

**Balnagask**

**Outline RAAC Business  
Case Review**

**July 2024**

**Issue 1**



**FAIRHURST**

**CONTROL SHEET**

**CLIENT:** Aberdeen City Council  
**PROJECT TITLE:** Balnagask RAAC Review  
**REPORT TITLE:** Balnagask Outline RAAC Business Case Review  
**PROJECT REFERENCE:** 160260  
**DOCUMENT REFERENCE** **160260/01**

Issue & Approval Schedule			Name	Signature	Date	
	Prepared by	K Browne		Held on File	17-07-2024	
	Checked by	D Holmes		Held on File	17-07-2024	
	Approved by	A Scott-Kiddie		Held on File	17-07-2024	
Update Record	Iss.	Date	Status	Description	Signature	
	1				Prepared By	
					Checked	
					Approved	
	2				Prepared By	
					Checked	
Approved						

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## Background and Objectives

Fairhurst have been appointed by Aberdeen City Council to undertake an Outline Business Case to consider options to address issues relating to the presence of Reinforced Autoclaved Aerated Concrete (RAAC) roof panels at Balnagask Aberdeen.

This report will set out the following:

- Project background and objectives
- Scope of Works
- Evaluation Criteria
- Design Requirements
- Stakeholder engagement
- Timelines and deliverables

## 2. RAAC Background

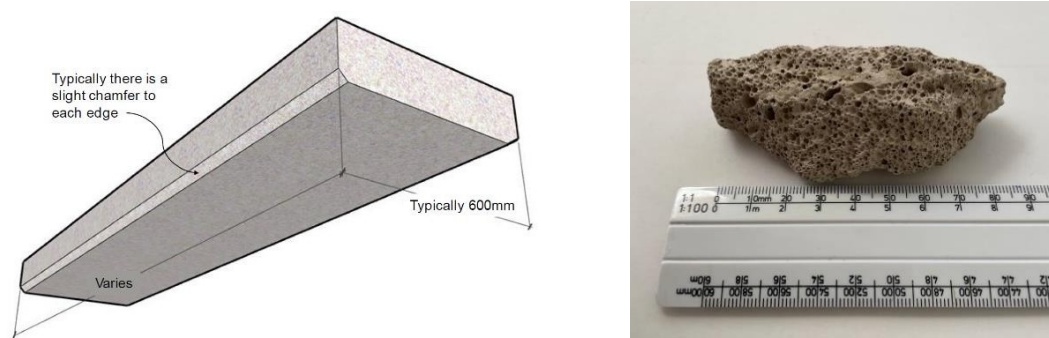
Following the sudden collapse of flat roof RAAC panels in 2018, the Standing Committee on Structural Safety (SCOSS) issued an alert in May 2019 aimed at building owners, consultants and contractors.

The Institution of Structural Engineers (IStructE) have since issued the following documents, which we have based our assessment on:

- Reinforced Autoclaved Aerated Concrete (RAAC) Panels - Investigation & Assessment - February 2022
- Reinforced Autoclaved Aerated Concrete (RAAC) - Investigation and Assessment - Further Guidance - April 2023

RAAC is a lightweight, 'bubbly' form of concrete, commonly used in construction between the 1950s and mid-1990s. It is predominantly found as pre-cast panels in roofs (commonly flat roofs, sometimes pitched).

RAAC panels are typically 600mm wide, although this has been known to vary. Their length will vary, typically up to 6m. They typically have a chamfer along their edge meaning there is a distinctive V-shaped groove at 600mm centres between the panels. See Figure 1 showing typical RAAC panel construction.



**Figure 1: Typical RAAC construction**

### 3. Existing Construction

The properties at Balnagask are two-storey buildings with traditional cavity blockwork wall construction and mono-pitched 125mm (5") thick RAAC roof panels spanning front to back, bearing onto external walls and a 100mm thick central concrete brickwork partition. See Figures 2 - 5 showing typical existing building construction. Figure 6 shows the typical RAAC panels condition observed during structural surveys.

Panels span approx. 3.5m at the rear of the property (typically above the living room and bedroom) and approx. 2.5m at the front of the property (typically above the kitchen and bathroom). These are relatively short spans, as RAAC panels can typically span up to 6m.

The mono-pitched roof construction is typically concealed behind a timber frame and plasterboard ceiling, some of which was retro-fitted (and was removed prior to inspections).

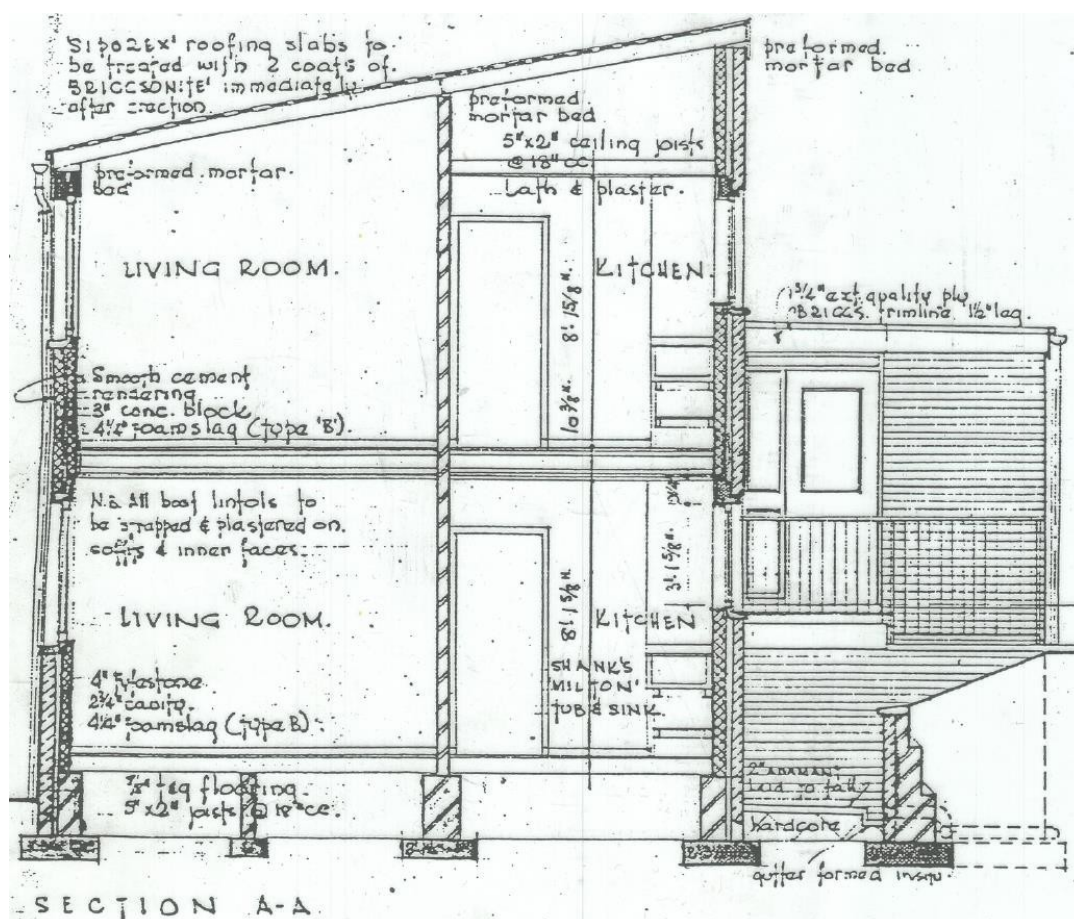


Figure 2: Original section drawing through flatted property

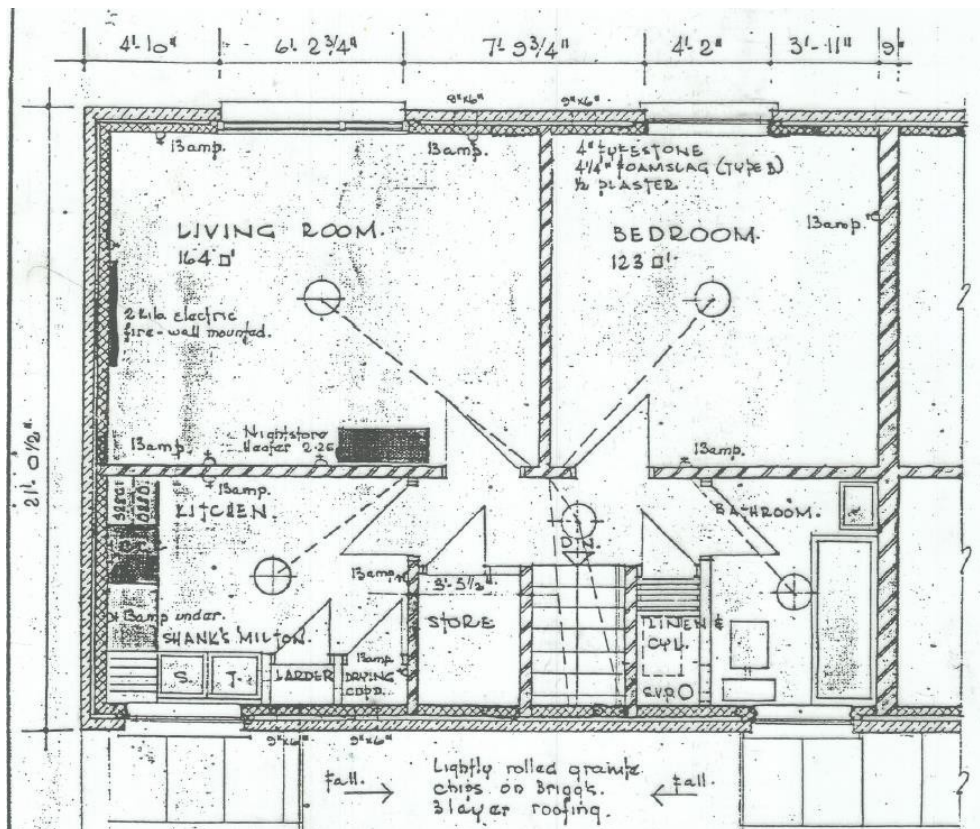


Figure 3: Original floor plan drawing of first floor flat

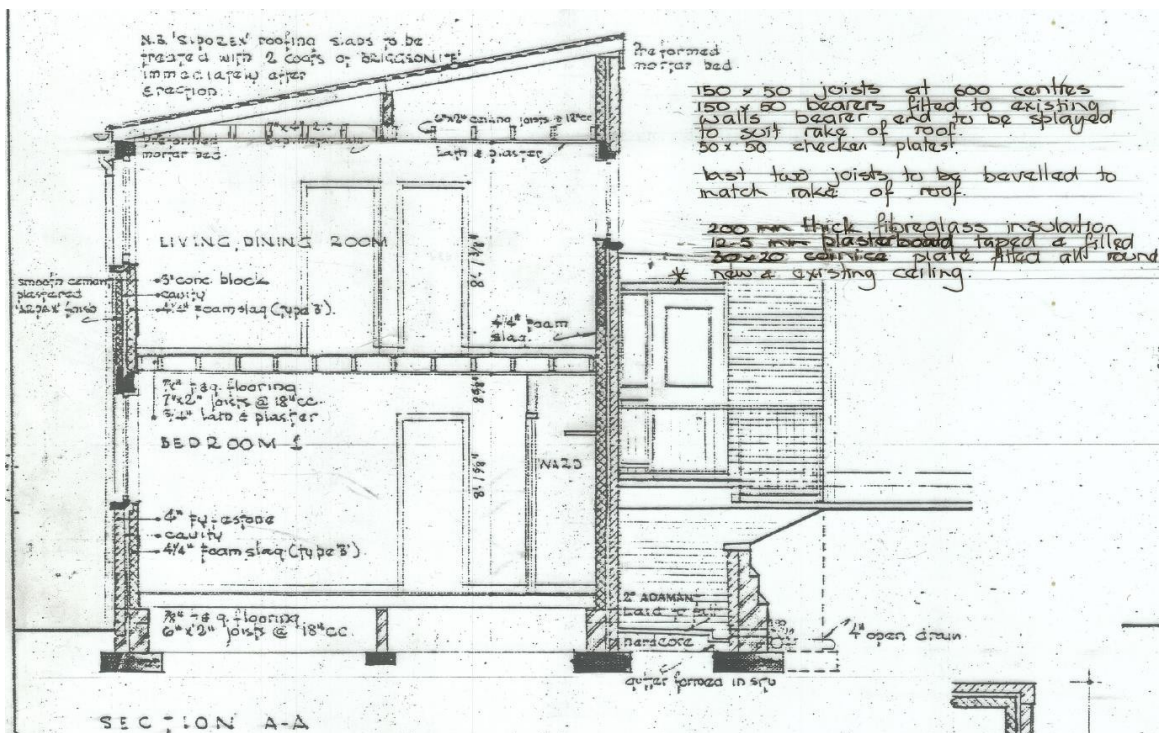


Figure 4: Original section drawing through 2-storey house

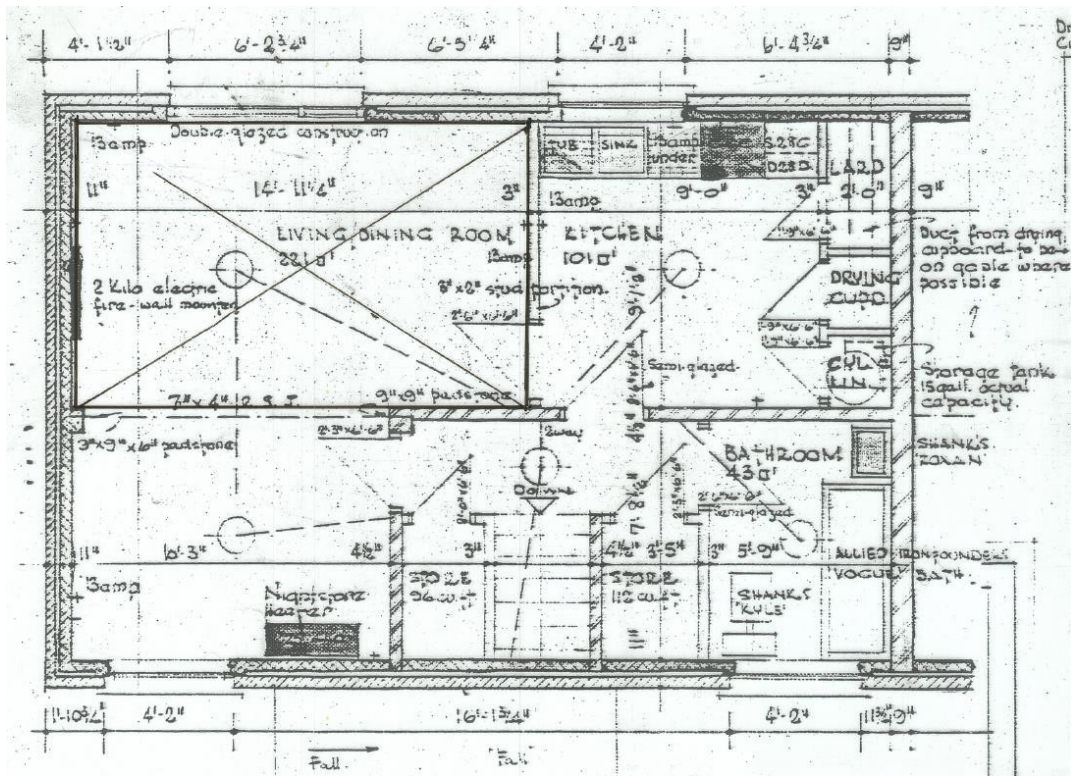


Figure 5: Original floor plan drawing of 2-storey house



Figure 6: Typical RAAC panels condition observed during surveys

#### 4. Methodology of RAAC Panel Assessment

The intrusive inspection scope and procedure was based on guidance by The Institution of Structural Engineers (IStructE) - Reinforced Autoclaved Aerated Concrete (RAAC) Investigation and Assessment - Further Guidance - April 2023.

We examined the following risk factors:-

- End bearing
- Anchorage reinforcement
- Cut Panels
- Cracking
- Builder's work / building modifications
- Water ingress
- Deflection
- Potential for adverse loading

The aspects identified during our intrusive and visual surveys that gave concern were:-

- Less than 75mm bearing on internal supports
- Excessive cracking of slab panel
- Excessive deflection
- Historic water ingress (prior to roof replacement contracts over the lifetime of the properties)
- Builder's works/builder modifications

Using the IStructE Risk Assessment approach defects were classified as per Table 1 detailed below.

Risk Factors	Assessment
End bearing	External wall supports all exceeded 75mm bearing
	Internal wall supports ranged between 40mm - 60mm bearing, with 1No. panel noted to be as low as 10mm – This slab is RED CRITICAL and was propped.
Anchorage/longitudinal reinforcement	Anchorage reinforcement missing to at least 1No. panel
Cut panels	None
Cracking	Transverse cracking found along full length of panel and within 500mm of the support. Spalling and corrosion of rebar also observed
Builder's works / building modifications	Damaged units from cable conduits and SVPs
Water ingress	Dampness has been noted to underside of panels
Deflection measurements	Up to span / 133, but with major cracking and spalling
Adverse or changes in loading	Replacement roofing systems with additional insulation

**Table 1: IStructE risk assessment approach to defects**

Red – High Risk  
 Amber – Medium Risk  
 Green – Low Risk

## 5. Principal Observations from Property Inspections

Using the Institution of Structural Engineers (IStructE) Risk Assessment approach we have classified the following RAAC defects;

### **End Bearing:**

By virtue of the fact that the central support wall is only 100mm wide, none of the slabs supported on the central wall achieve the required 75mm minimum bearing, required by the IStructE guidance. Notwithstanding the fact that as part of the overall Risk Assessment we have undertaken and proven in all but one of our inspections that both longitudinal and transverse bars exist at the slab bearings along the central 100mm wide wall. Of all the slabs inspected to date, one slab within an unoccupied property was found to have a bearing of 10mm. This slab was considered **RED Critical**. Propping was put in place to temporarily address this defect.

**Red High Risk Classification was assigned in the Risk Assessment for this element of the properties.**

### **Cracking:**

All of the slabs in the occupied and void properties inspected have transverse cracking, along the full length of the panel, including potential shear cracks within 500mm of the bearings. These cracks also typically travel through the full depth of the panels.

**RED High Risk Classification in the Risk Assessment for this element of the properties.**

### **Deflection:**

All of the slabs in the properties inspected have deflections generally similar.

**RED High Risk Classification in the Risk Assessment for this element of the properties.**

### **Builder's works / modification:**

All of the slabs in properties inspected found service penetrations/builder modifications.

**RED High Risk Classification in the Risk Assessment for this element of the properties.**



## 6. Conclusion & Recommendations

The inspections of 101 properties, to date, have shown the condition of the RAAC slabs are similar throughout the development. Given the number of properties inspected we have no reason to believe that uninspected properties will show any meaningful improvement on general condition of RAAC panels. Where there has been historic water ingress the condition of the RAAC slab and reinforcement will be measurably worse.

As a result of these findings and associated risk assessment Aberdeen City Council requested an Engineering Assessment of the following options:

### Proposed Assessment Options:

1. Extending bearing supports
2. Install a timber support frame under existing RAAC roof panels
3. Removal of RAAC panels and replace with a new timber roof cassette system
4. Demolition and rebuild of properties within same footprint

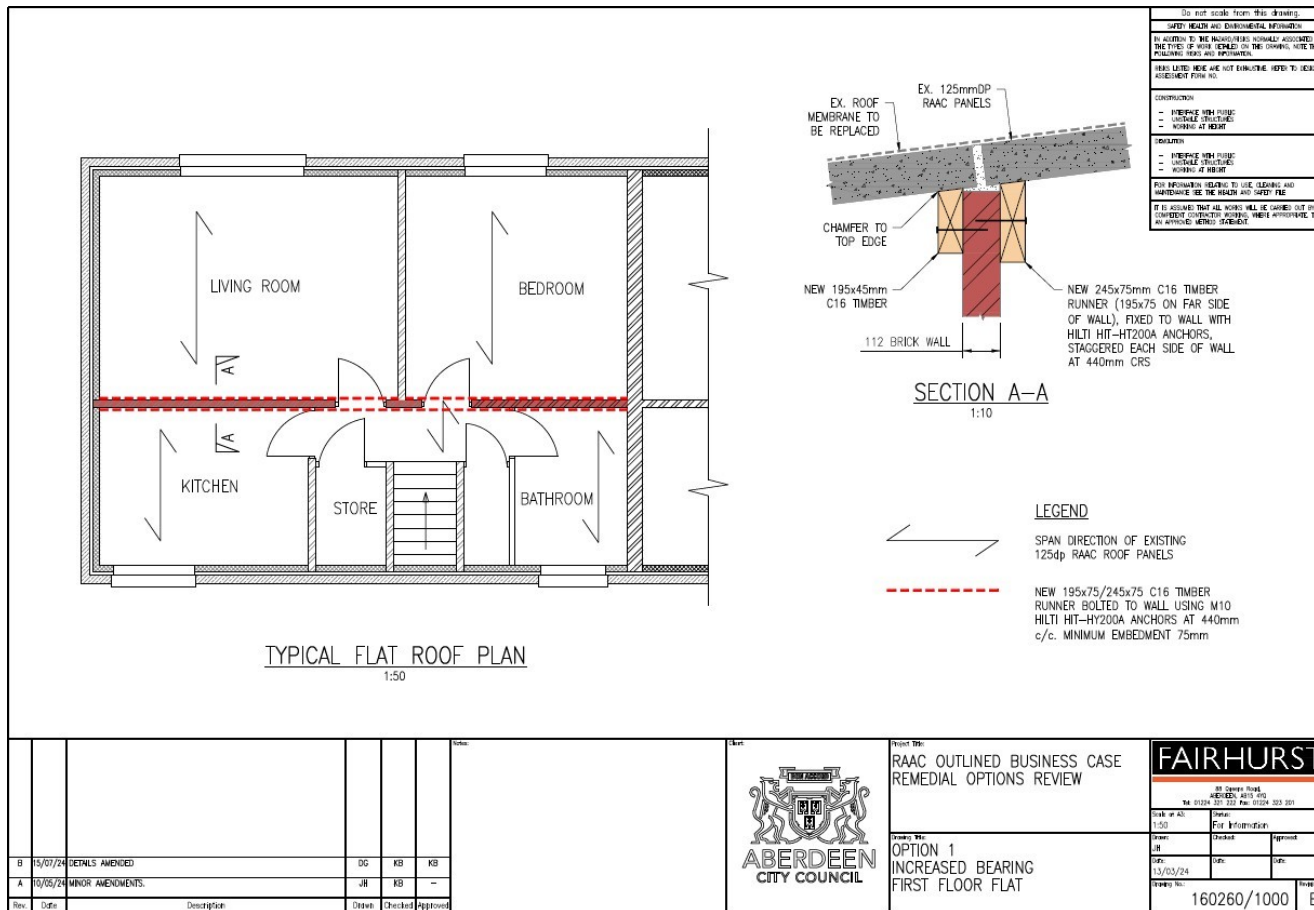
The proposed assessment options were assessed against the following criteria:

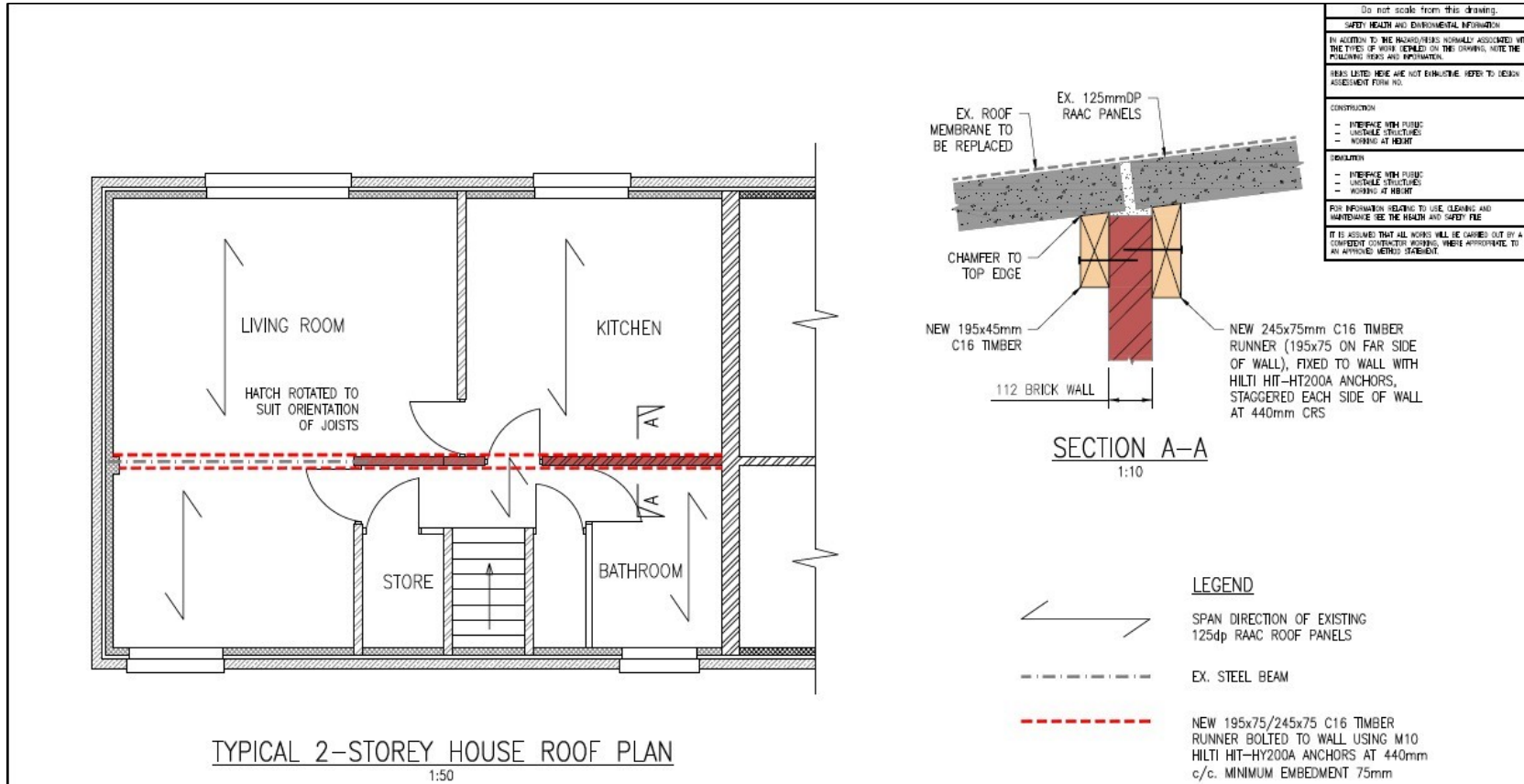
1. Remedial Assessment Review
2. Scope of Works:
  - a) Method to Install
  - b) Cost to install RAAC remedial works and undertake limited refurbishment works i.e. replace ceilings and repainting of walls/room where the repairs were carried out.
  - c) Cost for full property refurbishment and installation of RAAC remedial options
  - d) Timeline to install RAAC remedial works and undertake limited property refurbishment works
  - e) Timeline for full property refurbishment and installation of RAAC remedial options
  - f) Advantages and Disadvantages
3. Carbon footprint / environmental impact option review
4. EPC Rating option review and cost review

**7. Remedial Assessment Review**

**Option 1: Extending Bearing Supports**

This option would involve fixing timber runners to the face of internal 100mm brick walls thus increasing bearing to satisfy the minimum bearing requirement of 75mm. See drawings 160260/1000/1001 for proposed remedial details for both the 2 storey house and flatted property. Refer to **Table 2** for a risk category assessment for each of the remedial option.





Do not scale from this drawing.

**SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION**

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAIL ON THE DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

**CONSTRUCTION**


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**DEMOLITION**

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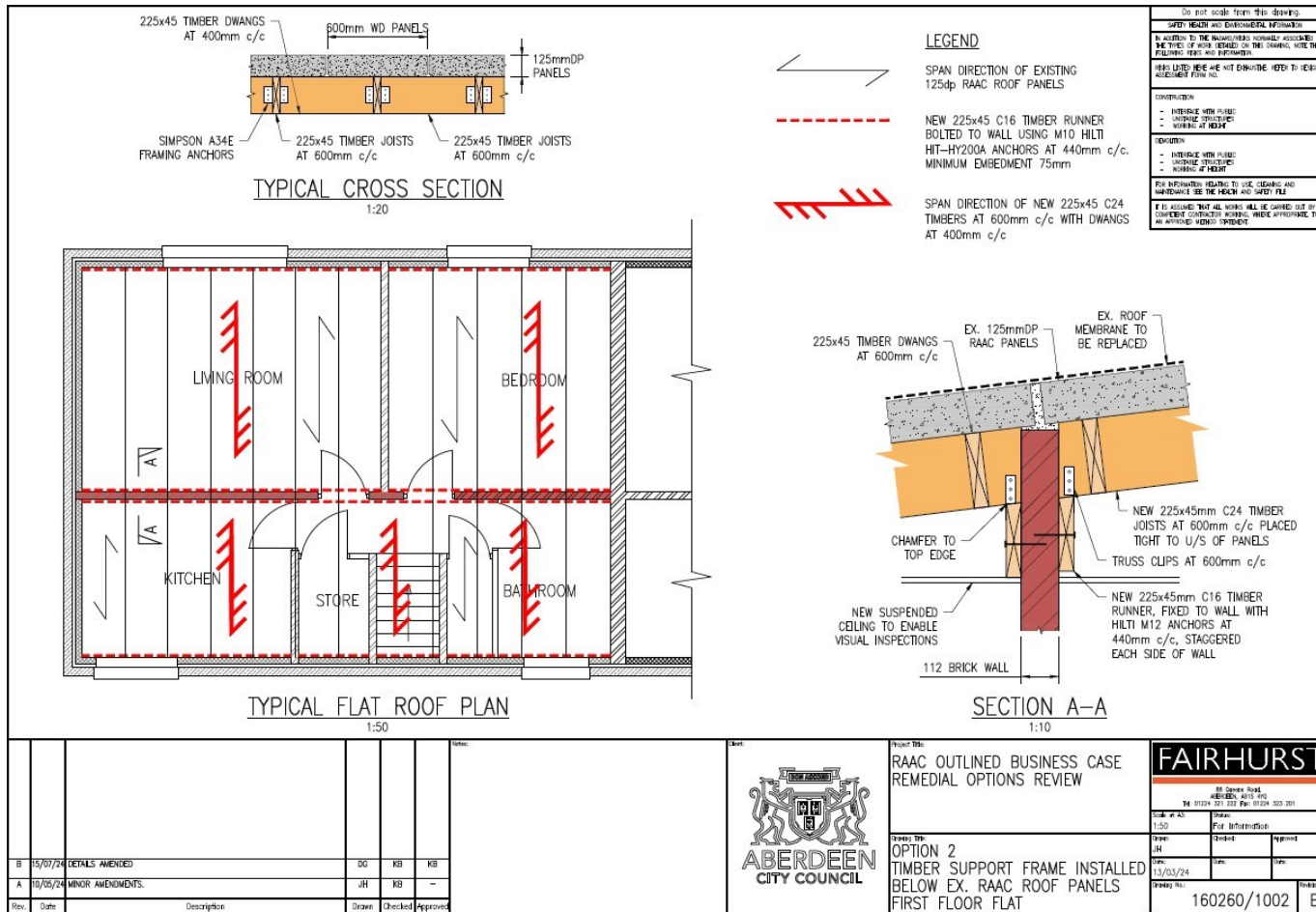
FOR INFORMATION RELATING TO LICE CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

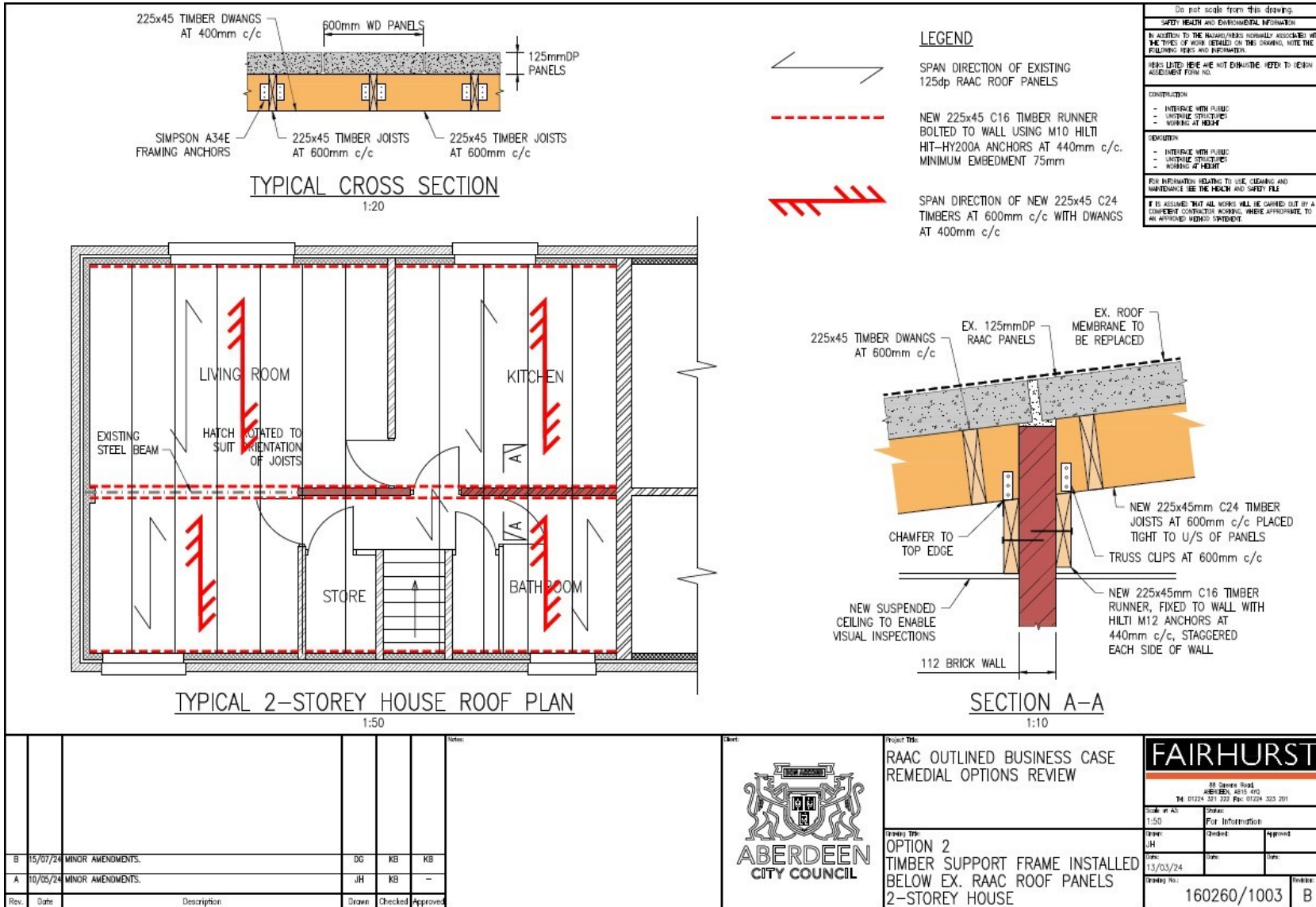
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED METHOD STATEMENT.

<table border="1"> <tr> <td>Rev.</td> <td>Date</td> <td>Description</td> <td>Drawn</td> <td>Checked</td> <td>Approved</td> </tr> <tr> <td>B</td> <td>15/01/24</td> <td>DETAILS AMENDED</td> <td>DG</td> <td>KB</td> <td>KB</td> </tr> <tr> <td>A</td> <td>10/05/24</td> <td>MINOR AMENDMENTS</td> <td>JH</td> <td>KB</td> <td>-</td> </tr> </table>			Rev.	Date	Description	Drawn	Checked	Approved	B	15/01/24	DETAILS AMENDED	DG	KB	KB	A	10/05/24	MINOR AMENDMENTS	JH	KB	-	<p>Notes:</p>		<p>Client:</p>  <p><b>ABERDEEN CITY COUNCIL</b></p>		<p>Project Title:</p> <p><b>RAAC OUTLINED BUSINESS CASE REMEDIAL OPTIONS REVIEW</b></p> <p>Drawing Title:</p> <p><b>OPTION 1 INCREASED BEARING 2-STOREY HOUSE</b></p>		<p><b>FAIRHURST</b></p> <p>83 Cairns Road                  ABERDEEN, AB15 4FD                  Tel: 01224 323 323 Fax: 01224 323 321</p> <p>Scale or As: 1:50                  Date: 13/03/24                  Drawing No: 160260/1001</p> <p>For Information</p> <p>Drawn: JH                  Checked: [ ]                  Date: [ ]</p> <p>Approved: [ ]                  Date: [ ]</p> <p>Revision: B</p>	
Rev.	Date	Description	Drawn	Checked	Approved																							
B	15/01/24	DETAILS AMENDED	DG	KB	KB																							
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**Option 2: Install a timber support frame under the existing RAAC roof panels**

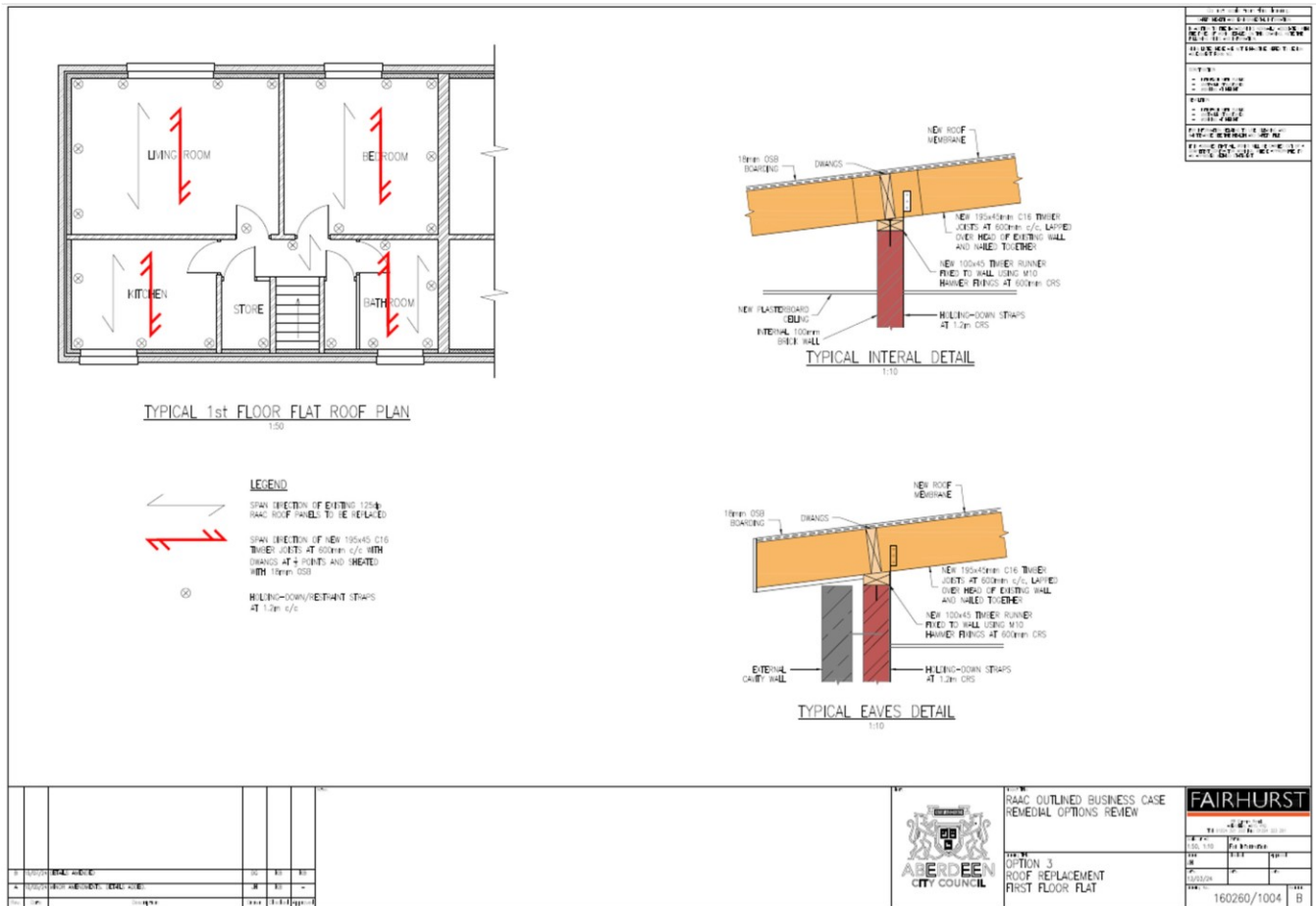
This option would involve installing a timber support frame under the existing roof panels which significantly reduces spans of the RAAC panels to 600mm. See drawings 160260/1002/1003 for proposed remedial details for both the 2 storey house and flatted property. Refer to **Table 2** for a risk category assessment for each of the remedial options.

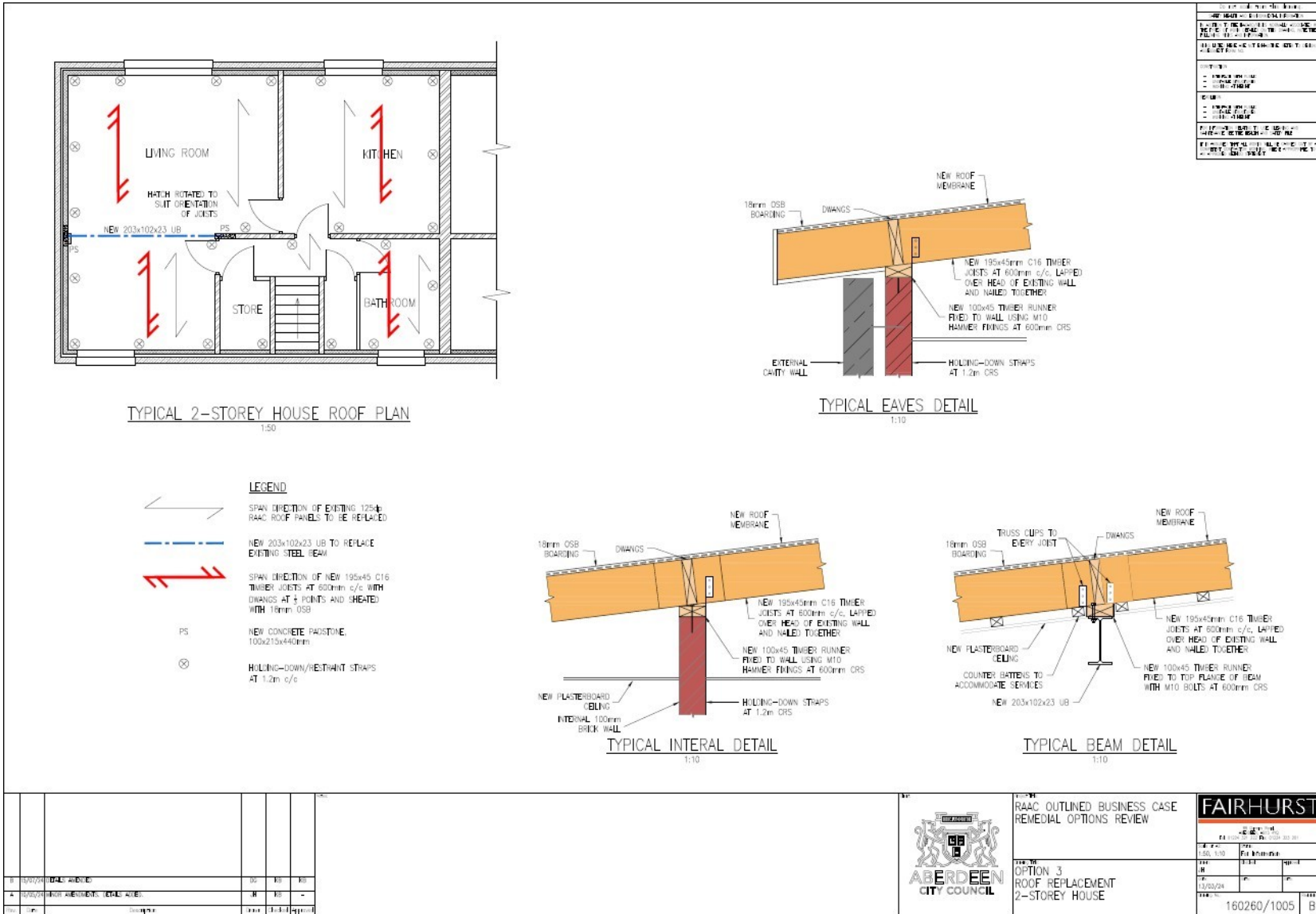




**Option 3: Removal of RAAC panels and replace with a new roof cassette system**

This option would involve removing the RAAC roof panels and replacing with a new timber roof structure. See drawings 160260/1004/1005 for proposed remedial details for both the 2 storey house and flatted property. Refer to **Table 2** for a risk category assessment for each of the remedial option.





**RAAC Panels Party Wall Support Remedial Detail**

**Observations and Proposed Measures**

During our surveys existing RAAC panels were found to be bridging over party walls between properties. The 215mm party wall was also found to be built tight to underside of panels. Please see adjacent drawing showing the typical as built panel arrangement. To minimise disruption to adjacent properties during the removal of RAAC panels the following has been proposed:

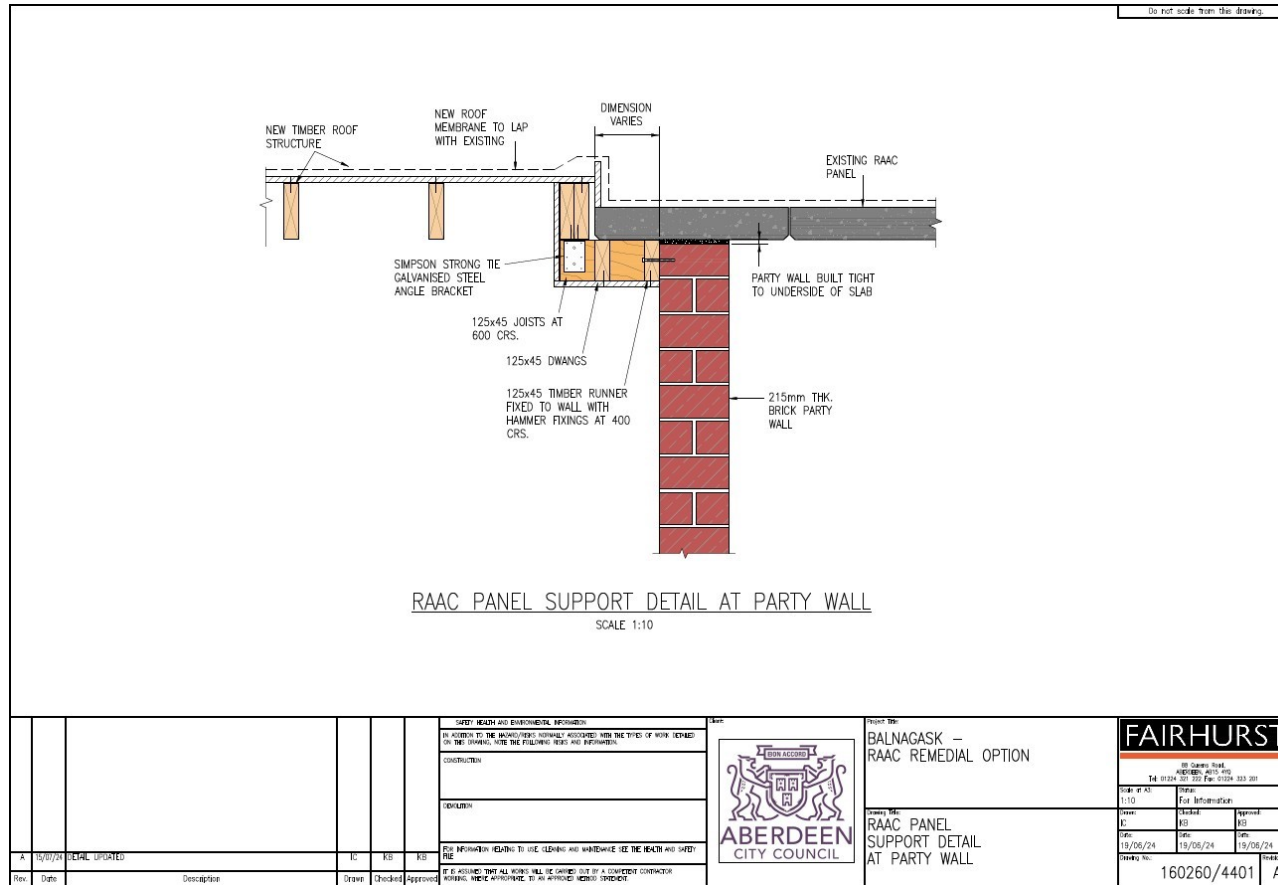
**Panels Over Party Wall:** Panels that are directly over the party wall will remain in place. This ensures stability and avoids unnecessary disturbance to adjacent properties.

**Timber Support Frame:** A timber support frame will be installed under the overhang of the RAAC panel. By doing so, a small section of the RAAC panel becomes structurally redundant. This approach allows for safer removal without compromising the adjacent property.

**Sequencing of Works:** The removal process will be carefully sequenced to minimise both disruption and vibration to neighbouring properties during the construction.

**New Roof Membrane Flashing:** As part of the process, new roof membrane flashing will be installed up to the external face of the party wall. This ensures proper waterproofing and protects against any potential leaks.

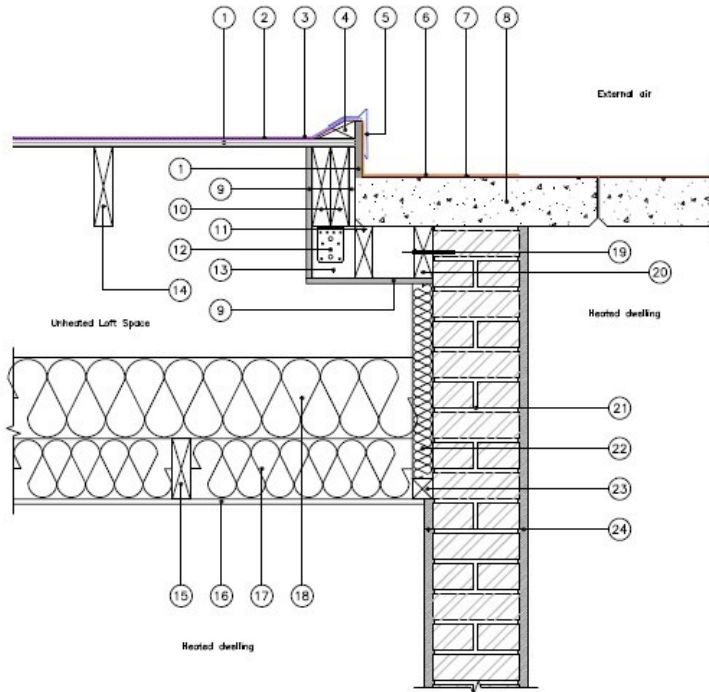
For further detailed information, please refer to the proposed Architectural drawing D01.





A3

- 1 Proposed 18mm Mapply, or equal approved, A1 (non-combustible) sarking board
- 2 Proposed reinforcement fleece, as per roof membrane manufacturer's specification
- 3 Proposed mechanically fixed single ply membrane, installed in accordance with manufacturer's installation guidance
- 4 Proposed treated timber fillet
- 5 Proposed pre-formed laminated metal trim, mechanically fixed
- 6 Proposed roof felt flashing, appropriate to existing roof material
- 7 Existing roof felt
- 8 Existing RAAC roof panel
- 9 Proposed 15mm A1 (non-combustible) board
- 10 Proposed 2No 195x45mm C16 timber roof joists
- 11 Proposed 45x125mm treated timber dwang, fitted between joists
- 12 Proposed Simpson Strong-Tie galvanneal steel angle bracket, to Engineer's specification
- 13 Proposed 45x125mm treated timber joist @ 600mm centres
- 14 Proposed 195x45mm C16 timber roof joists @ 600mm c/c
- 15 Proposed 150x45mm C16 timber ceiling joists @ 600mm c/c
- 16 Proposed 15mm Type A TE plasterboard
- 17 150mm Knuf Earthwool Loft Roll 40 insulation, fitted between joists
- 18 200mm Knuf Earthwool Loft Roll 40 insulation, laid perpendicular to layer below
- 19 Flings @ 400mm centres, to Engineer's specification
- 20 Proposed 45x125mm treated timber runner
- 21 Existing 215mm wide solid brick separating wall
- 22 Proposed 50mm rock mineral wool slab, mechanically fixed to wall
- 23 Proposed 50x50mm timber plasterboard dwang
- 24 Existing nominal 21mm plaster



**Notes**

1. Adjacent property assumed to have no lowered ceiling or insulation to roof.
2. RAAC roof panel overhang of party wall shown indicatively. Overhang 300mm may vary on site.
3. Roof finish of existing RAAC roof panels TBC.
4. Internal wall finish of separating wall assumed as plaster on hand. Exact finish TBC on site.
5. Flashing detail between existing roof and proposed roof TBC once existing roof finish has been determined.
6. Roof finish shown indicatively. Detail to be reviewed once roof membrane manufacturer has been confirmed.
7. Compliance with current Technical Standards cannot be demonstrated without a building warrant application.
8. Wall insulation to be fixed in accordance with manufacturer's installation guidance.
9. Roof membrane to achieve 'A1' suitability in accordance with BS 476 Part 3: 2004 or achieve a 'Bose' classification in accordance with BS EN 13501-5: 2016.
10. Proposed roof substrate to achieve a European Classification of A1 or A2 for a clearance of at least 1.7m from the centreline of the separating wall.
11. Roof to be ventilated with ventilators which provide minimum 25,000mm<sup>2</sup>/m ventilation at eaves level and 5,000mm<sup>2</sup>/m ventilation at ridge level.
12. Boards fixed around existing RAAC panels to be achieved a European classification of A1, providing short duration fire resistance.
13. Ceiling build-up to achieve a u-value of 0.12 W/mK.

Roof Replacement @ Party Wall Head Detail @ 1:10

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REVISIONS

#	Date	Description
A	12/07/24	Detail revised to suit Fairhurst comments.
B	15/07/24	Roof flashing extended.

**Inspired design & development ltd**

Member of **RICS** **CIAT**

Design Studio, 27 Even St, Aberdeen, AB39 2EQ  
 Oakfield House, 378 Brandon St, Methven, ML1 1XA

01569 764183  
 mail@idd-ltd.co.uk

Client: **Fairhurst**  
 Project: **Roof Replacement - Balnagask, Aberdeen**  
 Drawing title: **Roof Replacement @ Party Wall Head Detail**

Drawn by:	FA
Checked by:	GJB
Scale:	1:10
Date:	08/07/2024

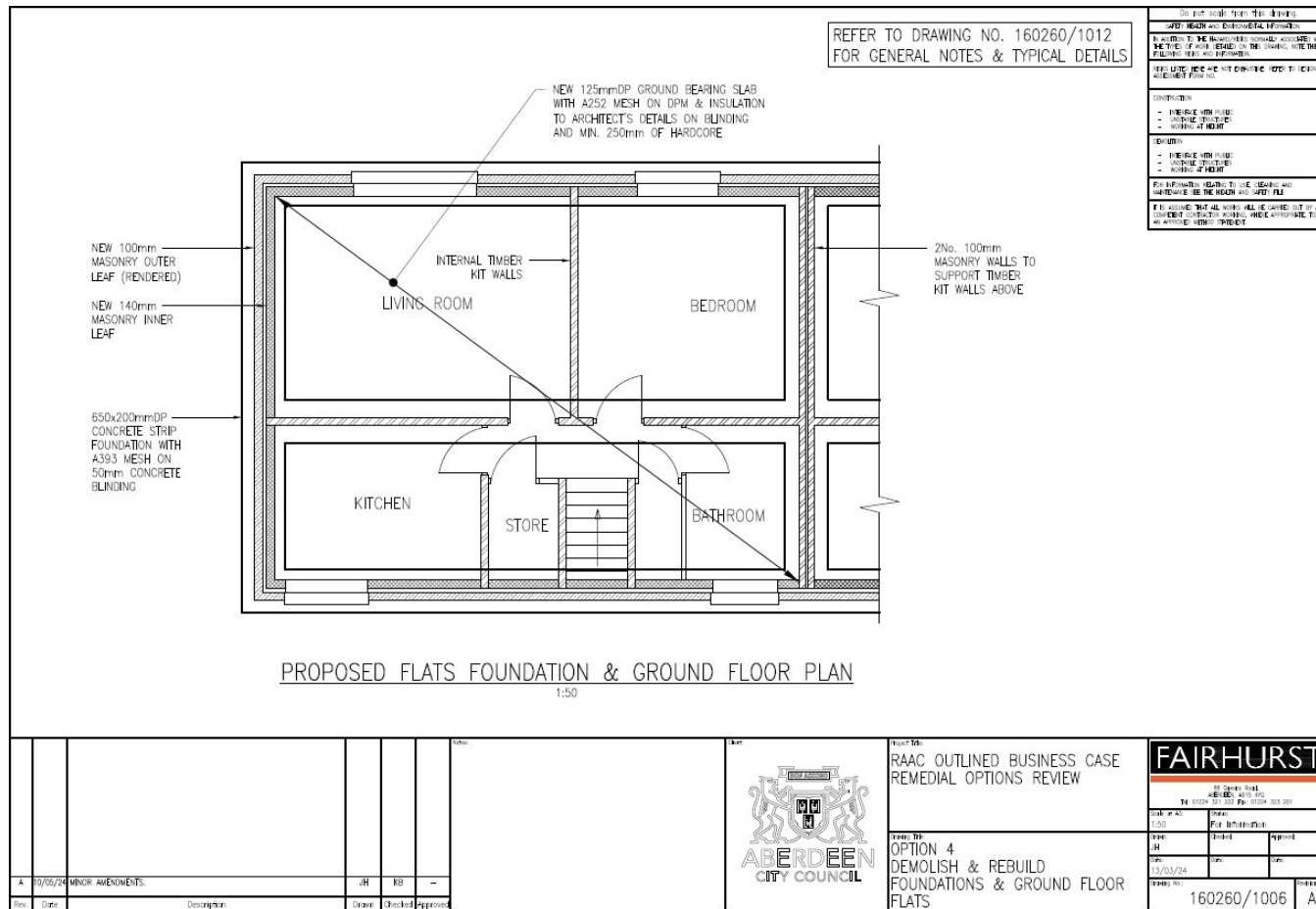
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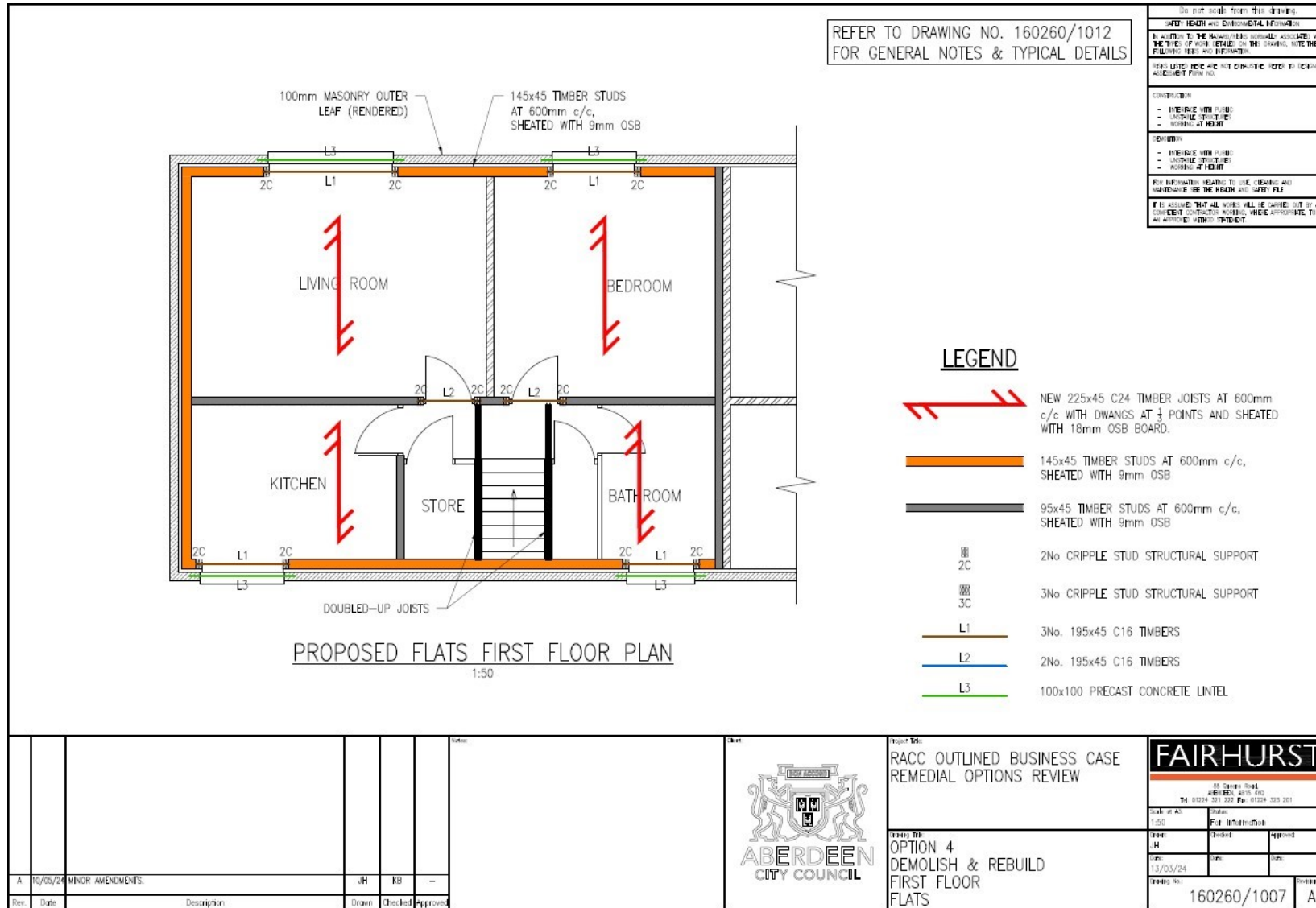
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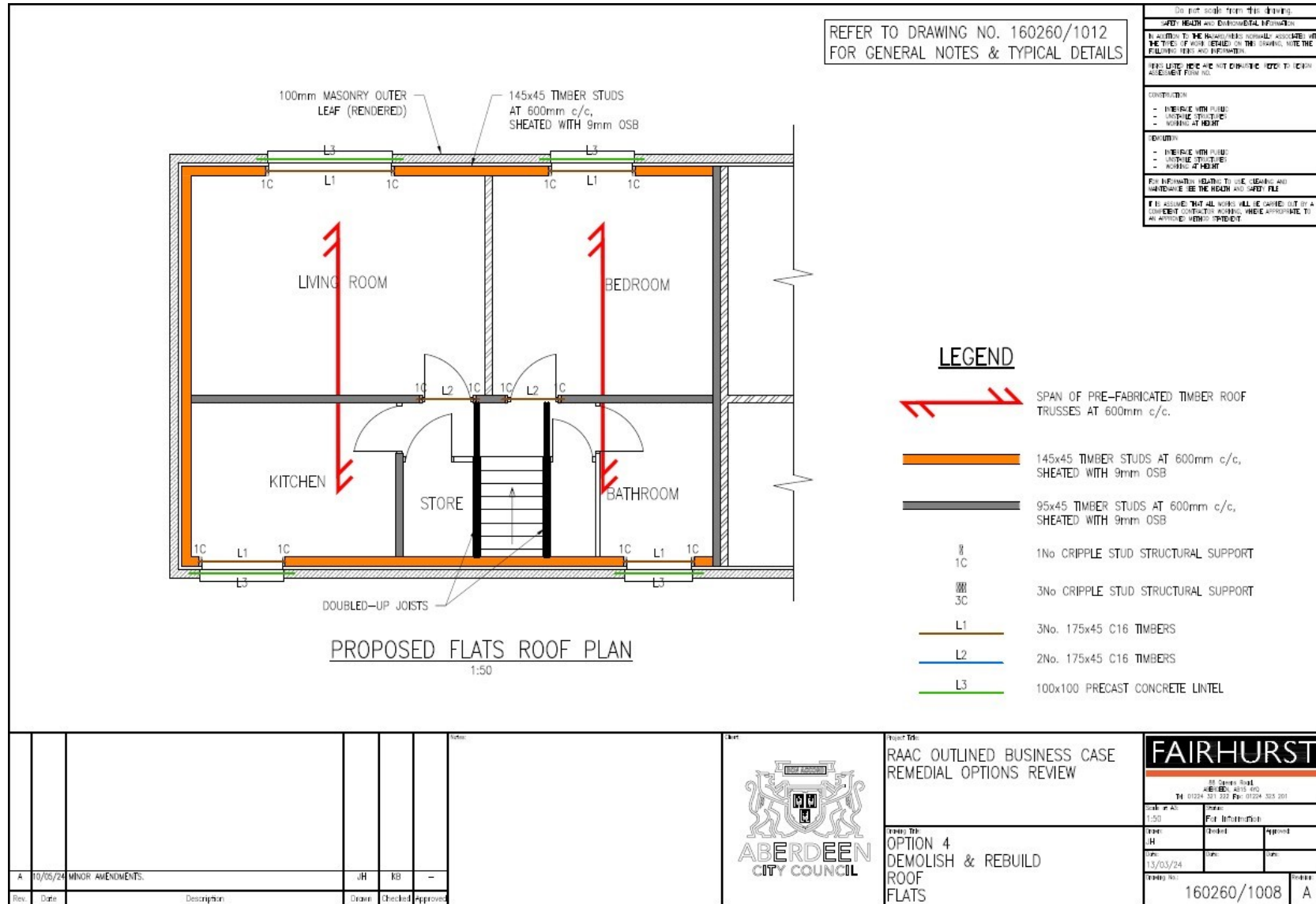
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**Option 4: Demolition and rebuild of properties within same footprint**

This option would involve full demolition of the properties and rebuilding to modern standards using traditional timber frame construction, timber suspended 1<sup>st</sup> floor, timber roof trusses and concrete ground bearing slab supported on concrete strip footing. See drawings 160260/1006/1007/1008/1012 for proposed details for both the 2 storey house and flatted property. Refer to **Table 2** for a risk category assessment for each of the remedial option.









**Table 2: RAAC Risk Category Assessment for Each Remedial Options**

Using the IStructE risk assessment approach table 2 compares the remaining critical risks associated with RAAC against each of the remedial options and evaluates them as High risk, Low risk and where the risks are removed.

Critical Risks Items	End bearing	Anchorage Reinforcement	Cut Panels	Cracking	Builder Works /Modification	Water Ingress	Deflection	Adverse or Change in Loading
Option 1: Bearing enhancement	Yellow	Yellow	Red	Red	Red	Red	Red	Red
Option 2: RAAC Panel Timber Support Frame	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Option 3:Roof Replacement	Green	Green	Green	Green	Green	Green	Green	Green
Option 4: Demolish and rebuild	Green	Green	Green	Green	Green	Green	Green	Green

**Legend**

Red	RAAC Remains a High Risk Item
Yellow	RAAC Becomes a Low Risk Item
Green	RAAC Risk Removed



## **Appendix A:** Proposed Remedial Drawing Options



**Option 1:**  
Extending Bearing Supports

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**SAFETY HEALTH AND ENVIRONMENTAL INFORMATION**

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

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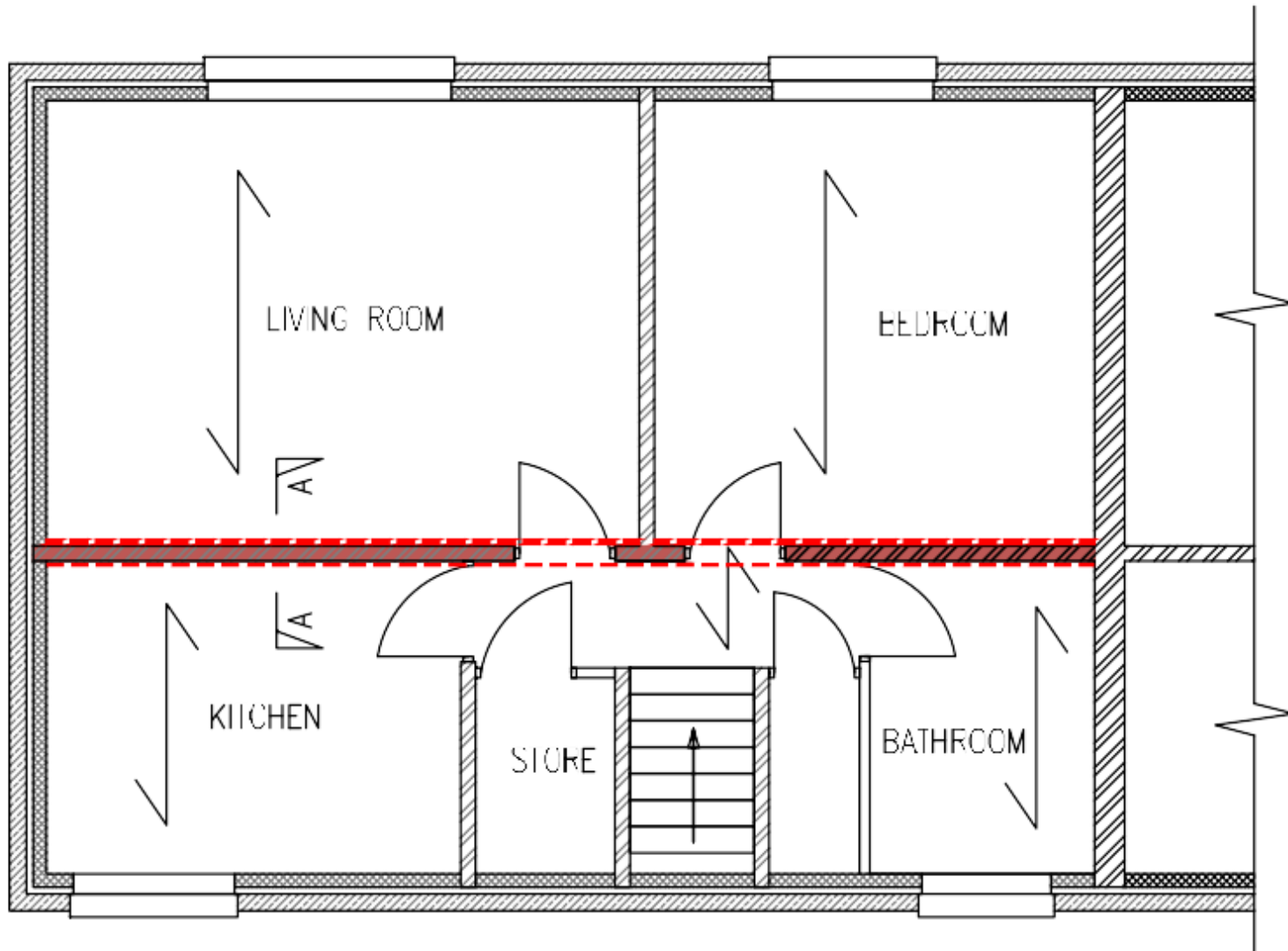
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**DEMOLITION**

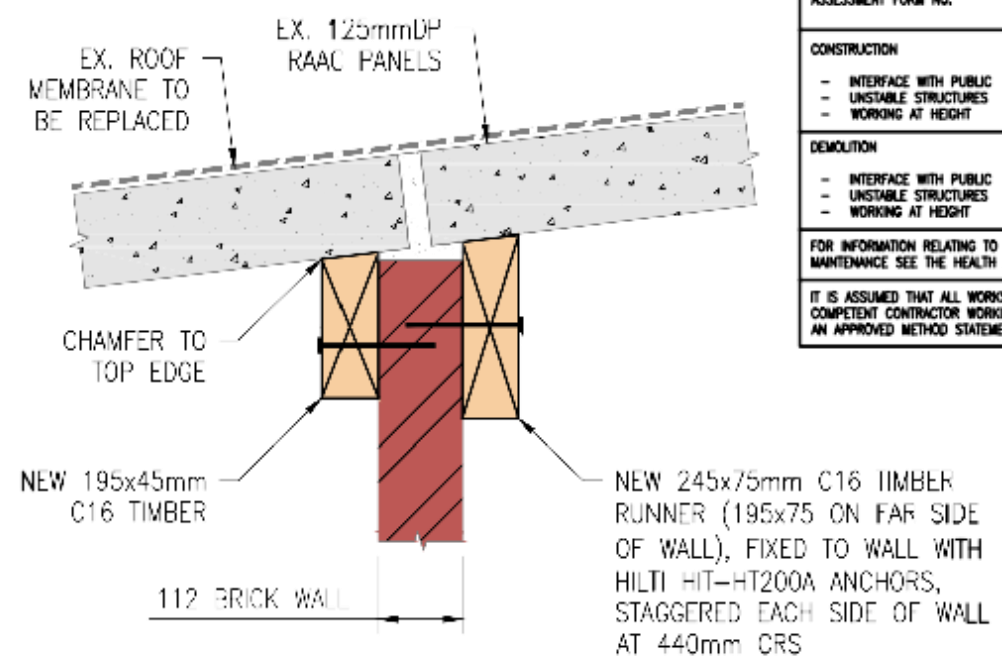
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**TYPICAL FLAT RCCF PLAN**  
1:50



**SECTION A-A**  
1:10

**LEGEND**

→ SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS

--- NEW 195x75/245x75 C16 TIMBER RUNNER BOLTED TO WALL USING M10 HILTI HIT-HY200A ANCHORS AT 440mm c/c. MINIMUM EMBEDMENT 75mm

Rev.	Date	Description	Drawn	Checked	Approved
B	15/07/24	DETAILS AMEND.	UC	Kb	Kb
A	10/05/24	MINOR AMENDMENTS.	JF	Kb	-

Notes:



Project Title: RAAC OUTLINED BUSINESS CASE REMEDIAL OPTIONS REVIEW

Option Title: OPTION 1 INCREASED BEARING FIRST FLOOR FLAT

**FAIRHURST**

88 Queens Road, ABERDEEN, AB10 4DQ  
Tel: 01224 321 222 Fax: 01224 233 207

Scale of A3: 1:50  
Status: For Information

Drawn: JF  
Date: 13/03/24

Checked: [ ]  
Date: [ ]

Approved: [ ]  
Date: [ ]

Project No.: 160260/1000  
Revision: E

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**SAFETY HEALTH AND ENVIRONMENTAL INFORMATION**

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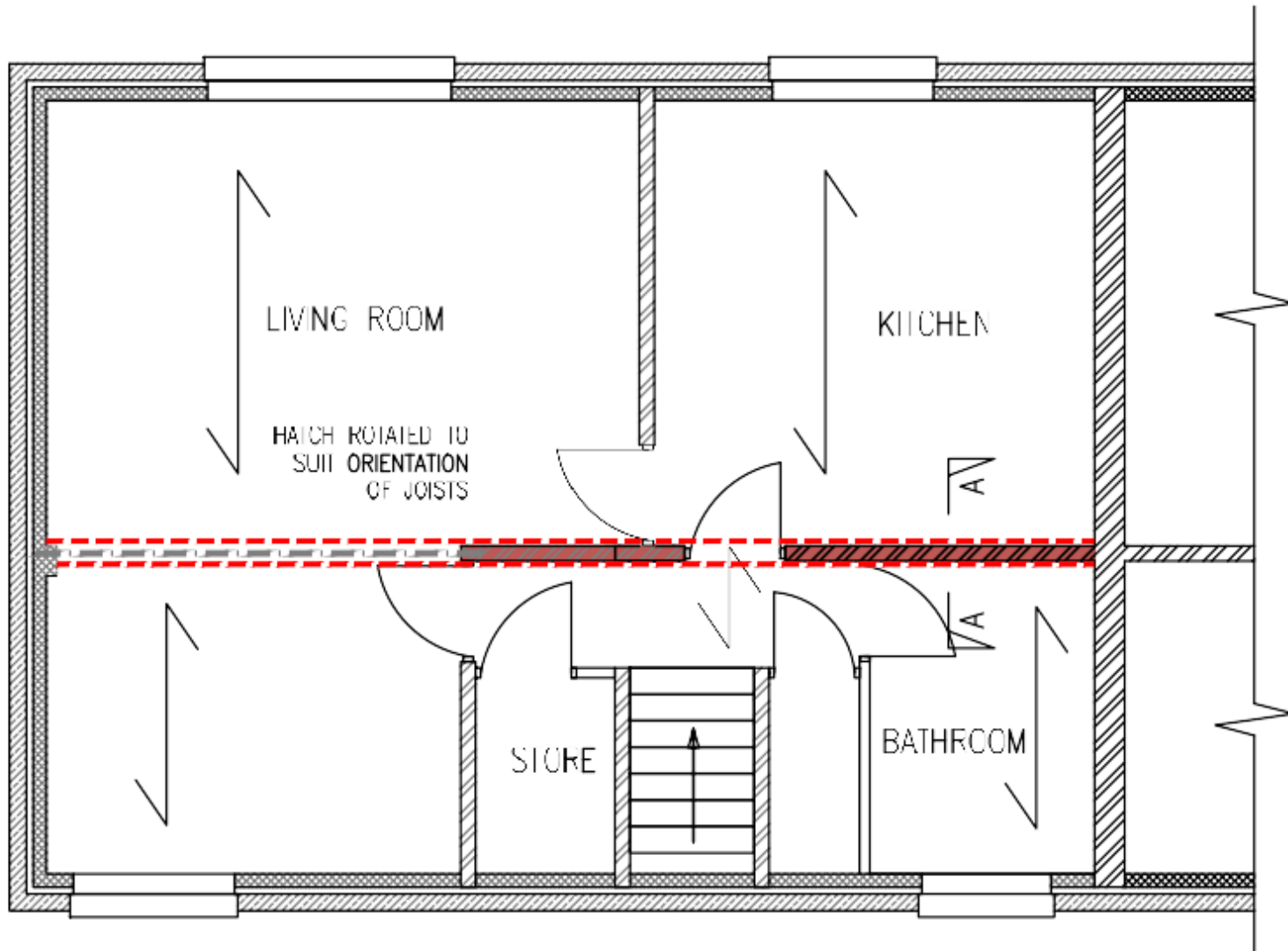
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- UNSTABLE STRUCTURES
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**DEMOLITION**

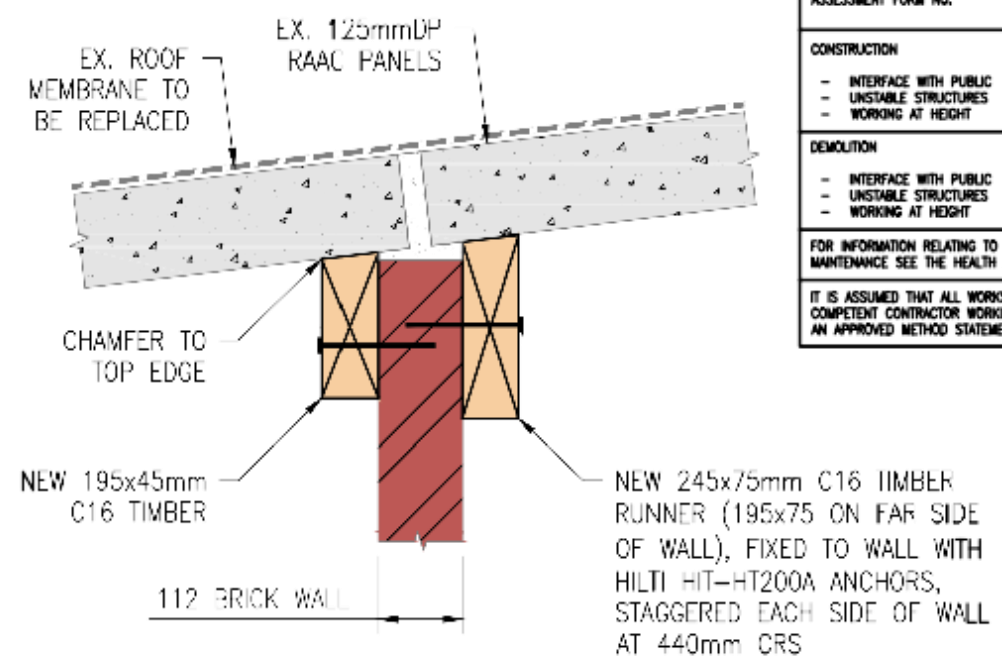
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TYPICAL 2-STOREY HOUSE ROOF PLAN  
1:50



SECTION A-A  
1:10

- LEGEND**
- SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS
  - EX STEEL BEAM
  - NEW 195x75/245x75 C16 TIMBER RUNNER BOLTED TO WALL USING M10 HILTI HIT-HY200A ANCHORS AT 440mm c/c. MINIMUM EMBEDMENT 75mm

Rev.	Date	Description	Drawn	Checked	Approved
B	15/07/24	DETAILS AMEND.	UC	Kb	Kb
A	10/05/24	MINOR AMENDMENTS.	JF	Kb	-

Notes:



Project Title  
**RAAC OUTLINED BUSINESS CASE REMEDIAL OPTIONS REVIEW**

Option Title  
**OPTION 1 INCREASED BEARING 2-STOREY HOUSE**

**FAIRHURST**

88 Queens Road,  
ABERDEEN, AB10 2DQ  
Tel: 01224 321 222 Fax: 01224 233 207

Scale of A3: 1:50  
Status: For Information

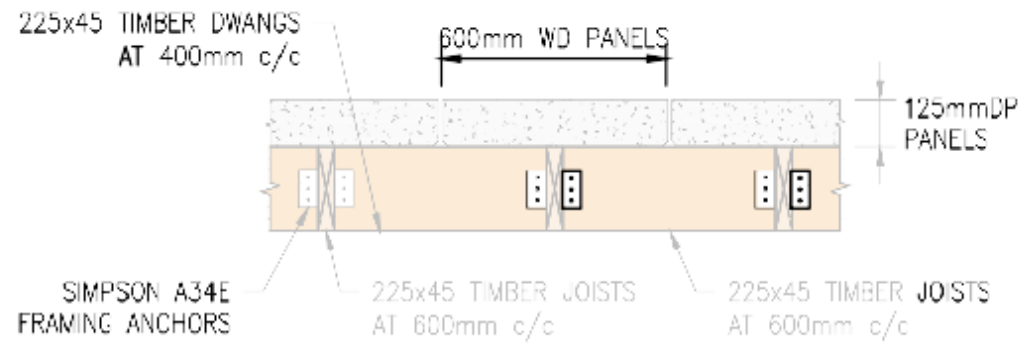
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Date: 13/03/24  
Date: [ ]  
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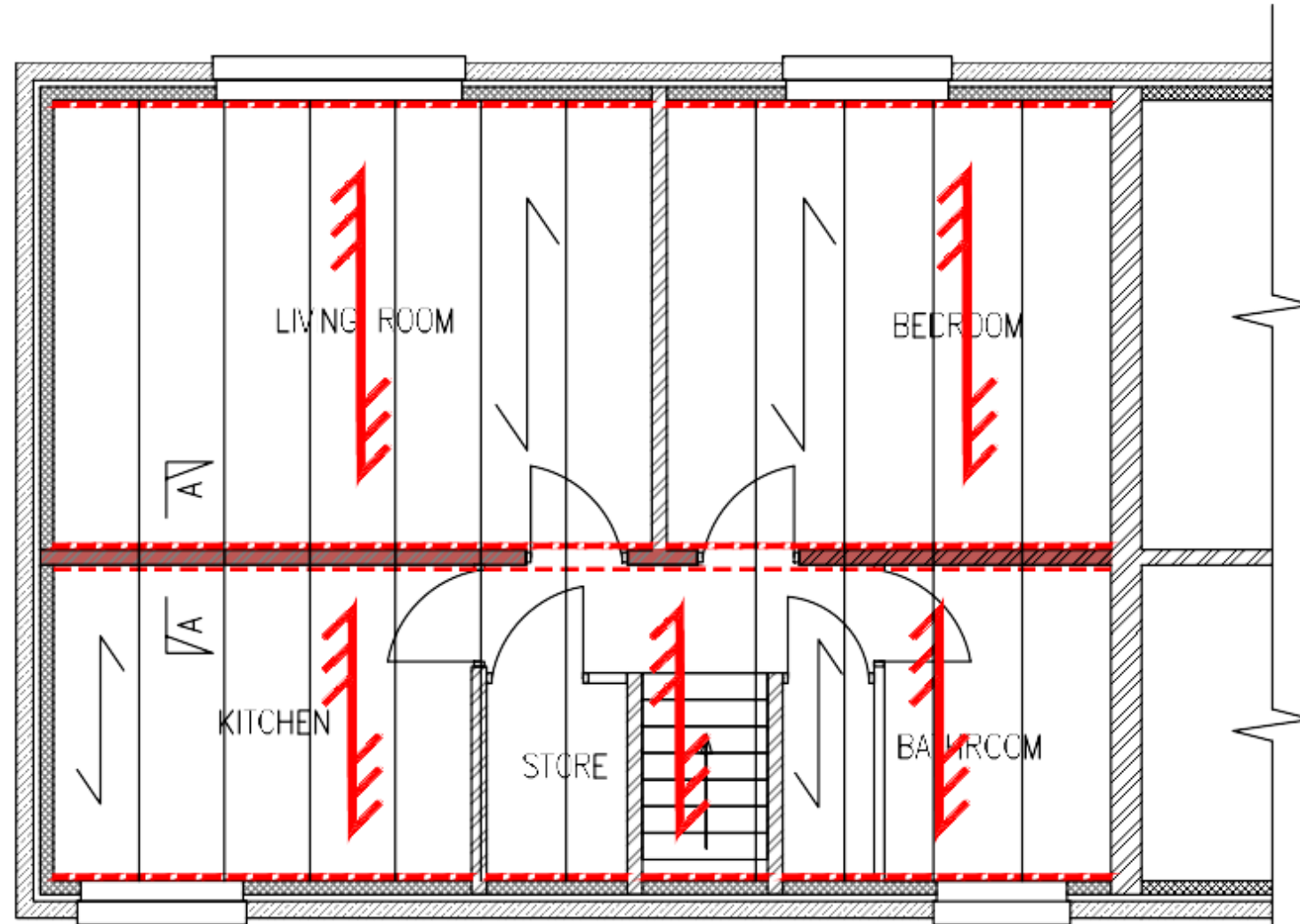
Project No.: 160260/1001  
Revision: E

**Option 2:**

Installation of secondary support frame under existing RAAC roof panels

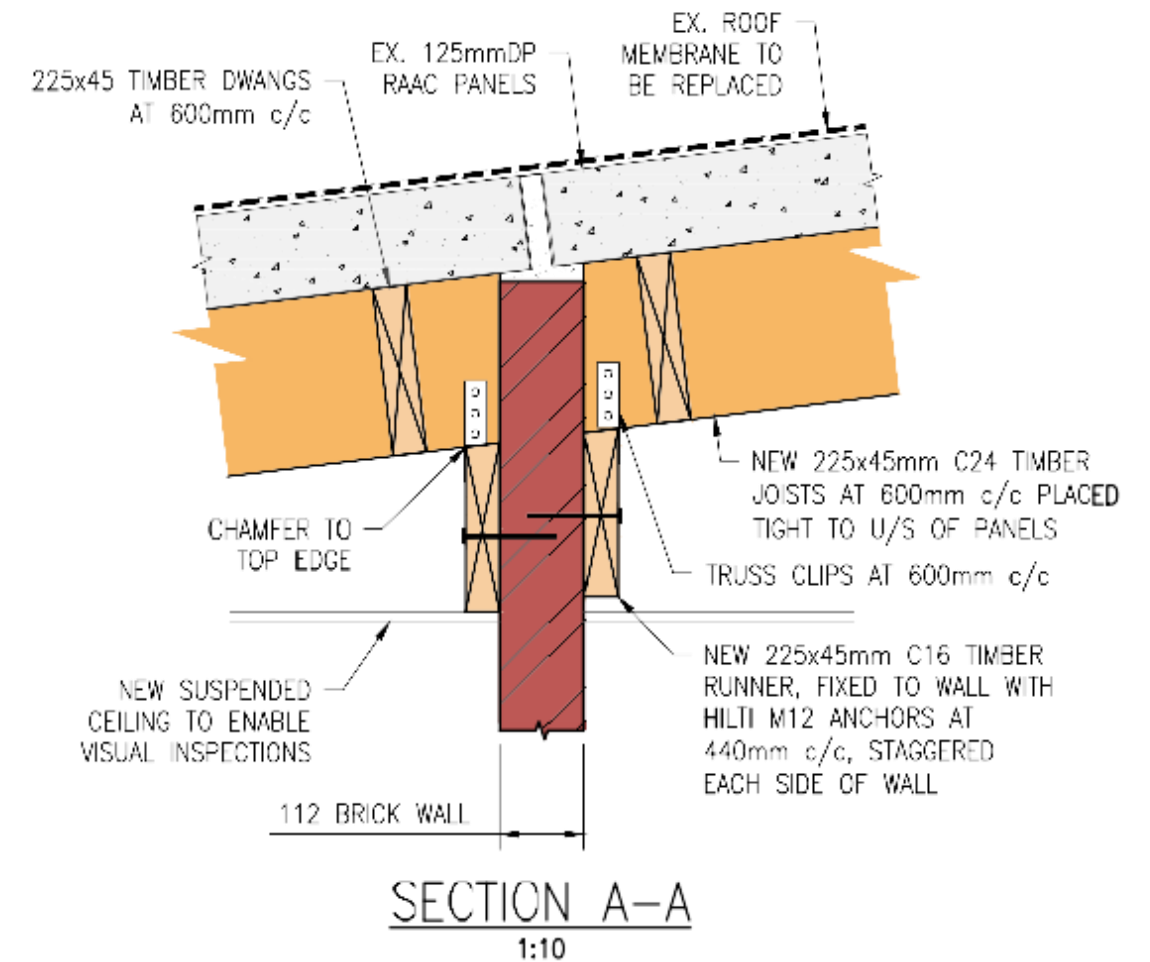


TYPICAL CROSS SECTION  
1:20



TYPICAL FLAT ROOF PLAN  
1:50

- LEGEND**
- SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS
  - NEW 225x45 C16 TIMBER RUNNER BOLTED TO WALL USING M10 HILTI HIT-HY200A ANCHORS AT 440mm c/c MINIMUM EMBEDMENT 75mm
  - SPAN DIRECTION OF NEW 225x45 C24 TIMBERS AT 600mm c/c WITH DWANGS AT 400mm c/c



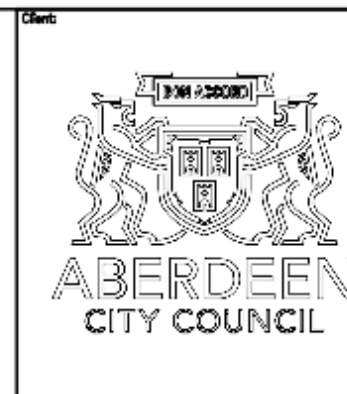
SECTION A-A  
1:10

Do not scale from this drawing
<b>SAFETY HEALTH AND ENVIRONMENTAL INFORMATION</b>
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.
RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.
<b>CONSTRUCTION</b>
- INTERFACE WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT
<b>DEMOLITION</b>
- INTERFACE WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT
FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

Rev.	Date	Description	Drawn	Checked	Approved
B	15/07/24	DETAILS AMENDED	DG	Kc	KB
A	10/05/24	MINOR AMENDMENTS.	JH	Kc	-

Notes:

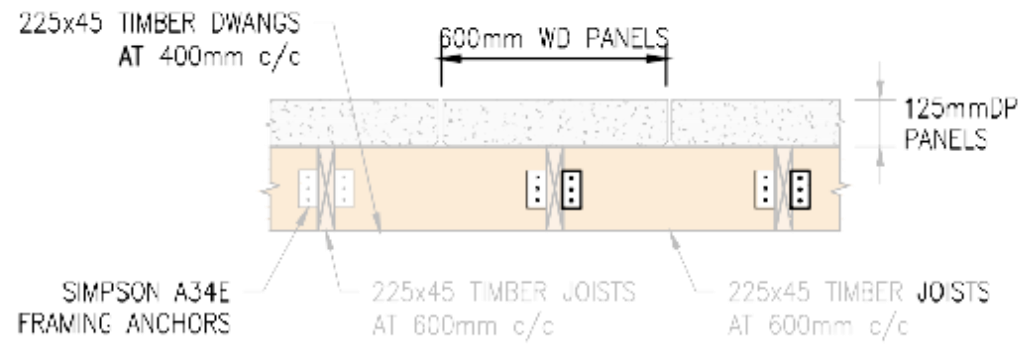
Client:



PROJECT Title  
RAAC OUTLINED BUSINESS CASE REMEDIAL OPTIONS REVIEW

OPTION 2  
TIMBER SUPPORT FRAME INSTALLED BELOW EX. RAAC ROOF PANELS FIRST FLOOR FLAT

<b>FAIRHURST</b>	
88 Queens Road, ABERDEEN, AB10 2DQ Tel: 01224 321 222 Fax: 01224 223 207	
Scale of A3: 1:50	Status: For Information
Drawn: JH	Checked: Kc
Date: 13/03/24	Date: Kc
Drawing No: 160260/1002	Revision: E

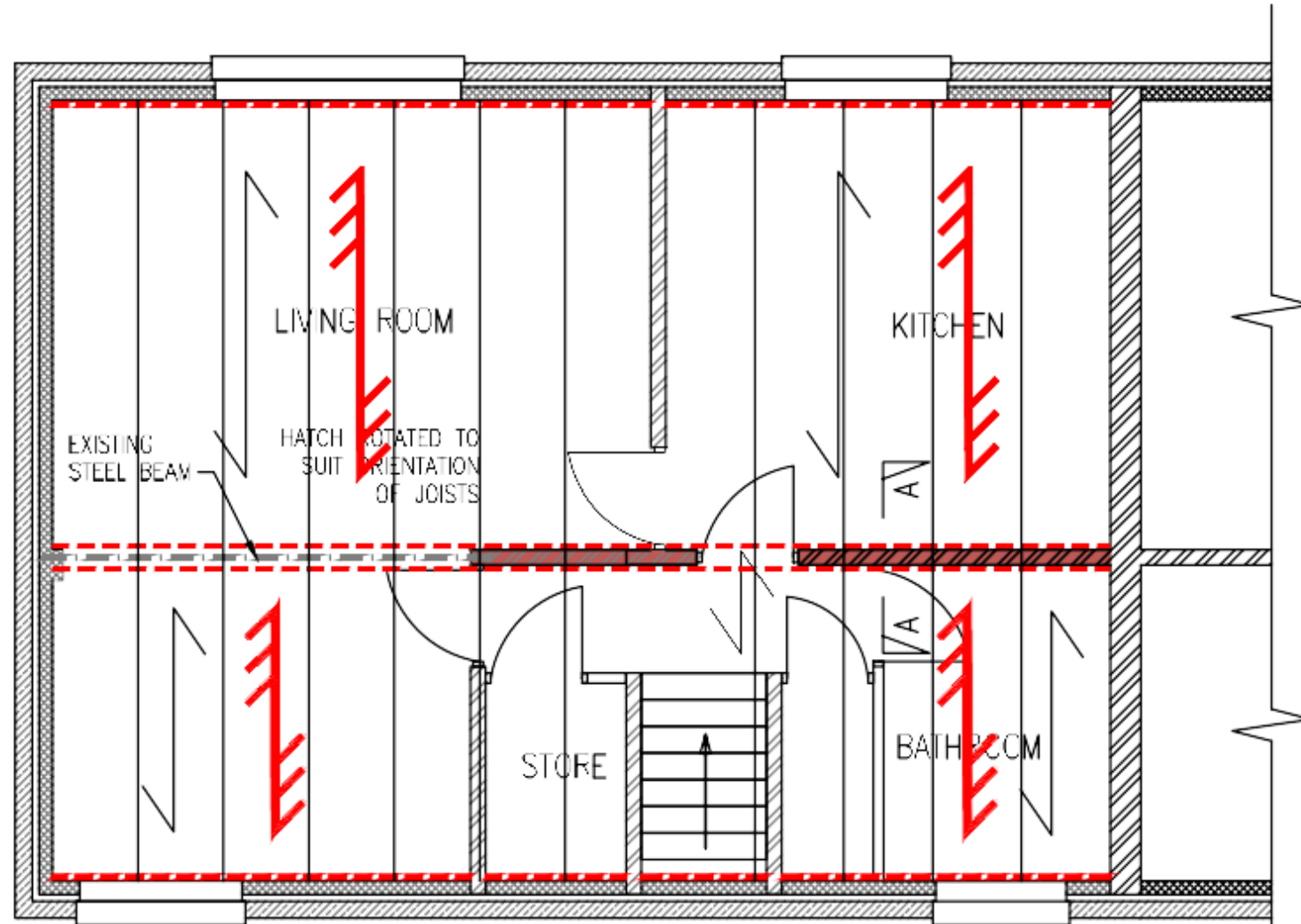


TYPICAL CROSS SECTION  
1:20

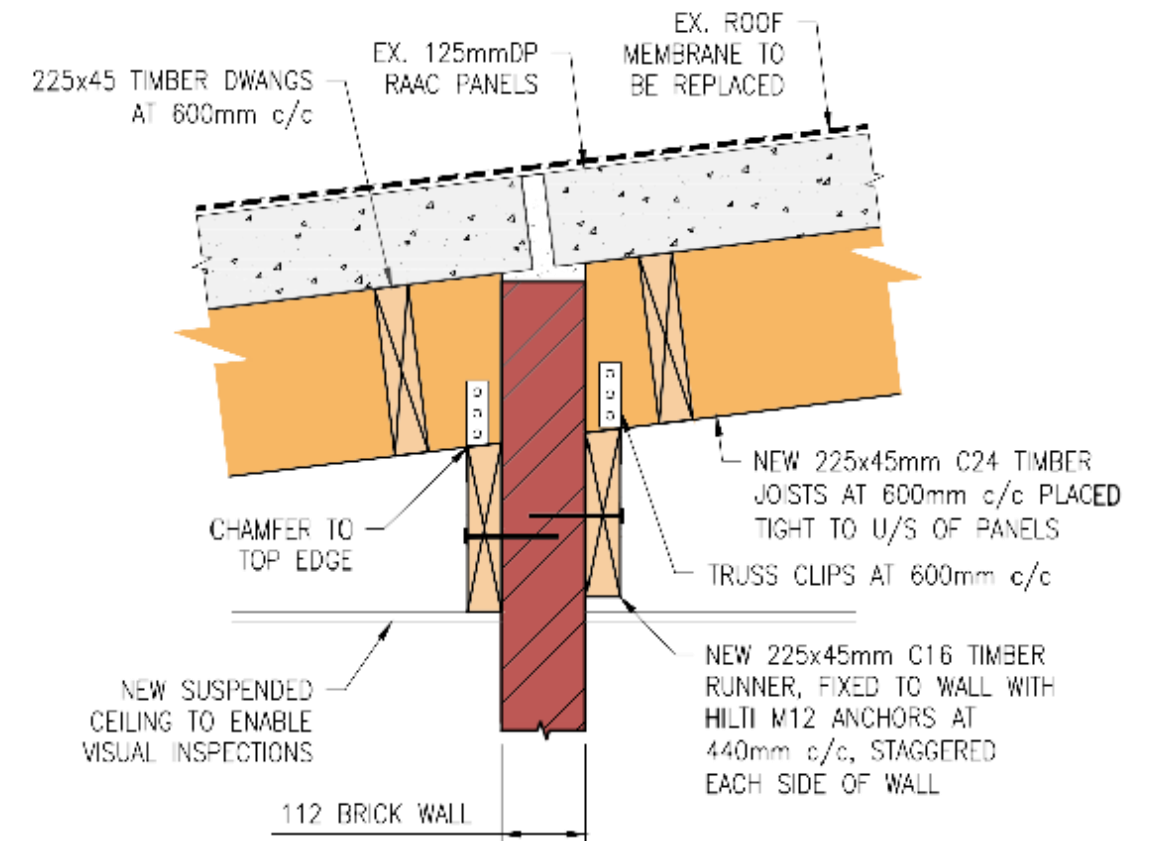
LEGEND

- SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS
- NEW 225x45 C16 TIMBER RUNNER BOLTED TO WALL USING M10 HILTI HIT-HY200A ANCHORS AT 440mm c/c MINIMUM EMBEDMENT 75mm
- SPAN DIRECTION OF NEW 225x45 C24 TIMBERS AT 600mm c/c WITH DWANGS AT 400mm c/c

Do not scale from this drawing
<b>SAFETY HEALTH AND ENVIRONMENTAL INFORMATION</b>
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<b>CONSTRUCTION</b>
- INTERFACE WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT
<b>DEMOLITION</b>
- INTERFACE WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT
FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE
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TYPICAL 2-STOREY HOUSE ROOF PLAN  
1:50



SECTION A-A  
1:10

Rev.	Date	Description	Drawn	Checked	Approved
B	15/07/24	MINOR AMENDMENTS.	DG	Kc	KB
A	10/05/24	MINOR AMENDMENTS.	JH	Kc	-

Notes:

Client:



PROJECT Title  
RAAC OUTLINED BUSINESS CASE REMEDIAL OPTIONS REVIEW

OPTION 2  
TIMBER SUPPORT FRAME INSTALLED BELOW EX. RAAC ROOF PANELS 2-STOREY HOUSE

**FAIRHURST**

88 Queens Road, Aberdeen, AB11 6JG  
Tel: 01224 321 222 Fax: 01224 233 207

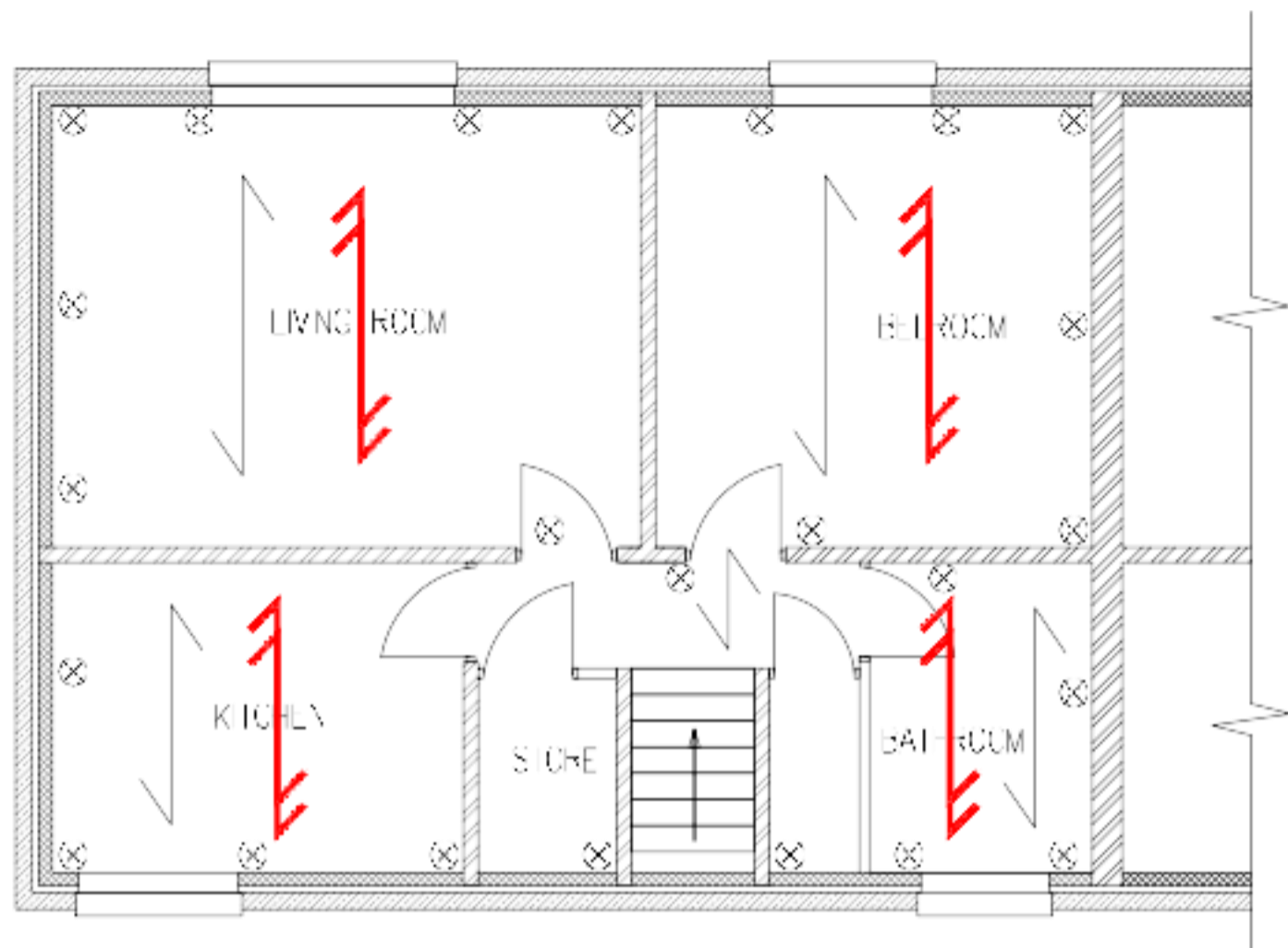
Scale of A3: 1:50  
Status: For Information

Drawn: J-  
Checked:   
Approved:   
Date: 13/03/24  
Date:   
Date:   
Drawing No: 160260/1003  
Revision: E

**Option 3:**

Removal of RAAC panels and replace with a new timber roof cassette system

<p>SEE THE HEALTH AND SAFETY FILE FOR THE FOLLOWING INFORMATION:</p> <p>IN ADDITION TO THE INFORMATION NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAIL IN THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION:</p> <p>RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.</p>	
<p>CONSTRUCTION</p> <ul style="list-style-type: none"> <li>- INTERFERE WITH PUBLIC</li> <li>- UNSTABLE STRUCTURE</li> <li>- WORKING AT HEIGHT</li> </ul>	
<p>DEMOLITION</p> <ul style="list-style-type: none"> <li>- INTERFERE WITH PUBLIC</li> <li>- UNSTABLE STRUCTURE</li> <li>- WORKING AT HEIGHT</li> </ul>	
<p>FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE</p> <p>IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED NOTICE SYSTEM.</p>	



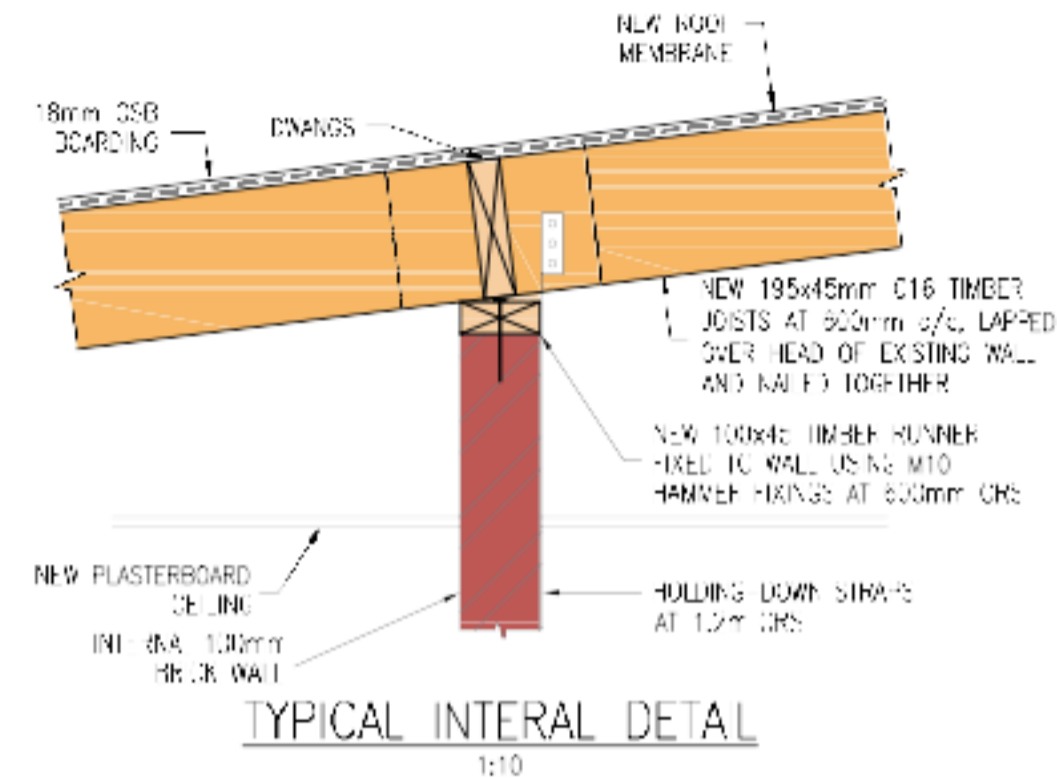
TYPICAL 1st FLOOR FLAT ROOF PLAN  
1:50

**LEGEND**

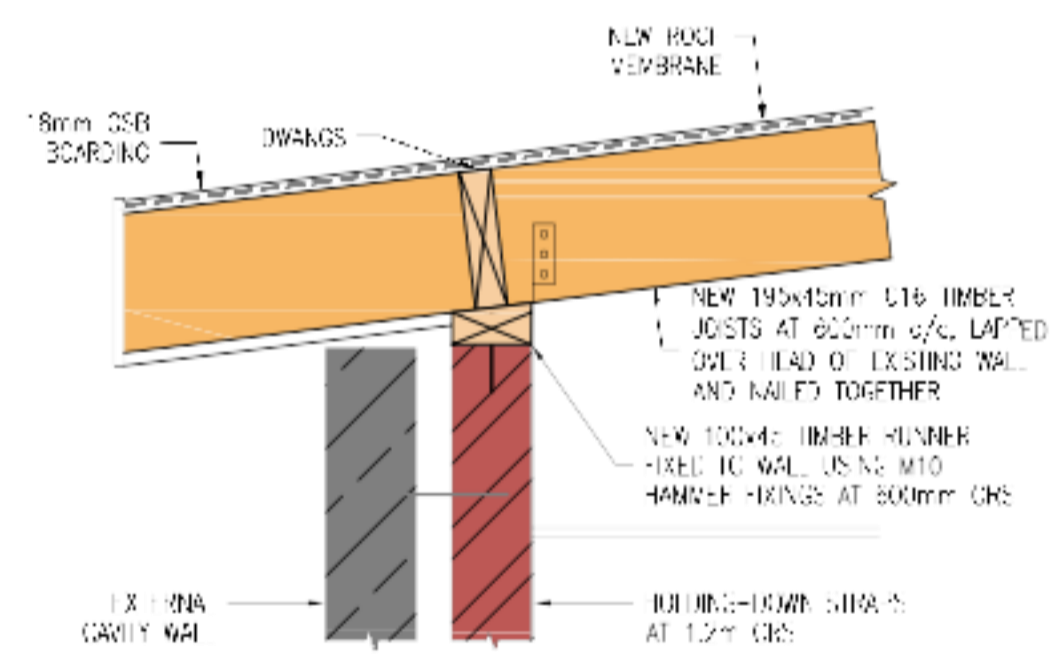
SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS TO BE REPLACED

SPAN DIRECTION OF NEW 195x45 C16 TIMBER JOISTS AT 600mm c/c WITH DWANGS AT 1/3 POINTS AND SHEATHED WITH 18mm OSB

HOLDING-DOWN/RESTRAINT STRIPS AT 1.2m c/c



TYPICAL INTERNAL DETAIL  
1:10



TYPICAL EAVES DETAIL  
1:10

Rev	Date	Description	Drawn	Checked	Approved
B	15/03/24	DETAILED REVISION	UL	KC	KR
A	15/03/24	WORK AGREEMENTS DETAILS ADDED	JP	KR	-

Project No	160260/1004
Client	FAIRHURST
Project Name	RAAC OUTLINED BUSINESS CASE REVEALAL OPTIONS REVIEW
Project Location	OPTION 3 ROOF REPLACEMENT FIRST FLOOR FLAT
Project Manager	160260/1004



Project No	160260/1004
Client	FAIRHURST
Project Name	OPTION 3 ROOF REPLACEMENT FIRST FLOOR FLAT
Project Location	160260/1004
Project Manager	E

**FAIRHURST**

160260/1004

160260/1004



**DO NOT SCALE THIS DRAWING**

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE INFORMATION NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILLED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION:

RISKS LISTED HERE ARE NOT EXHAUSTIVE, REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

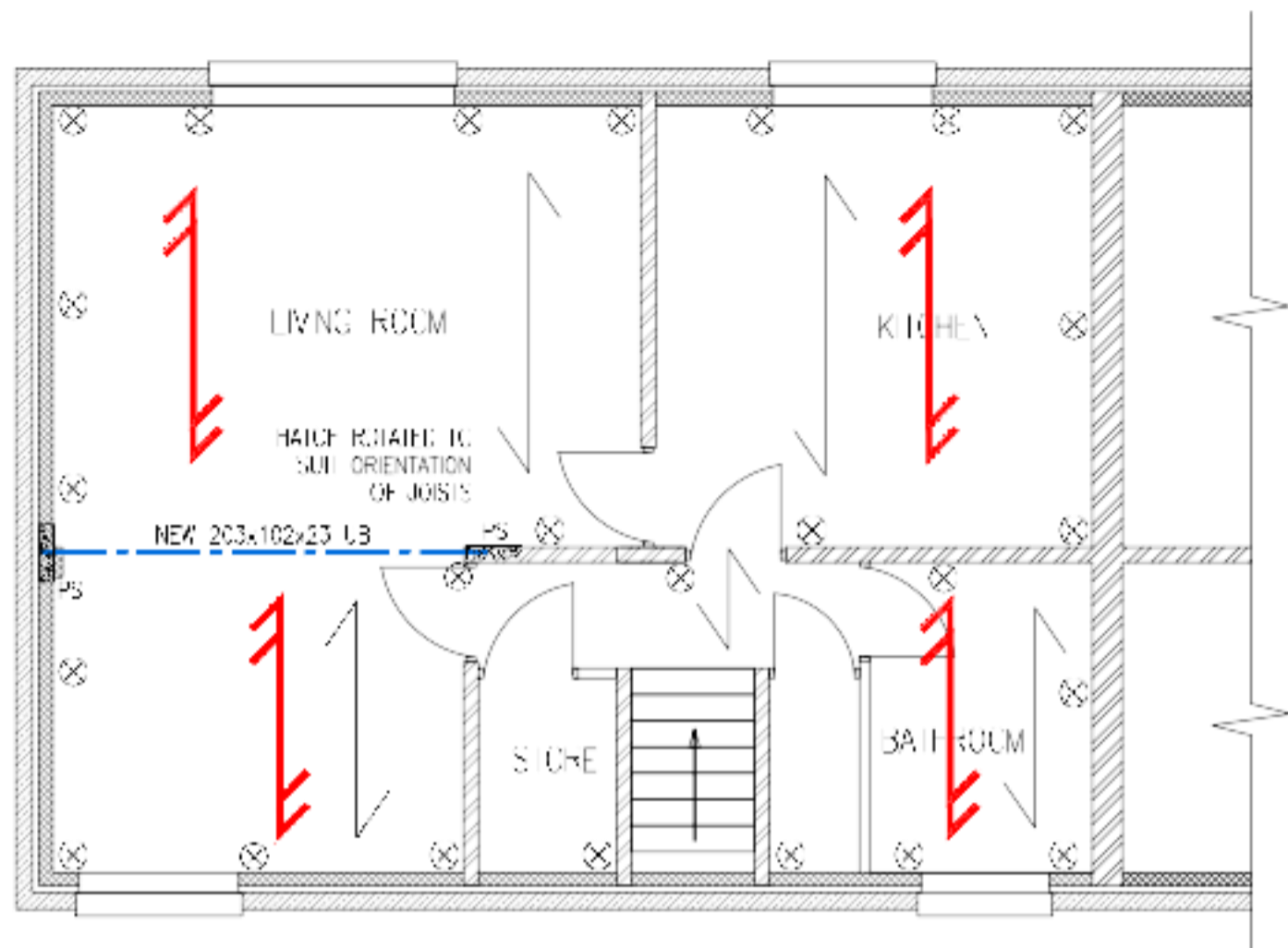
- INTERACT WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT

DEMOLITION

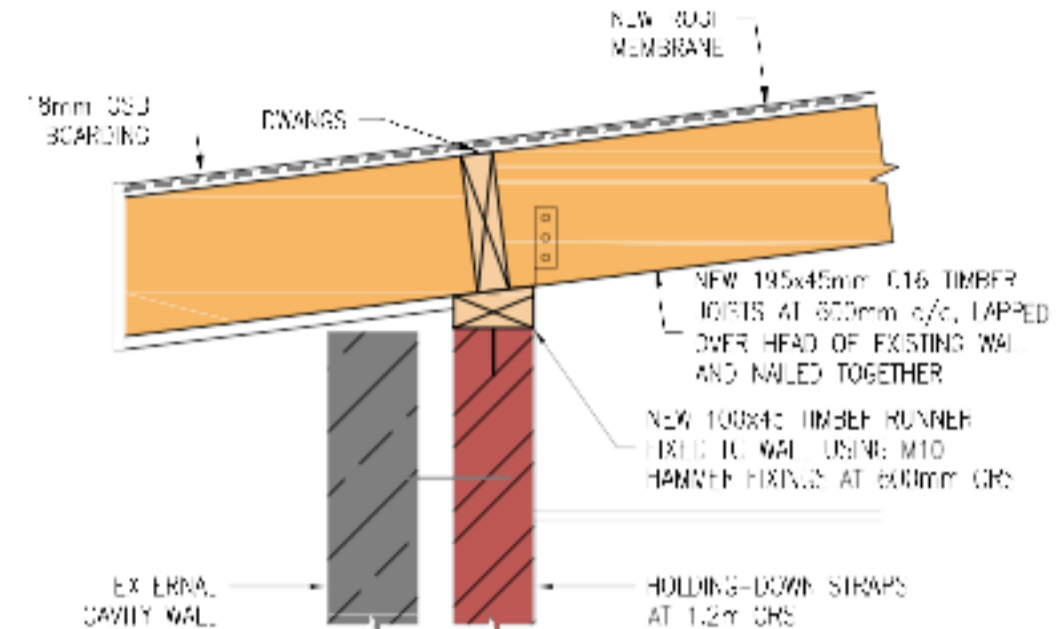
- INTERACT WITH PUBLIC
- UNSTABLE STRUCTURES
- WORKING AT HEIGHT

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING UNDER APPROPRIATE TO AN APPROVED METHOD STATEMENT.

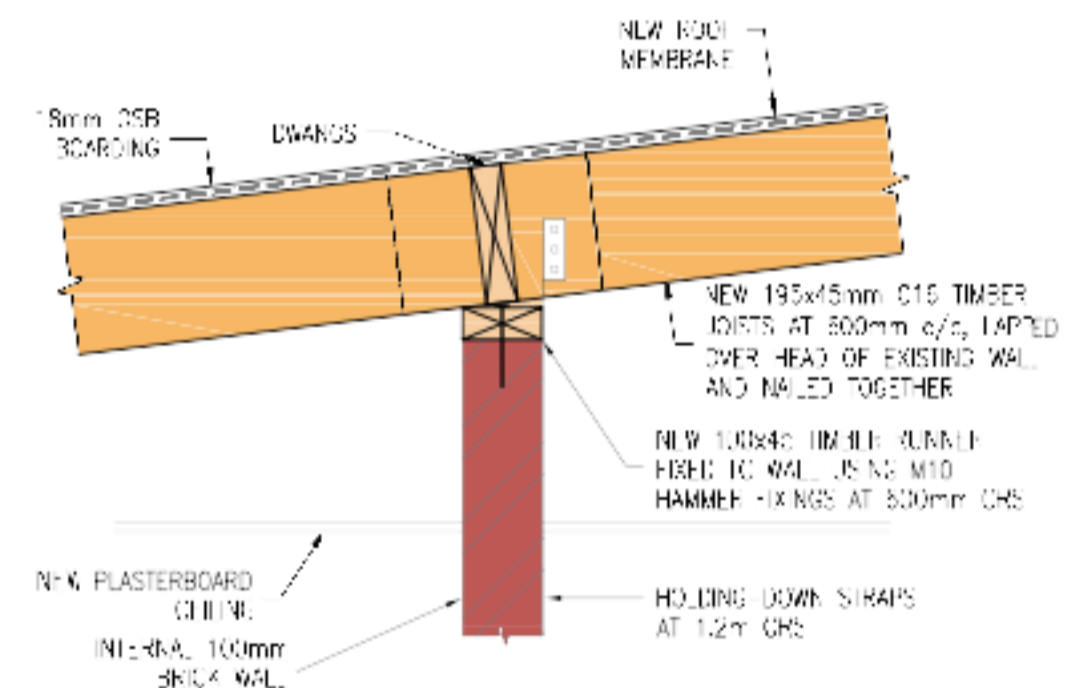


**TYPICAL 2-STORY HOUSE ROOF PLAN**  
1:50

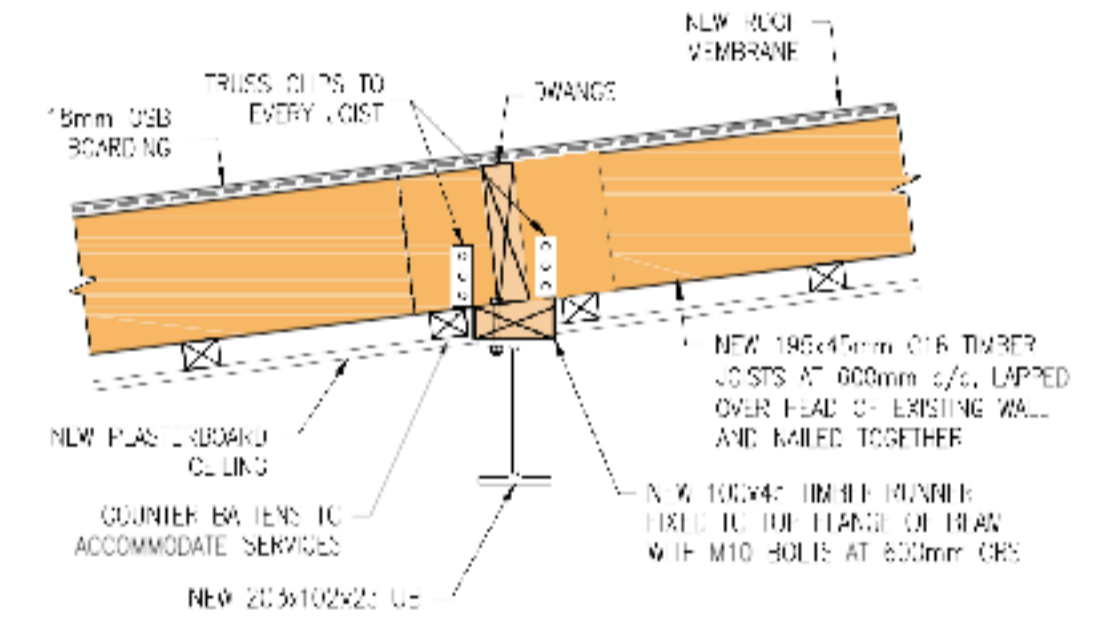


**TYPICAL EAVES DETAIL**  
1:10

- LEGEND**
- SPAN DIRECTION OF EXISTING 125dp RAAC ROOF PANELS TO BE REPLACED
  - NEW 203x102x23 UB TO REPLACE EXISTING STEEL BEAM
  - SPAN DIRECTION OF NEW 195x45 C16 TIMBER JOISTS AT 600mm c/c WITH DWANGS AT 3 POINTS AND SHEATHED WITH 19mm OSB
  - N.W. CONCRETE PADSTONE, 100x215x440mm
  - HOLDING DOWN/RESTRAINT STRAPS AT 1.2m c/c



**TYPICAL INTERNAL DETAIL**  
1:10



**TYPICAL BEAM DETAIL**  
1:10

Rev	Date	Description	Drawn	Checked	App'd
B	11/07/24	DECKS REMOVED	JK	KE	KE
A	10/07/24	WORK AND RISKS DETAILS ADDED	JP	KE	-



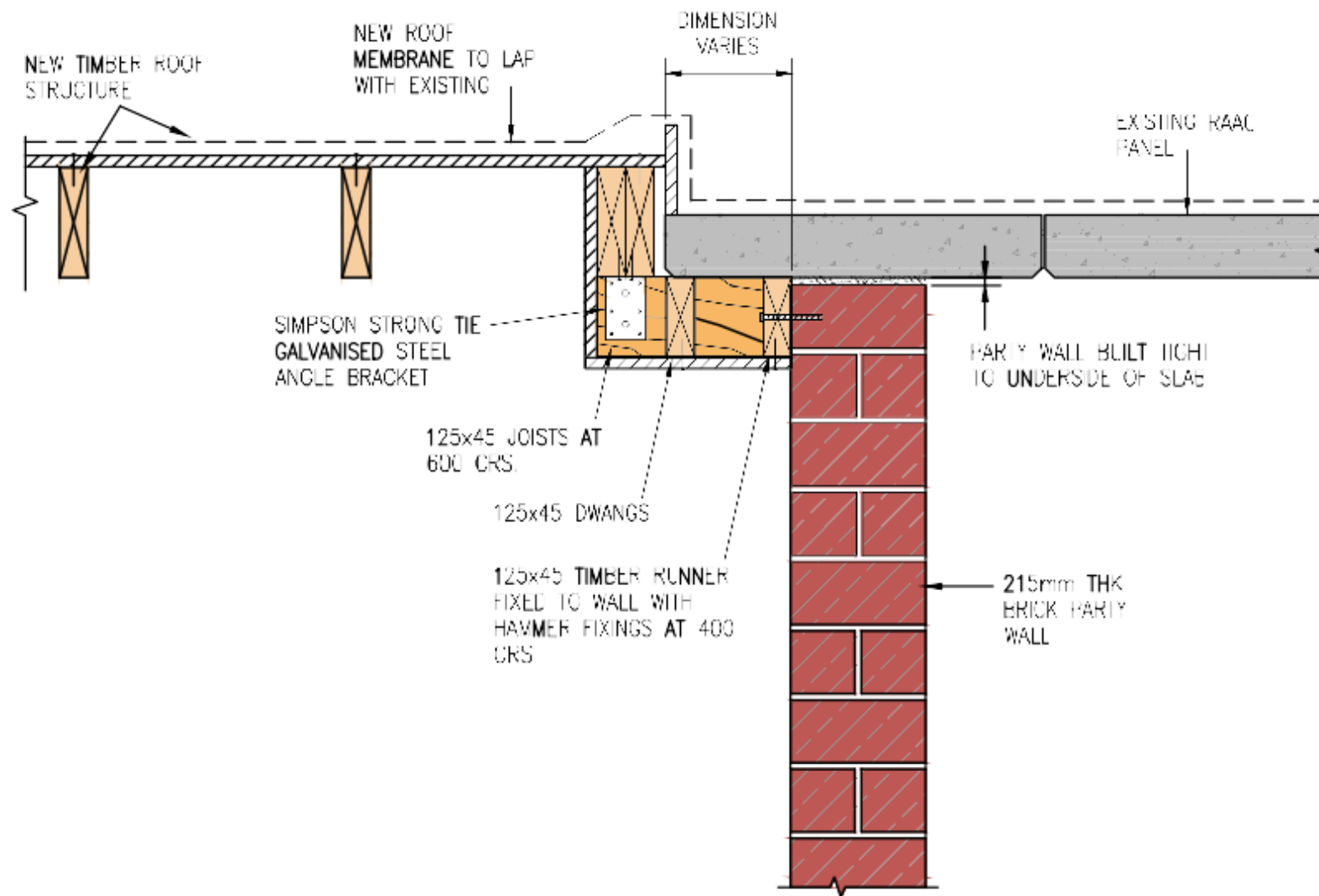
RAAC CONTROLLED BUSINESS CASE  
REMEDIAL OPTIONS REVIEW

OPTION 3  
ROOF REPLACEMENT  
2-STORY HOUSE

**FAIRHURST**


25 South Street  
Aberdeen AB9 1QB  
Tel: 01224 377 700 Fax: 01224 377 701

Scale of All:	1:50, 1:10	Not Indicated
Drawn:	JK	Checked:
Date:	10/07/24	App'd:
Drawing No.:	160260/1005	Revision:
		E

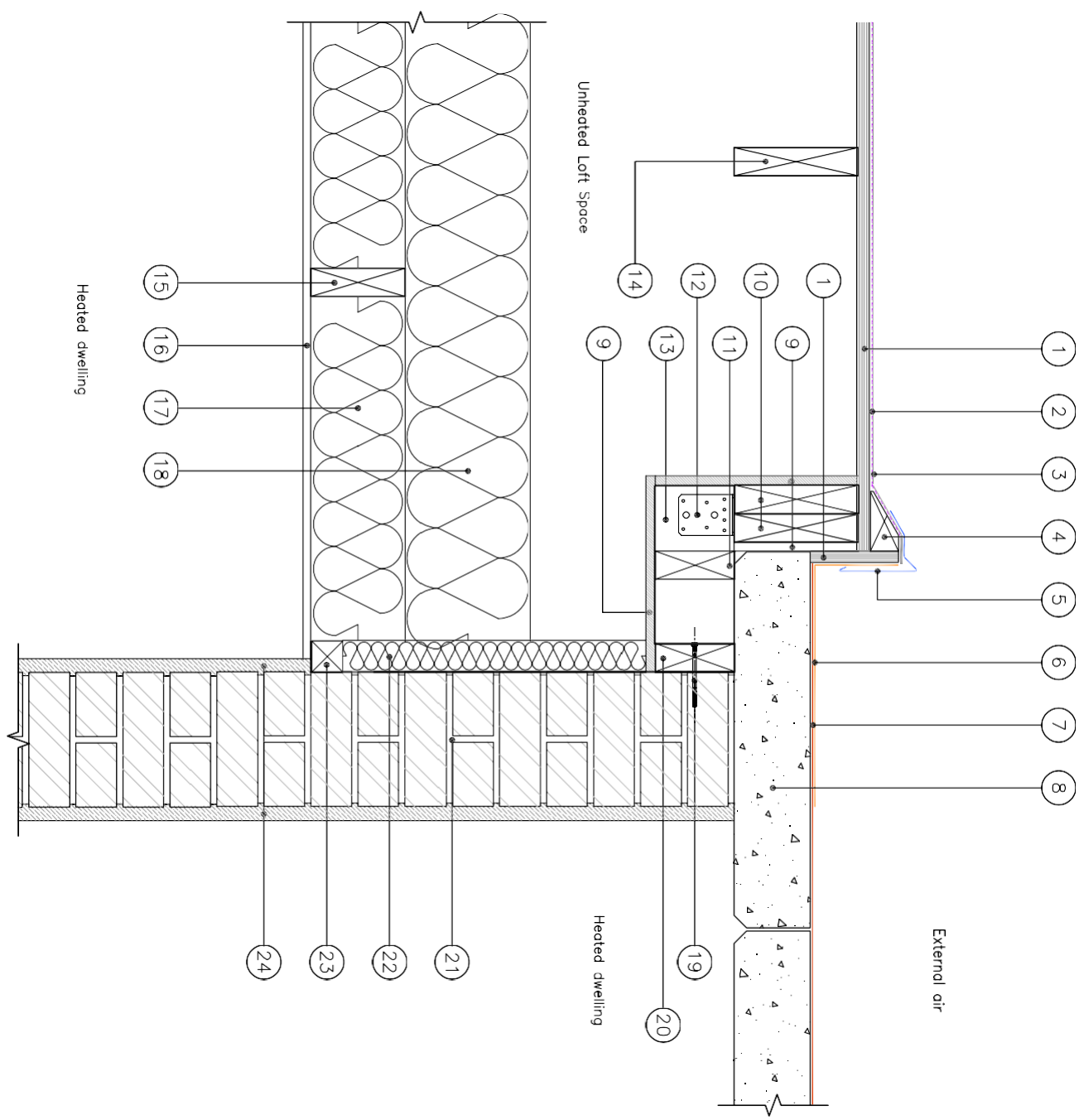


RAAC PANEL SUPPORT DETAIL AT PARTY WALL

SCALE 1:10

			<p><b>SAFETY HEALTH AND ENVIRONMENTAL INFORMATION</b></p> <p>IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.</p> <p>CONSTRUCTION</p> <p>DEMOLITION</p> <p>FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE</p> <p>IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.</p>			<p>Client</p>  <p><b>ABERDEEN</b> CITY COUNCIL</p>		<p>PROJECT Title</p> <p>BALNAGASK – RAAC REMEDIAL OPTION</p> <p>WORK Title</p> <p>RAAC PANEL SUPPORT DETAIL AT PARTY WALL</p>		<p><b>FAIRHURST</b></p> <p>88 Queens Road, ABERDEEN, AB10 4DQ Tel: 01224 321 222 Fax: 01224 323 201</p>	
<p>Scale of A3: 1:10</p> <p>Drawn: IC</p> <p>Date: 19/06/24</p>			<p>Status: For Information</p> <p>Checked: KE</p> <p>Date: 19/06/24</p>			<p>Approved: KE</p> <p>Date: 19/06/24</p>		<p>Approved: KE</p> <p>Date: 19/06/24</p>			
<p>Rev. Date Description</p>			<p>Drawn Checked Approver</p>			<p>Drawing No.:</p> <p>160260/4401</p>		<p>Revision:</p> <p>A</p>			
<p>A 15/07/24 DETAIL UPDATED</p>			<p>IC KE KE</p>								

- 1 Proposed 18mm Magply, or equal approved, A1 (non-combustible) sarking board
- 2 Proposed reinforcement fleece, as per roof membrane manufacturer's specification
- 3 Proposed mechanically fixed single ply membrane, installed in accordance with manufacturer's installation guidance
- 4 Proposed treated timber fillet
- 5 Proposed pre-formed laminated metal trim, mechanically fixed
- 6 Proposed roof felt flashing, appropriate to existing roof material
- 7 Existing roof felt
- 8 Existing RAAC roof panel
- 9 Proposed 15mm A1 (non-combustible) board
- 10 Proposed 2No 195x45mm C16 timber roof joists
- 11 Proposed 45x125mm treated timber dwang, fitted between joists
- 12 Proposed Simpson Strong-Tie galvanised steel angle bracket, to Engineer's specification
- 13 Proposed 45x125mm treated timber joist @ 600mm centres
- 14 Proposed 195x45mm C16 timber roof joists @ 600mm c/c
- 15 Proposed 150x45mm C16 timber ceiling joists @ 600mm c/c
- 16 Proposed 15mm Type A TE plasterboard
- 17 150mm Knauf Earthwool Loft Roll 40 insulation, fitted between joists
- 18 200mm Knauf Earthwool Loft Roll 40 insulation, laid perpendicular to layer below
- 19 Fixings @ 400mm centres, to Engineer's specification
- 20 Proposed 45x125mm treated timber runner
- 21 Existing 215mm wide solid brick separating wall
- 22 Proposed 50mm rock mineral wool slab, mechanically fixed to wall
- 23 Proposed 50x50mm timber plasterboard dwang
- 24 Existing nominal 21mm plaster



## Roof Replacement @ Party Wall Head Detail @ 1:10

**Notes**

1. Adjacent property assumed to have no lowered ceiling or insulation to roof.
2. RAAC roof panel overhang of party wall shown indicatively. Overhang size may vary on site.
3. Roof finish of existing RAAC roof panels TBC.
4. Internal wall finish of separating wall assumed as plaster on hard. Exact finish TBC on site.
5. Flashing detail between existing roof and proposed roof TBC once existing roof finish has been determined.
6. Roof finish shown indicatively. Detail to be reviewed once roof membrane manufacturer has been confirmed.
7. Compliance with current Technical Standards cannot be demonstrated without a building warrant application.
8. Wall insulation to be fixed in accordance with manufacturer's installation guidance.
9. Roof membrane to achieve 'Low' vulnerability in accordance with BS 476: Part 3: 2004 or achieve a Broof' classification in accordance with BS EN 13501-5: 2016.
10. Proposed roof substrate to achieve a European Classification of A1 or A2 for a distance of at least 1.7m from the centreline of the separating wall.
11. Roof to be ventilated with ventilators which provide minimum 25,000mm<sup>2</sup>/m ventilation at eaves level and 5,000mm<sup>2</sup>/m ventilation at ridge level.
12. Boards fitted around existing RAAC panels to be achieve a European classification of A1, providing short duration fire resistance.
13. Ceiling build-up to achieve a u-value of 0.12 W/m<sup>2</sup>K.

#	Date	Description
A	12/07/24	Detail revised to suit Fairhurst comments.
B	15/07/24	Roof flashing extended.

<p>Client: <b>Fairhurst</b></p> <p>Project: <b>Roof Replacement - Balnagask, Aberdeen</b></p> <p>Drawing Title: <b>Roof Replacement @ Party Wall Head Detail</b></p>		<p>Design Studio, 06kfield House, 27 Eyon St, 378 Brandon St, Stonhaven, Motherwell, AB39 2EQ, ML1 1XA</p> <p>01569 /64185 mgi@odd-ltd.co.uk</p>	<p>Required by <b>RICS</b> CIAT</p>	<p><b>inspired design &amp; development ltd</b></p>
<p>Drawn by: FA</p> <p>Checked by: GJB</p> <p>Scale: 1:10</p> <p>Date: 08/07/2024</p> <p>Ref: <b>199/2023</b></p>	<p>Dwg No: D01</p> <p>Rev: B</p> <p>DRAFT</p>			

