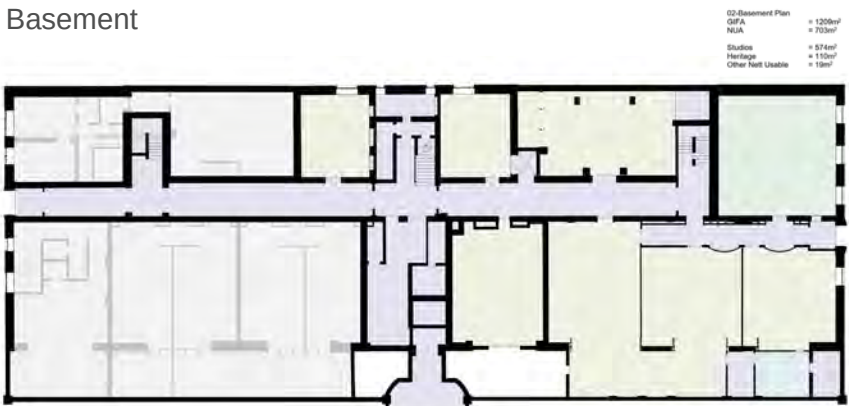
Library Gallery above First Floor



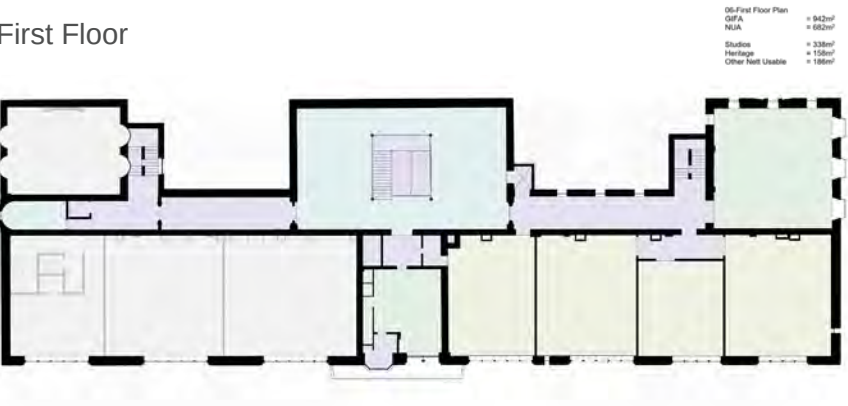
Key:

- Studio
- Heritage
- Other

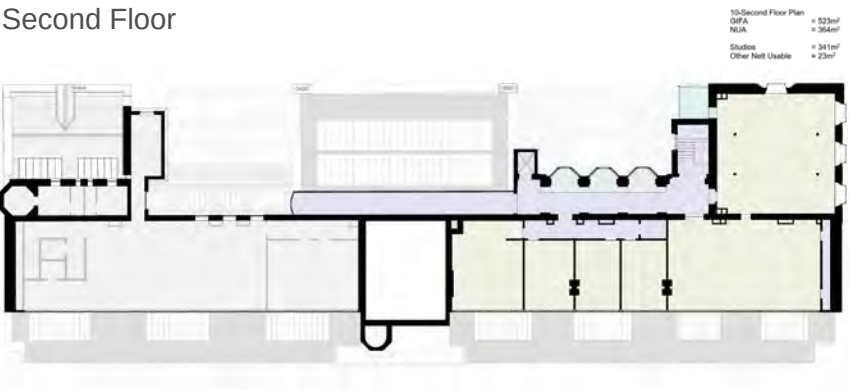
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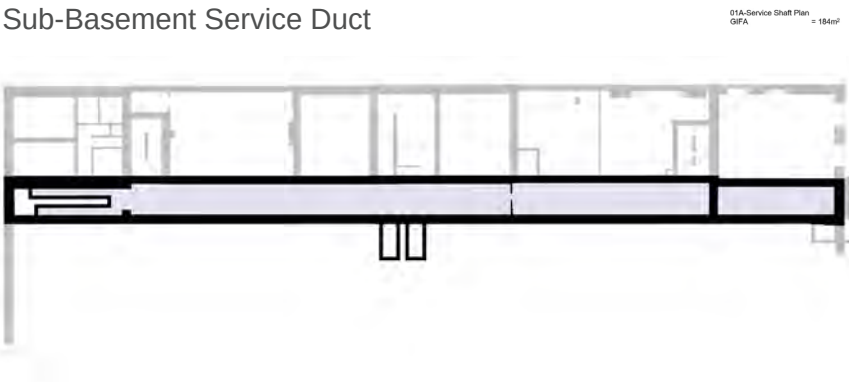
First Floor



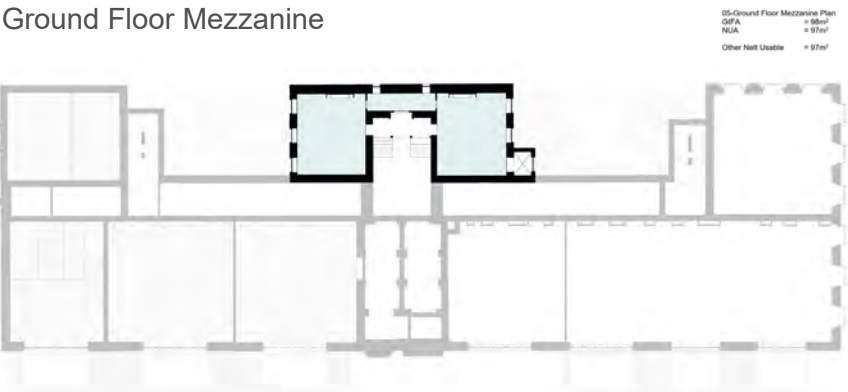
Second Floor



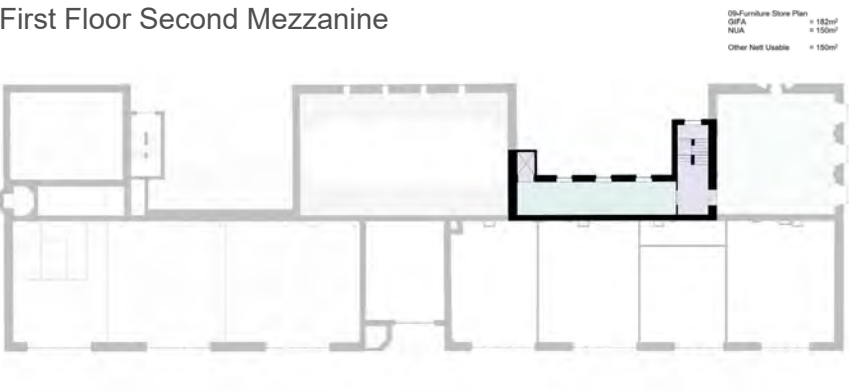
Sub-Basement Service Duct



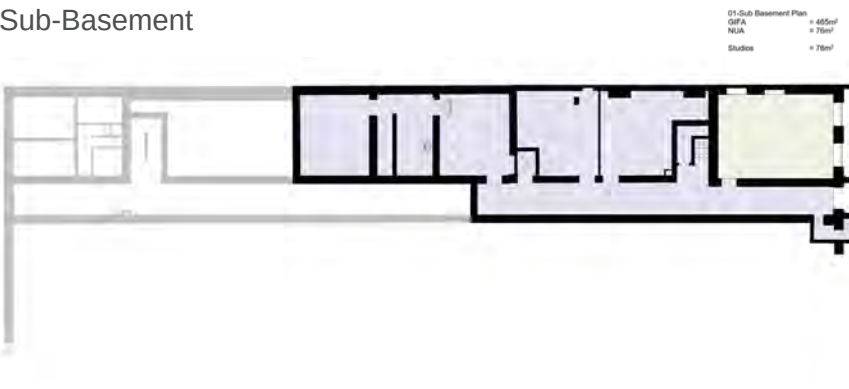
Ground Floor Mezzanine



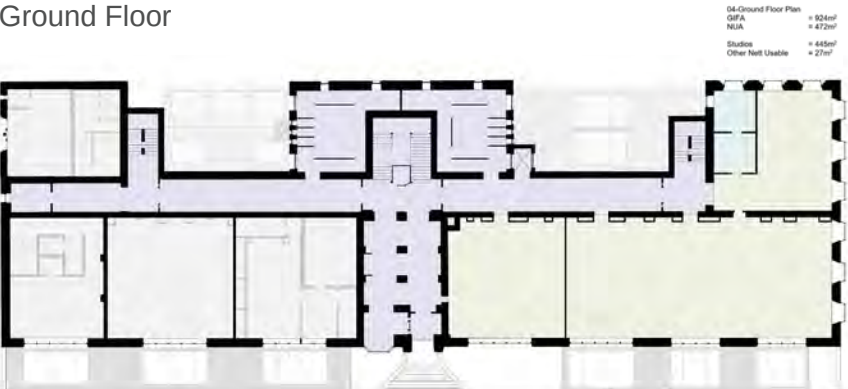
First Floor Second Mezzanine



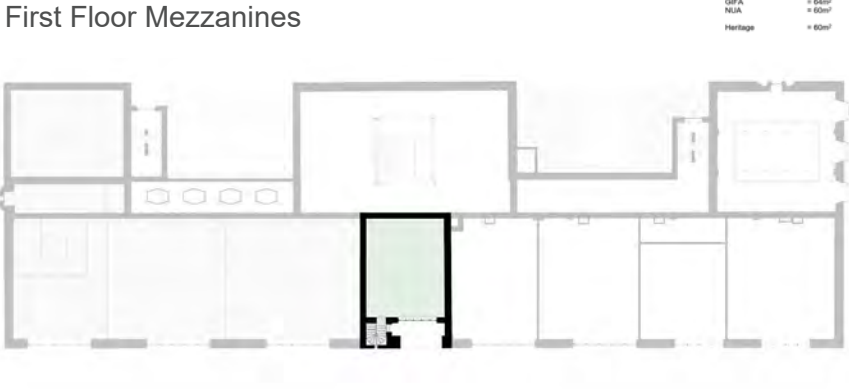
Sub-Basement



Ground Floor

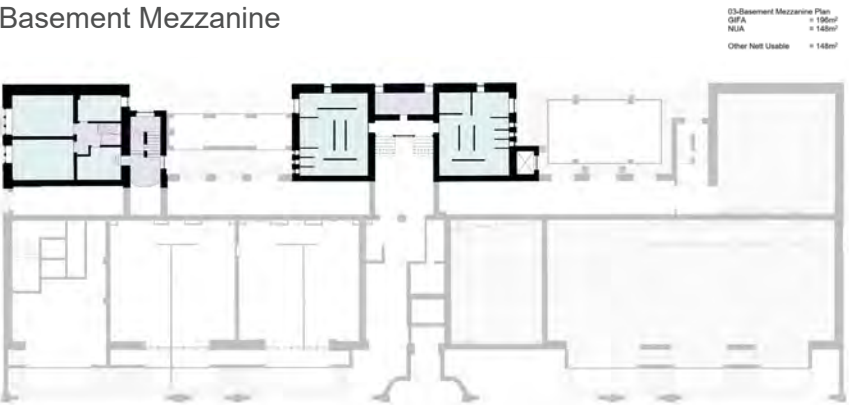


First Floor Mezzanines

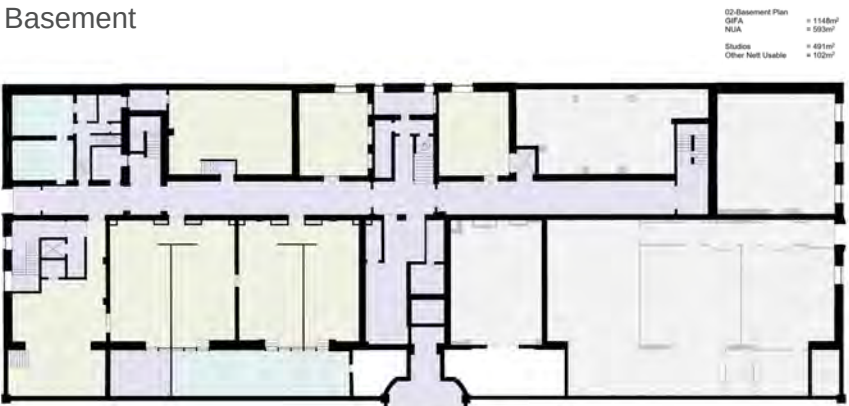


Delivery Scenario 1b Area Plans

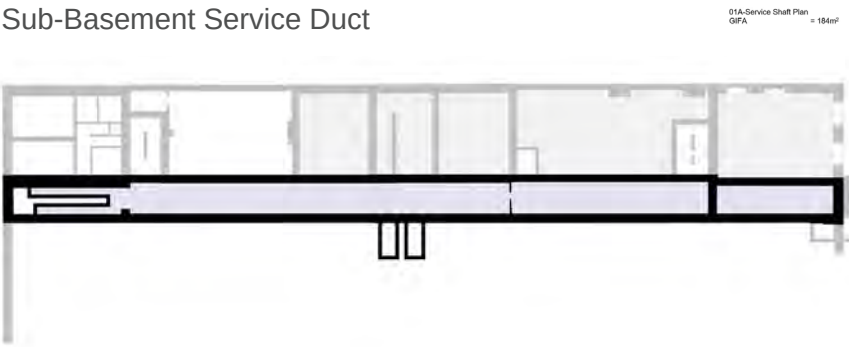
Basement Mezzanine



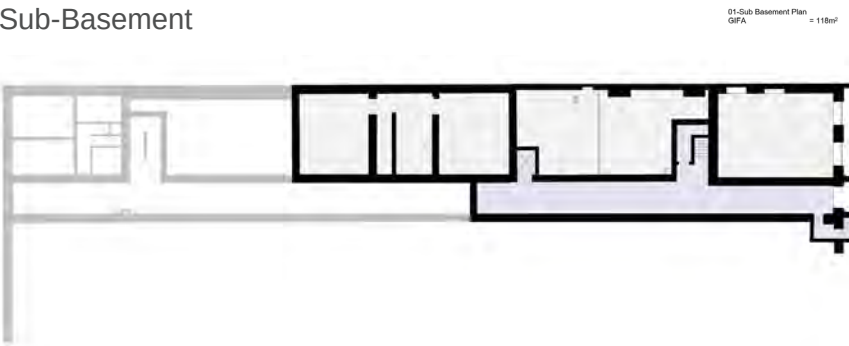
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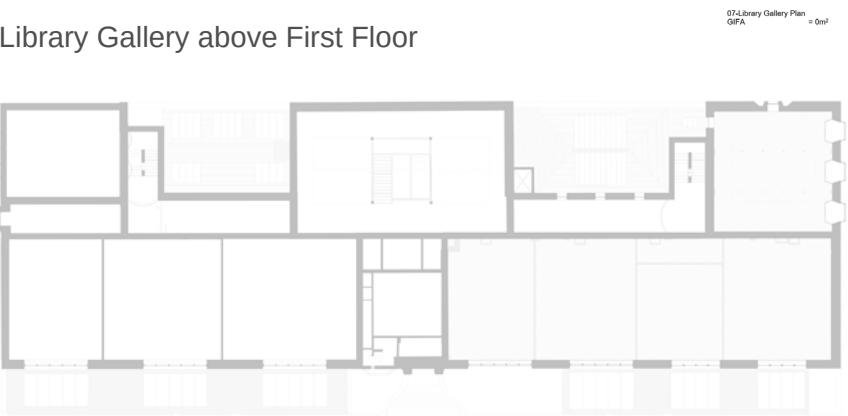
Sub-Basement Service Duct



Sub-Basement



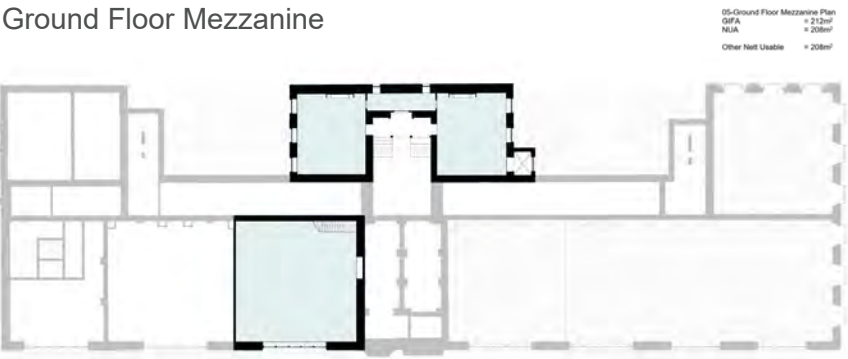
Library Gallery above First Floor



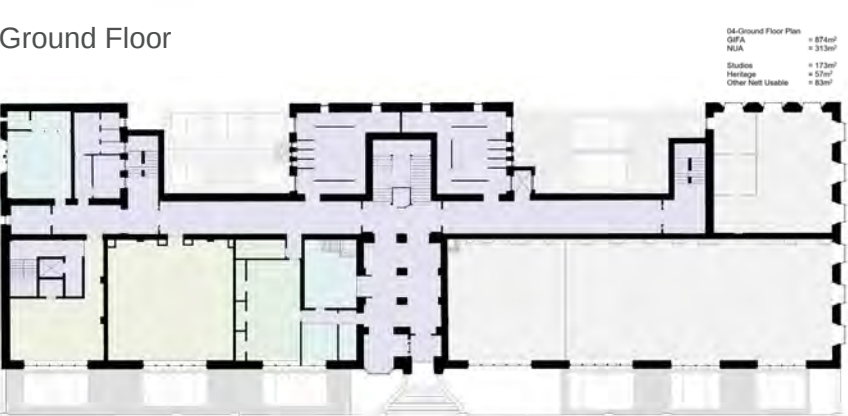
First Floor



Ground Floor Mezzanine



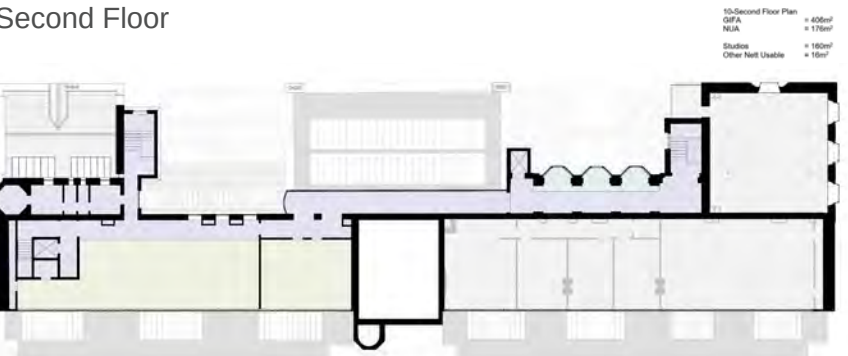
Ground Floor



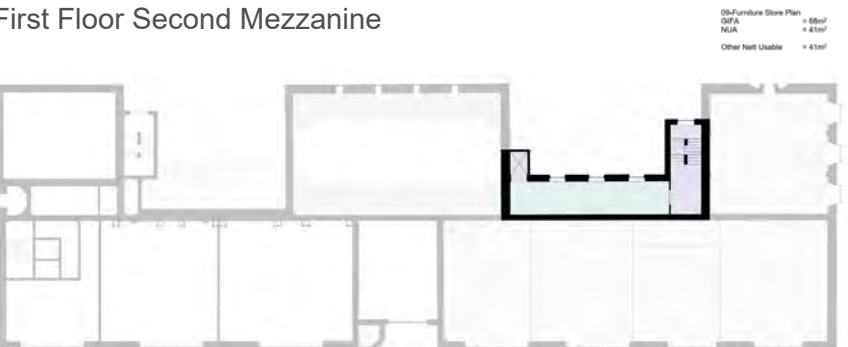
Key:

- Studio
- Heritage
- Other

Second Floor



First Floor Second Mezzanine



First Floor Mezzanines

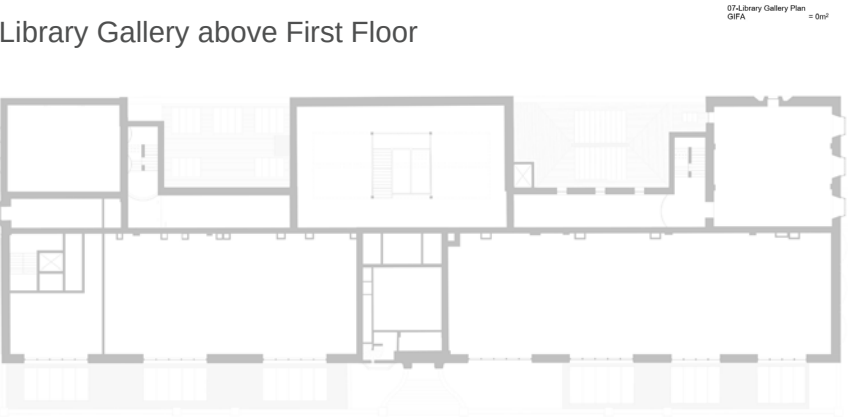


Delivery Scenario 2 Area Plans

Basement Mezzanine



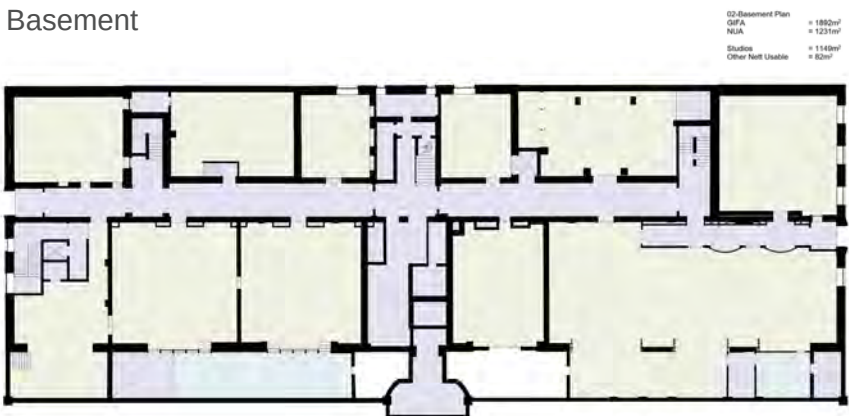
Library Gallery above First Floor



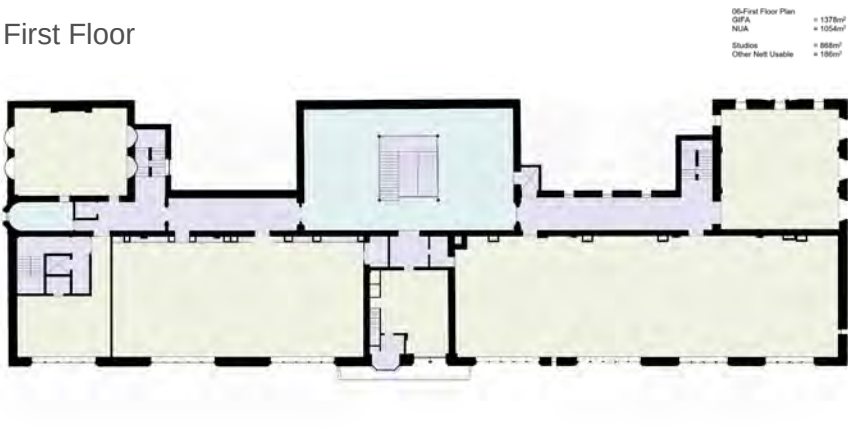
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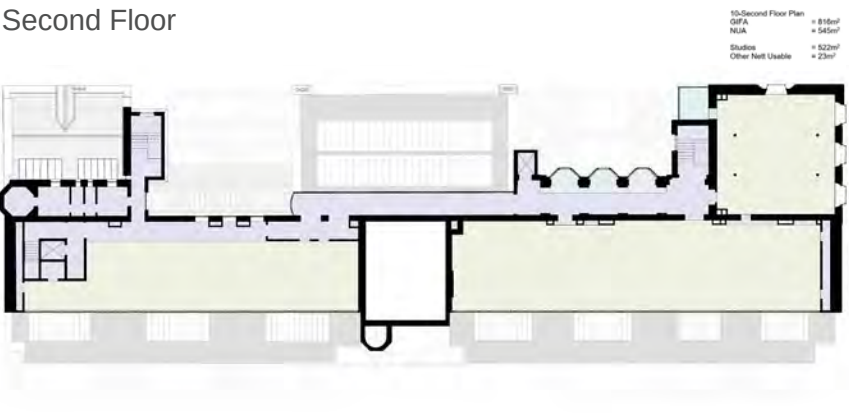
Basement



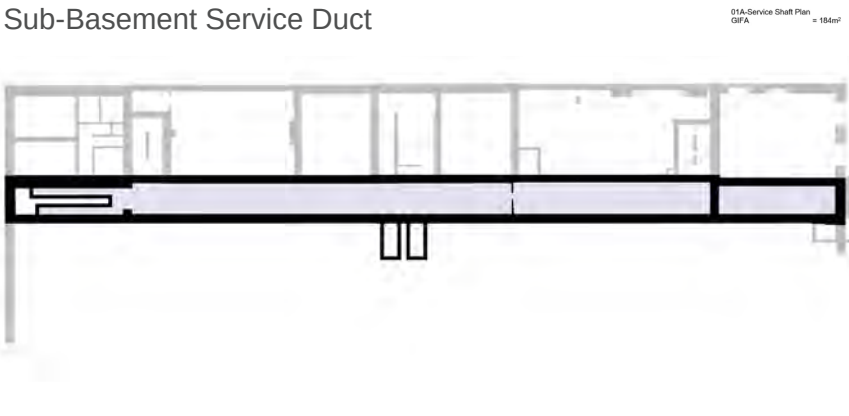
First Floor



Second Floor



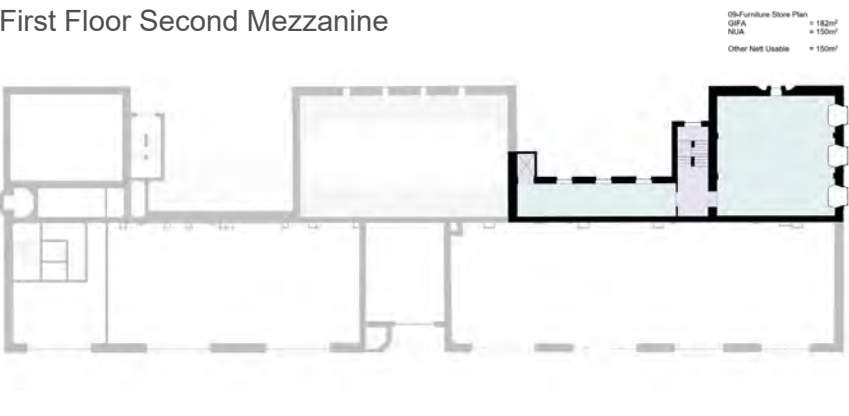
Sub-Basement Service Duct



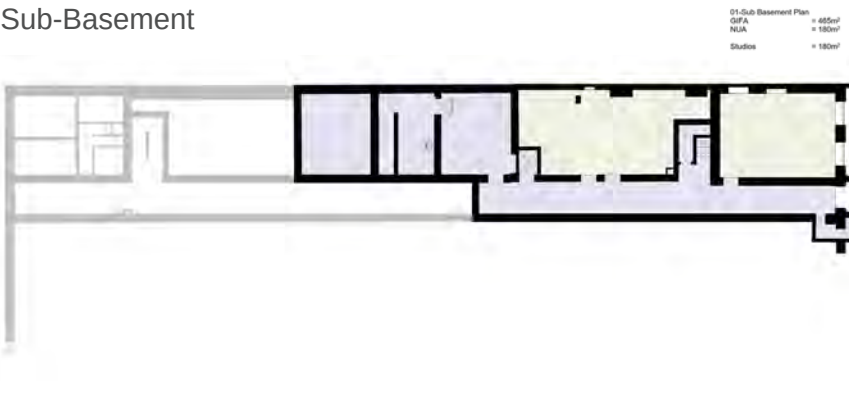
Ground Floor Mezzanine



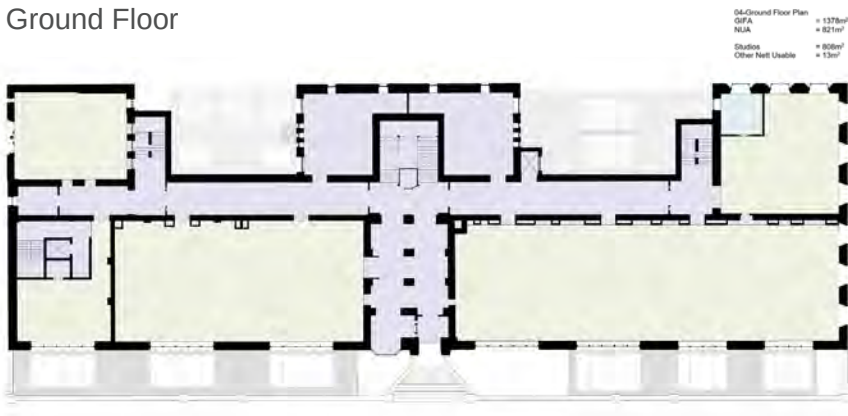
First Floor Second Mezzanine



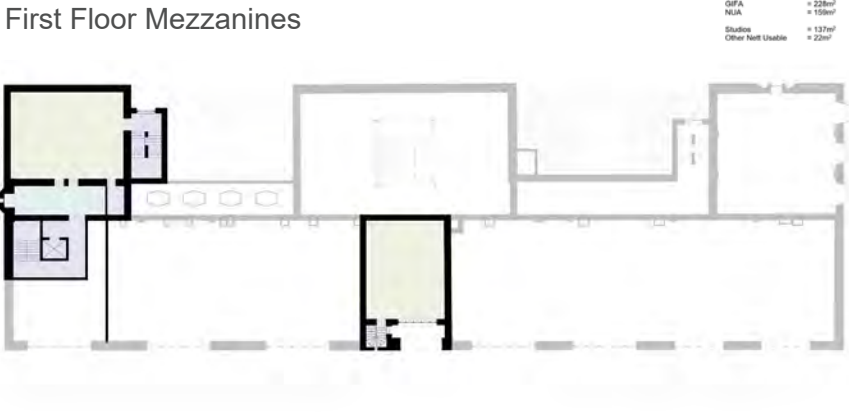
Sub-Basement



Ground Floor



First Floor Mezzanines



Design Team

BOP Consulting	Economic Consultants
QMPF LLP	Financial Consultants
Gardiner and Theobald LLP	Cost Consultants
Currie & Brown	Cost Consultants
Reiach and Hall Architects	Architects
Purcell Architecture	Conservation Architects
Narro Associates	Structural Engineers
Harley Haddow	M&E Consultants
Atelier 10	Fire Engineer

