HARLEY HADDOW



North Manchester General Hospital – Gallery Restaurant

Stage 2 Structural Report

August 2026

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Executive Summary

Harley Haddow has been appointed by Murphy Philipps Architects, on behalf of Manchester University NHS Foundation Trust, to provide civil and structural engineering services for the refurbishment and Reinforced Autoclaved Aerated Concrete (RAAC) remediation works at the Gallery Restaurant and the adjacent toilet accommodation at North Manchester General Hospital.

The project is proceeding on the Option 2 - Plus basis developed at Stage 1. The current structural strategy is retention-led Remove and replace the RAAC roof construction, Dining Extension facade and north-west canopy while retaining the primary roof beams, columns, ground-floor slab and foundations, subject to survey and structural assessment. The Stage 2 structural drawings listed in Section 12 develop the demolition extents, replacement roof framing, local slab and foundation works, facade support and AHU enclosure strategy.

The principal structural uncertainty is the lateral stability arrangement of the Dining Extension. The external walls proposed for demolition may currently provide vertical support, lateral resistance or restraint to the retained frame, or may conceal columns or bracing. Their removal must not proceed until the structural layout survey and opening-up works have established the existing load paths and suitable permanent and temporary stability arrangements have been designed.

At this stage, roof replacement strategy is based on a profiled-steel-deck replacement roof over the Gallery Extension, supported by retained and new steelwork, and timber-joist roofs over the Toilet Block and AHU enclosure. The current strategy assumes that the new Gallery roof will provide diaphragm action and that the Gallery frame derives part of its lateral restraint from the main hospital building with existing full height masonry walls potentially also contributing to lateral restraint and demolition of them is subject to further survey and potential requirement for new columns and bracing in the location of the existing full height walls.

Key Stage 3 actions are:

- Complete surveys and investigations as per “317330-HAH-XX-XX-T-S-00002 - Civil and Structural survey brief”.
- Align timelines for receiving design critical survey information and wider project programme.
- Confirm proposed MEP ducting arrangements including any new penetrations required through the roof and walls.
- Confirm roof edge protection, parapet, acoustic screening requirements.
- Confirm proposed new façade construction to allow proper coordination with head restraint steel and base support plinth.
- Confirm proposed AHU plant size and weight.
- Confirm new roof strategy – metal decking over gallery extension and traditional timber joisted roof over AHU extension and toilet block.
- Confirm requirements for any new below ground surface and foul water drainage.

1 Introduction

This report records the civil and structural design position at RIBA Stage 2 for the Gallery Restaurant and Servery RAAC remediation project. It defines the current structural understanding, the proposed strategy, the design assumptions and the surveys and coordination required to progress to Stage 3 and technical design.

The report is based on the information listed in Section 12 and should be read with the Stage 2 structural drawings scheduled in Section 13.

This report has been prepared for Manchester University NHS Foundation Trust for the stated project purpose. It should be read with the current architectural, MEP, fire, acoustic and specialist information and should not be relied upon by third parties without written agreement.

2 Site and Existing Context

The Gallery Restaurant is a single-storey facility within the North Manchester General Hospital estate on Delaunays Road, Manchester, M8 5RB. The project area comprises the Dining Extension, Kitchen and Servery and the adjacent male, accessible and female toilet accommodation. The Dining extension and the adjacent toilet block structures are single storey structures which are abutting the main 3 storey load bearing masonry hospital ward structure which is understood to provide lateral support and restraint to the toilet block walls and in case of the Dining extension partial vertical and lateral support.

The Dining Extension and Toilet Block contain RAAC roof planks. Previous consultants developed short-term remedial measures. During Harley Haddow's ground-level inspection on 17 July 2026, the Dining Extension ceiling void was not accessible and implementation of its remedial works could not be witnessed. Props and supporting timbers were observed within the Toilet Block ceiling void.

The wider hospital remains operational. Demolition, RAAC removal, temporary works, dust, noise, vibration, service diversions and access constraints will therefore require close planning with the Trust and principal contractor.

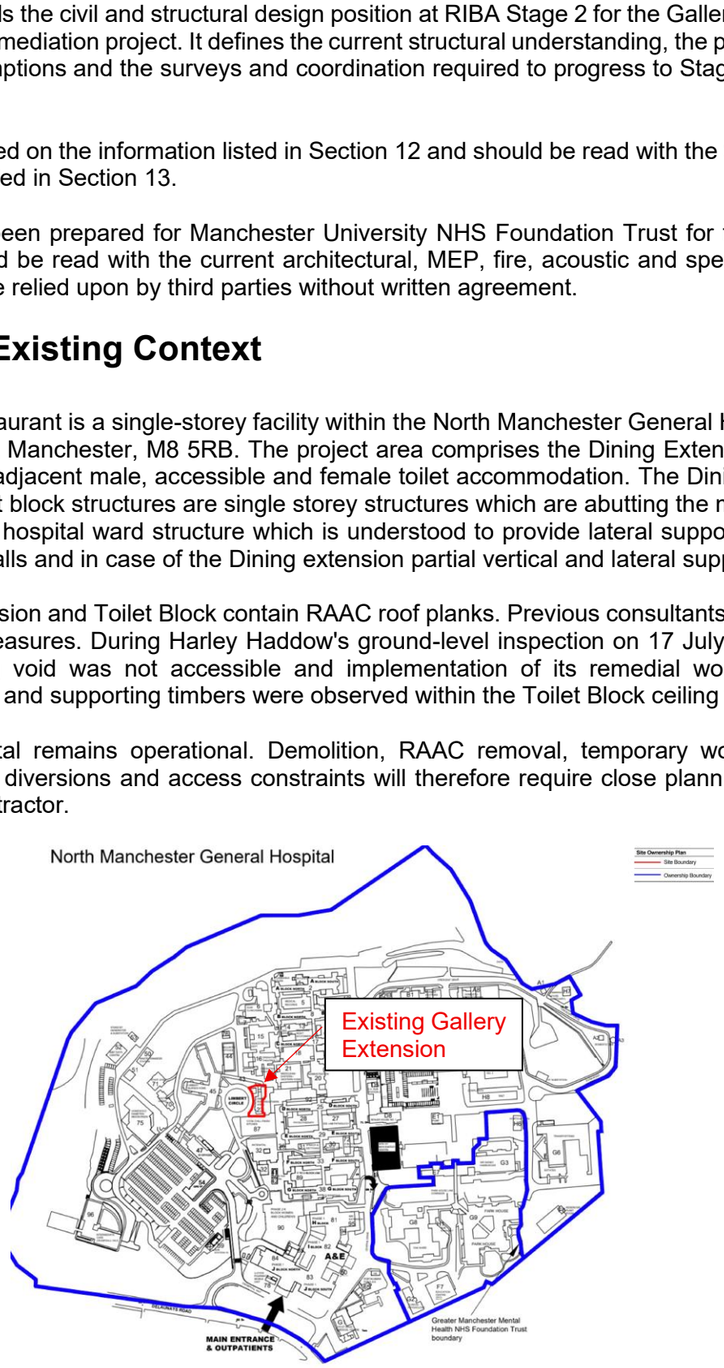


Figure 1 - North Manchester General Hospital location plan and project boundary.

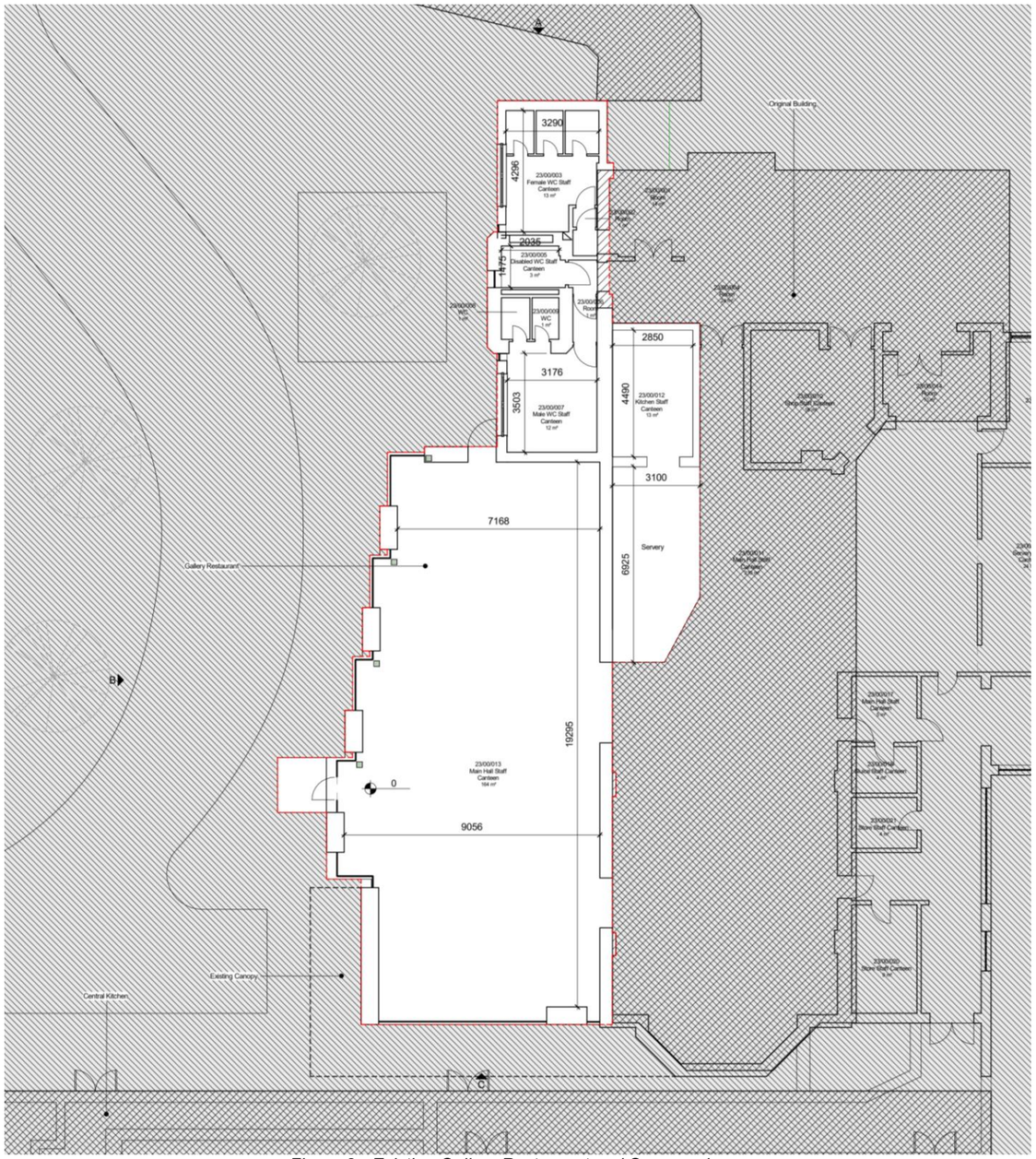


Figure 2 - Existing Gallery Restaurant and Servery plan

3 Existing Structure

3.1 Dining Extension

Available information such as previous RAAC remediation works scheme drawings 232498-CCS-S1-XX-DR-S-002 and 232431-CCS-S1-XX-DR-S-NM-902 (See Figure 3) indicate that the roof comprises approximately 600 mm wide RAAC planks spanning onto steel beams supported on steel SHS columns. Local timber infill construction has also been recorded. The external elevation comprises glazing and masonry panels with a pebble-dash concrete parapet.

Previous RAAC information records severely compromised bearings and areas with greater than 50% loss of bearing, together with soffit staining and efflorescence. The extent and condition of retained steelwork, connections, parapet restraint and interfaces with the original building have not yet been verified by Harley Haddow and will be subject to review during surveys planned for the next design stage.

3.2 Toilet Block

The Toilet Block roof is understood to comprise RAAC planks bearing onto masonry walls. Short-term remedial works included acrow props and mid-span supporting timbers.

3.3 Kitchen and Servery

The Kitchen and Servery is understood not to contain RAAC. The proposed work is principally refurbishment, fire suppression, ventilation and service alteration. Structural intervention is expected to be limited to any new wall openings to facilitate new ducting where identified by MEP.

3.4 Existing stability and substructure

The Dining Extension's lateral stability system has not been fully confirmed. Gallery extension lateral restraint is assumed to be largely reliant on the main building wall with some additional lateral support potentially provided in some of the external full height masonry walls. This will be further confirmed during investigation outlined for the next design stage.

Toilet block stability is understood to be based on single story external masonry wall panels being restrained at the head by the roof structure which then transfers any lateral loads into the main building walls adjacent.

The existing ground floor slab build-up, foundation geometry and ground conditions are not confirmed. Based on our observations we anticipate that toilet block foundations are likely to be trench fill concrete footings and Gallery extension being supported by RC shallow pad foundations under columns with a trench concrete footing under the external façade perimeter. Ground investigations are proposed in a form of trial pits to confirm ground conditions and existing foundation geometry assumptions.

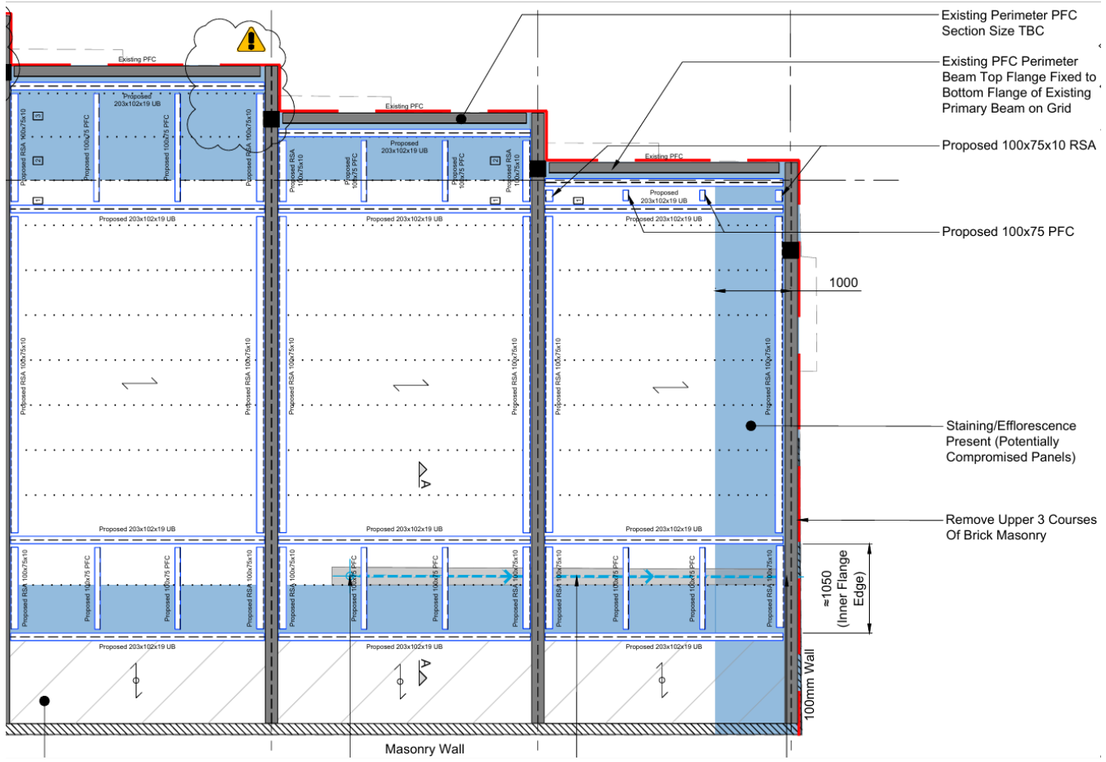


Figure 3: Part extract of RAAC remediation works drawing (232498-CCS-S1-XX-DR-S-002)

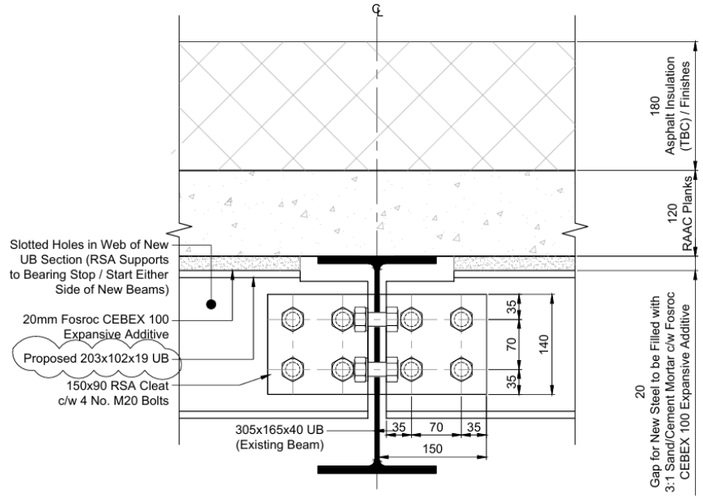


Figure 4: Existing roof structure and RAAC buildup (extract from 232498-CCS-S1-XX-DR-S-002)

4 Scheme Proposals

The selected Stage 2 scheme develops Option 2 - Plus from the Stage 1 feasibility study. The principal works relevant to the structural design are:

- Removal and replacement of the RAAC roof construction to the Dining Extension and Toilet Block.
- Removal of existing steel frame canopy located in the northwest corner of the Dining Extension.
- Removal of the Dining Extension glazing, external façade walls and parapet, while retaining the primary beams, columns, slab and foundations.
- A new external façade with secondary structural support and restraint.
- Local adjustment of the Dining Extension façade line, requiring local extension of the ground floor slab and roof edge.
- A new approximately 15 m² AHU enclosure extension.
- New roof-level acoustic screening/louvres and associated support, subject to final acoustic and MEP design.
- Local drainage and service alterations associated with the refurbished toilets, kitchen, servery and rainwater drainage.

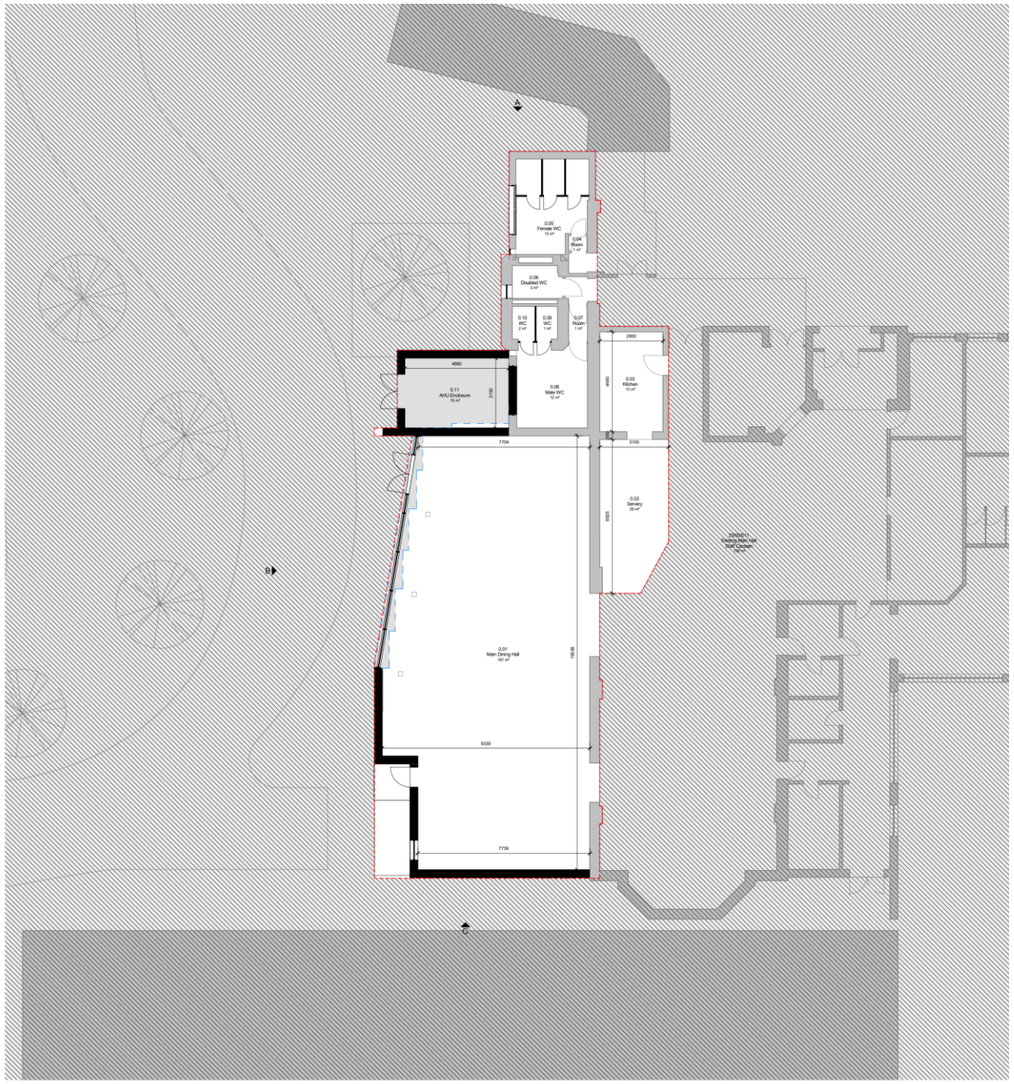


Figure 5 - Proposed footprint, including local floor extension and AHU enclosure (MPA, P1, 14 August 2026).

5 Design Criteria and Standards

5.1 Basis of design

At Stage 2, the design basis is to retain the existing primary structure where survey and assessment demonstrate that it is suitable, and to introduce lightweight replacement roof, façade, stability (if existing is removed) and local substructure interventions.

Detailed calculations and member sizing will follow once the existing structure is surveyed and key design proposals such as new cladding interfaces and MEP proposals affecting structural loads and geometry are coordinated and fixed.

5.2 Statutory framework

Structural works are to be designed and specified to satisfy the Building Regulations 2010 (as amended), including:

- Part A (Structure):
  - Requirement A1 - loading.
  - Requirement A3 - disproportionate collapse.
- Part B (Fire safety):
  - Requirement B3 - internal fire spread (structure).
- Part H (Drainage and waste disposal):
  - Requirement H1 - foul water drainage and disposal.
- Part C (Site preparation and resistance to contaminants and moisture):
  - Requirement C2 - resistance to moisture.

5.3 Structural design standards

The structural design basis for new interventions and checks to existing elements is to be developed in accordance with the Eurocodes and UK National Annexes, including:

- BS EN 1990: Basis of structural design.
- BS EN 1991-1-1: Densities, self-weight and imposed loads for buildings.
- BS EN 1991-1-7: Accidental actions.
- BS EN 1992-1-1: Design of concrete structures - General rules and rules for buildings.
- BS EN 1993-1-1: Design of steel structures – General rules and rules for buildings.
- BS EN 1997-1: Geotechnical design - General rules.

5.4 Actions and loading

No verified existing design load schedule or record structural drawings are available for the existing structure affected by the proposals and hence existing loading assumptions are based on our visual observations made during the site visit as well as review of information provided subsequently relating to previous RAAC remediation interventions.

Gallery Dining Extension	Existing (KN/m^2)	Notes
Roof (Permanent loads)		
RAAC panels	0.72	Assumed 120mm thick panel
finishes	0.35	Assumed
Services	0.1	Assumed
Ceiling	0.1	Assumed
Total	**1.27**	
Imposed loads		
Roof maintenance access (H)	0.6	And 0.9 kN point load
Ground floor slab (C1)	3.0	and 2.7 kN point load

Gallery Dining Extension	Proposed (KN/m^2)	Notes
Roof (Permanent loads)		
Corrugated metal deck or joists with OSB	0.35	Could be reduced to 0.15 if opted for corrugated metal deck
finishes	0.35	Assumed unchanged
Services	0.2	Increased by 0.1 over existing
Ceiling	0.15	Increased 0.05 over existing
Total	**1.05**	
Imposed loads		
Roof maintenance access (H)	0.6	And 0.9 kN point load
Ground floor slab (C1)	3.0	and 2.7 kN point load

Toilet Block	Existing (KN/m^2)	Notes
Roof (Permanent loads)		
RAAC panels	0.72	Assumed 120mm thick panel
finishes	0.35	Assumed
Services	0.1	Assumed
Ceiling	0.1	Assumed
Total	**1.27**	
Imposed loads		
Roof maintenance access	0.6	And 0.9 kN point load
Ground floor slab (A3)	2.0	And 2.0 kN point load

Toilet Block	Proposed (KN/m^2)	Notes
Roof (Permanent loads)		
Corrugated metal deck or joists with OSB	0.35	Could be reduced to 0.15 if opted for corrugated metal deck
finishes	0.35	Assumed unchanged
Services	0.2	Increased by 0.1 over existing
Ceiling	0.15	Increased 0.05 over existing
Total	**1.05**	
Imposed loads		
Roof maintenance access (H)	0.6	And 0.9 kN point load
Ground floor slab (A3)	2.0	And 2.0 kN point load

New AHU extension	Proposed (KN/m^2)	Notes
Roof (Permanent loads)		

Corrugated metal deck or joists with OSB	0.35	Could be reduced to 0.15 if opted for corrugated metal deck
finishes	0.35	Allowance
Services	0.2	Allowance
Ceiling	0.15	Allowance
Total	**1.05**	
Imposed loads		
Roof maintenance access (H)	0.6	And 0.9 kN point load
Ground floor slab	5.0	and 5kN point load

It should be noted that existing assumed permanent load allowances for the existing roof areas over the gallery extension and the toilet block are considered to be conservative allowances, however they remain to be verified pending further surveys and investigations. New permanent loads for the roof areas are generally expected to be lower than existing due to replacement of RAAC panels with lightweight alternatives such as metal decking or traditional timber joist with ply/osb decking. At this stage, a nominal increase in permanent loads associated with services and ceilings have been assumed to allow for greater design flexibility in the subsequent design changes but these may be revisited and adjusted as appropriate to reflect more developed Architectural and MEP proposals once these are available.

5.5 Fire and robustness

Required structural fire resistance and the fire performance of existing and new steelwork, roof, façade supports and connections are to be coordinated with the fire strategy.

The existing building disproportionate collapse classification is a consequence Class 2B in accordance with Building Regulations, for hospital buildings under three storeys. The structures concerned with this scheme are all single storey and therefore the roof elements cannot cause failure of any storey above and therefore there is no requirement for ties within the roof structure.

6 Structural Strategy

6.1 Roof RAAC removal and replacement generally

The existing roof RAAC planks and associated roof build-up is proposed to be removed in accordance with a contractor-designed temporary works and sequencing plan. The contractor should consider providing crash decking beneath the Gallery roof to facilitate the safe removal of the existing RAAC panels.

Two lightweight replacement roof options have been considered at this stage - profiled steel decking and timber joists with structural plywood or OSB decking. Profiled steel decking is expected to offer a quicker and more efficient installation over the relatively large Gallery roof area. When appropriately designed and fixed, it could also provide diaphragm action within the roof plane. It is not certain if the original design relied on the RAAC roof for diaphragm action and given this uncertainty it would be conservative to allow for the new roof structure to be designed such that it can provide diaphragm action. Achieving equivalent diaphragm action using timber joists and structural decking may require more extensive connection detailing and potentially additional plan bracing.

At this stage, profiled steel decking (see figure 6) is considered the more appropriate solution for the steel-framed Gallery Extension. A lightweight roof build-up would help minimise additional loading on the retained steelwork and foundations. This is particularly relevant where the proposed realignment of the roof edge increases the cantilever length and associated foundation loads.
Traditional timber-joist construction is considered better suited to the smaller Toilet Block roof, which is supported by existing masonry walls, and the proposed AHU enclosure assuming that it will also be built as traditional masonry construction.

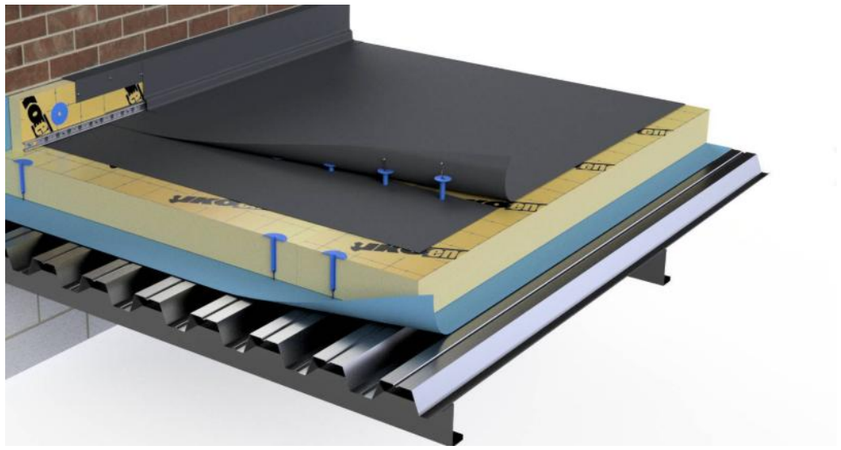


Figure 6: Typical metal decking roof buildup

6.2 Permanent stability

The structural layout survey is required to establish whether the full height masonry walls intended for demolition are load-bearing and/or provide lateral resistance, conceal columns or bracing. It should also determine if any of the external steel frames are acting as moment frames potentially providing lateral stability.

Depending on the survey findings, new columns (if wall is load bearing) and bracing (if wall is providing stability) may be required to be constructed to provide lateral stability to the frame particularly in the longitudinal direction of the frame. The Gallery structure's lateral stability is also believed to be largely reliant on the main hospital's external masonry wall which supports the roof beams. No modifications are proposed to these existing roof beam connections at the main wall interface and therefore it is anticipated that the main building external wall will continue to be able to provide lateral stability in the longitudinal direction of the gallery roof at the interface with that wall as well as transverse direction due to the main building wall being restrained by the hospital ward floors on the other side.

6.4 Dining Gallery New Façade and parapet/acoustic panel support

Stage 2 scheme proposals include for localised façade realignment and extending of the roof frame to form cantilevered roof canopies.

The roof line is proposed to be extended by extending the existing primary beam cantilevers up to the new roof edge line. To form these cantilever extensions new steel beams will be fixed to the end of existing beam ends with moment connections. On one of the beam lines where the extended cantilever will be at its longest it is proposed to utilise the newly proposed sloping external wall to introduce a steel post with a dedicated footing that could act as a prop to the cantilevered end.

New edge beams spanning between the extended cantilevers would then be provided to form a new roof edge with additional beams introduced where the façade line does not align with the roof edge of where additional support is required for the acoustic panels where these are inset from the roof edge.

6.5 Dining Gallery Ground floor and foundations

To facilitate the proposed façade realignment, localised ground bearing slab extensions dowelled to the existing slab edge would be required. It is also anticipated that a shallow trench footing with a masonry or concrete upstand would also be constructed to provide support for the new façade as well as provide any nominal soil retaining to the slab edge and facilitate damp proofing and insulation detailing.

Subject to investigation findings related to the existing building lateral stability arrangements, new foundations or strengthening of the existing foundations may be required in the location where existing full height masonry wall is proposed to be removed in case new columns and/or bracing is required.

A new pad footing is also anticipated to be required for the new sloped steel post proposed to be installed to support one of the extended roof beams where the cantilever will be the longest.

Design of any new or modifications of existing foundations will also be subject to trial pit findings confirming existing soil conditions.

6.6 AHU enclosure

It is at this stage anticipated that AHU enclosure extension would be of traditional construction formed from load bearing masonry cavity walls built on trench fill mass concrete footings with a timber joisted roof with OSB/plywood decking for the AHU enclosure, with joists doubled beneath the acoustic screen.

For the ground floor slab, we would also anticipate an allowance of 150mm thick reinforced concrete ground bearing slab being appropriate at this stage.

6.7 Civil and drainage interfaces

It is proposed that CCTV drainage survey is undertaken to establish existing foul and surface-water routes, sizes, depths, condition and connectivity so that should any new below ground drainage connection be required these could be designed accordingly to be connected into the existing drainage system. However, considering that these would typically require localised slab breakouts and reinstatement it is generally advisable that new drainage connections as much as possible are routed above ground and utilise existing stub stack locations.

7 Assumptions

The Stage 2 strategy relies on the following assumptions, all of which require confirmation:

- Gallery extension existing steel frame is assumed to be as per drawing “232498-CCS-S1-XX-DR-S-002 C1” related to previous RAAC remedial works.
- Existing primary roof beams, columns, slab and foundations can be retained subject to survey.
- The Kitchen and Servery does not contain RAAC.
- New roof construction over Gallery extension will be lightweight and will not support heavy plant other than typical loads associated with services (lighting, cable trunking, ducts, fans).
- Existing ground conditions will be reasonably competent to enable shallow strip or pad foundations
- No significant below ground drainage diversions will be required to facilitate AHU extension and Gallery façade extension.
- Gallery extension lateral restraint is largely reliant on the main building wall with some additional lateral support potentially provided in some of the external full height masonry walls.
- It is not known if the existing RAAC roof panels are intended to provide diaphragm action, hence at this stage it is assumed that they do. It is therefore assumed that the new roof will also be designed to provide diaphragm action.

8 Risks and Constraints

- It is understood that the current steel frame roof was designed for maintenance access load only with no provision for heavy plant loading. The current scheme is based on the roof remaining as maintenance access only hence subject to localised interventions where required to support acoustic louvres, new stair connection and façade realignment it will remain suitable for the intended use and associated loading. Should the intended roof use change over the course of design development, then more substantial structural interventions may be required to strengthen the existing steel frame.
- The existing Gallery Extension steel frame may contain localised corrosion or other condition-related defects. Any defects identified during the survey should be assessed and addressed as part of the refurbishment works
- Existing below ground drainage may clash with new foundations and or slab extension. To be reviewed following CCTV survey.
- Existing full height masonry walls located in the northwest corner may be providing vertical and lateral support to the existing frame. Their intended demolition is subject to further review following surveys and may require additional temporary works to facilitate demolition as well as new columns with bracing to reinstate vertical support and lateral stability.

9 Surveys and Information Required

Survey requirements are covered by a separate dedicated document “317330-HAH-XX-XX-T-S-00002 - Civil and Structural survey brief”. Summary of this is also provided below:

Table 1: Proposed surveys summary

Ref.	Investigation	Purpose	Deliverable
2.1	Structural layout survey	Verify retained structure and stability arrangements	Structural layout drawings
2.2	Slab cores and trial pits	Confirm slab details and ground conditions	Investigation report with dimensions and photos
2.3	Recording any condition defects discovered	Identify any defects that need rectifying as part of the refurbishment	Condition observations incorporated into 2.1 deliverable
2.4	CCTV drainage survey	Establish drainage layout/condition	Drainage plan and CCTV report

10 Next Steps

- Complete surveys and investigations as per “317330-HAH-XX-XX-T-S-00002 - Civil and Structural survey brief”.
- Align timelines for receiving design critical survey information and wider project programme.
- Confirm proposed MEP ducting arrangements including any new penetrations required through the roof and walls.
- Confirm roof edge protection, parapet, acoustic screening requirements.
- Confirm proposed new façade construction to allow proper coordination with head restraint steel and base support plinth.
- Confirm proposed AHU plant size and weight.
- Confirm new roof strategy – metal decking over gallery extension and traditional timber joisted roof over AHU extension and toilet block.
- Confirm requirements for any new below ground surface and foul water drainage.

11 Information Register

- This stage 2 structural design was developed with reference to the below information:

- MPA Stage 1 Feasibility Report, ref. 3529-MPA-XX-XX-RP-A-08001, July 2026.
- Harley Haddow Stage 1 RAAC replacement structural review, ref. 317339-HAH-XX-XX-T-S-00001, P01, 24 July 2026.
- Harley Haddow Civil and Structural Survey Brief, ref. 317330-HAH-XX-XX-T-S-00002, August 2026.
- MPA Draft Planning Pack drawings P1 dated 14 August 2026: location, existing plans/elevations/sections, demolition plans/elevations/sections, proposed plan/roof/elevations/sections and diagrammatic phasing views.
- MPA NMGH Gallery Seating Outline Specification, P0, 14 August 2026.
- CCS Consulting RAAC and short-term remedial information referenced within the Stage 1 structural review and survey brief.

12 Structural Drawing Schedule

The following preliminary Stage 2 structural drawings are to be read with this report.

Drawing number	Title	Rev	Date
317330-HAH-XX-00-SK-S-00101	Gallery Extension - Existing Ground Floor Slab GA and Proposed Demolition	P01	21/08/2026
317330-HAH-XX-01-SK-S-00101	Gallery Extension - Existing Roof GA and Proposed Demolition	P01	21/08/2026
317330-HAH-XX-00-SK-S-00102	Gallery Extension - Proposed Ground Floor GA	P01	21/08/2026
317330-HAH-XX-01-SK-S-00102	Gallery Extension - Proposed Roof GA	P01	21/08/2026
317330-HAH-XX-01-SK-S-00103	Toilet Block - Proposed Roof GA	P01	21/08/2026