Small Scale Retrofit

Case Study: 4 Hiley Road

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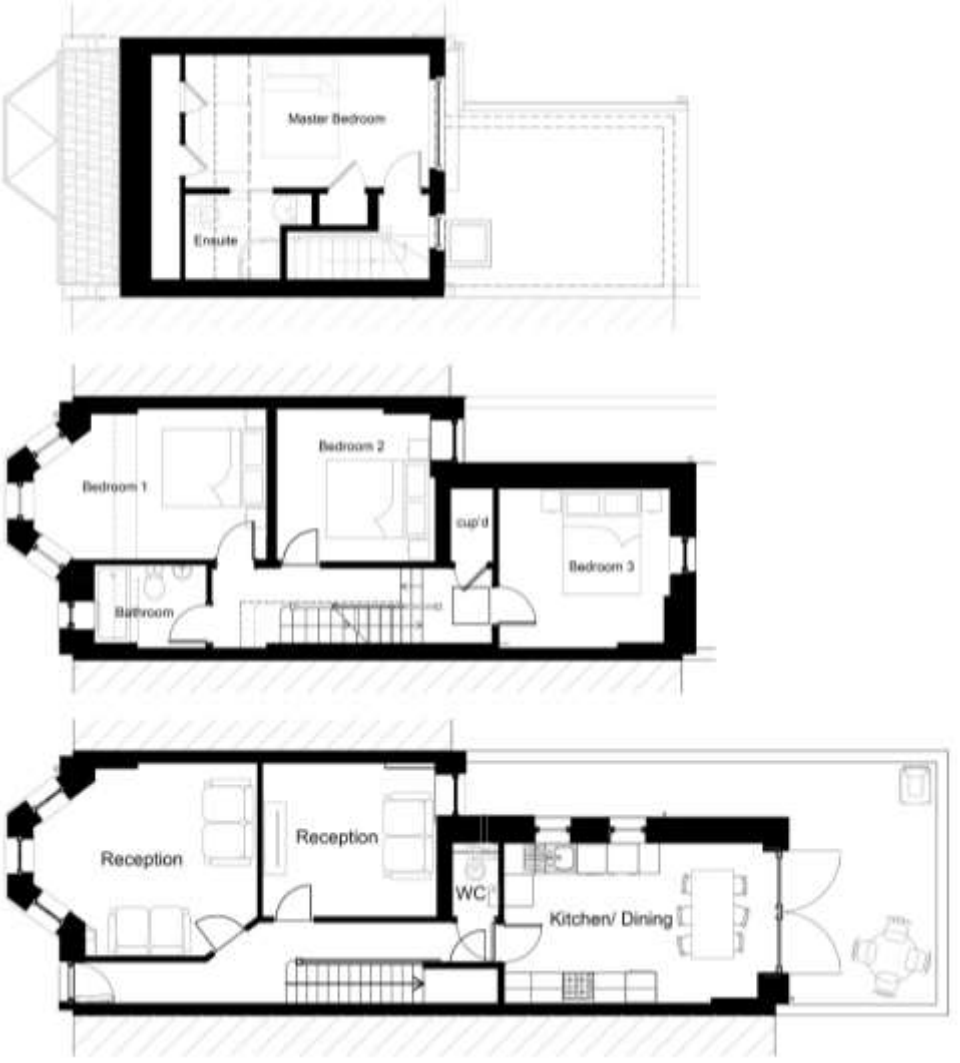
Existing House and Condition

4 Hiley Road

Typical Victorian Terrace in NW London, Not in Conservation Area

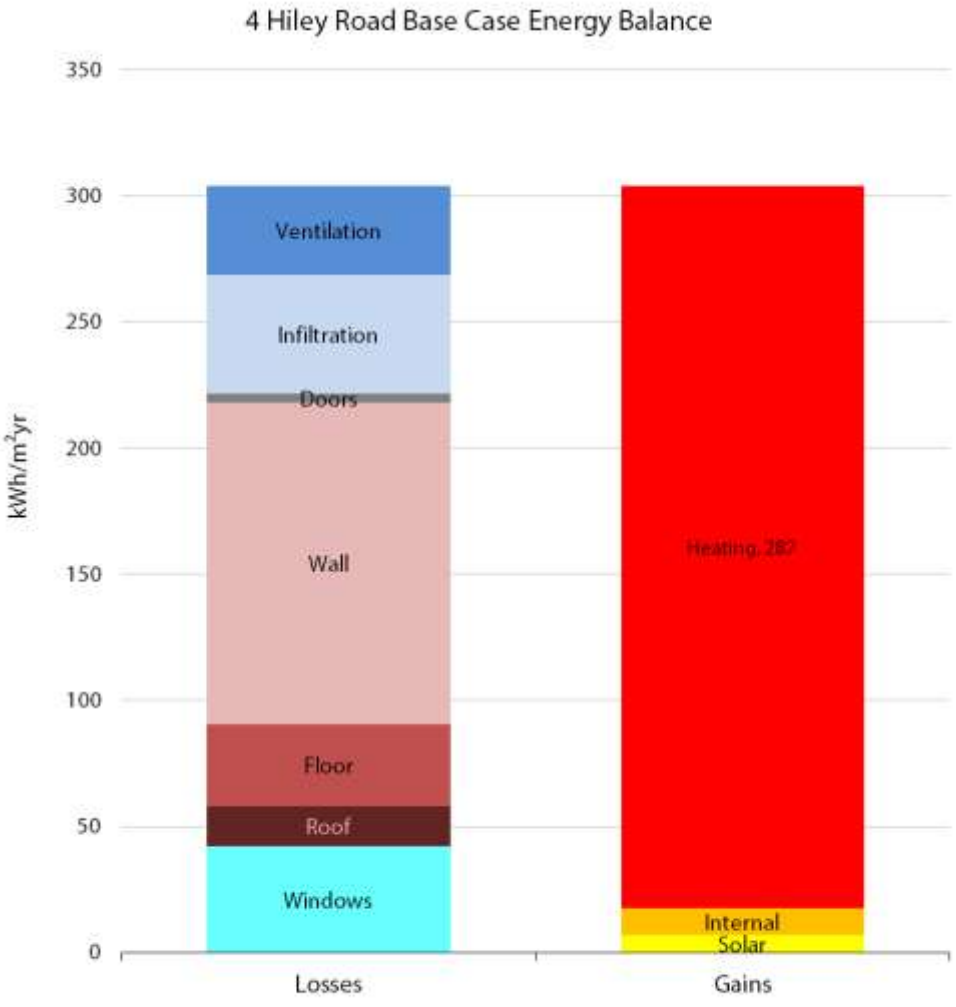
Background

- Solid wall construction
- Not Conservation Area
- Small TFA



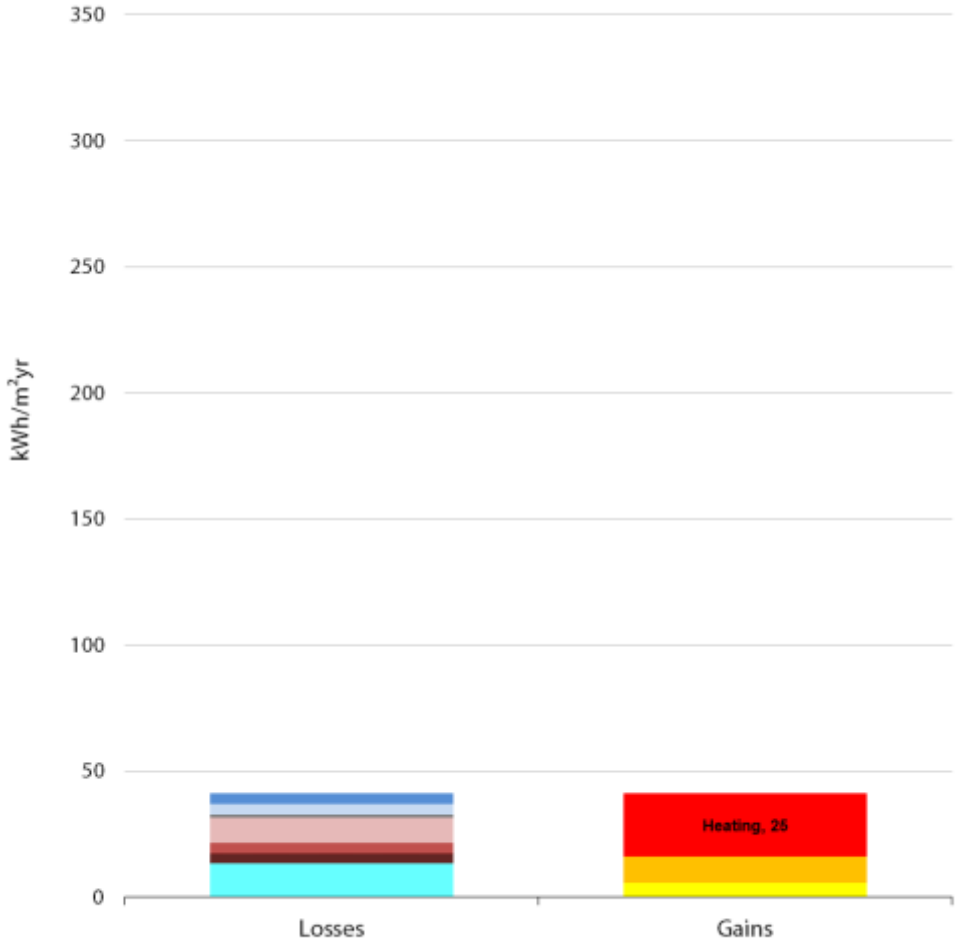
Background

- Large proportion of heat loss through external walls, floors and windows



Background

- Client was keen to reduce carbon emissions by as much as possible – carbon key driver towards Passivhaus



1. External Wall Insulation

- Interesting façade details

1. External Wall Insulation

- Permitted Development Rights

250mm EWI allowed – no limit to thickness. Designated as an 'improvement'

1. External Wall Insulation

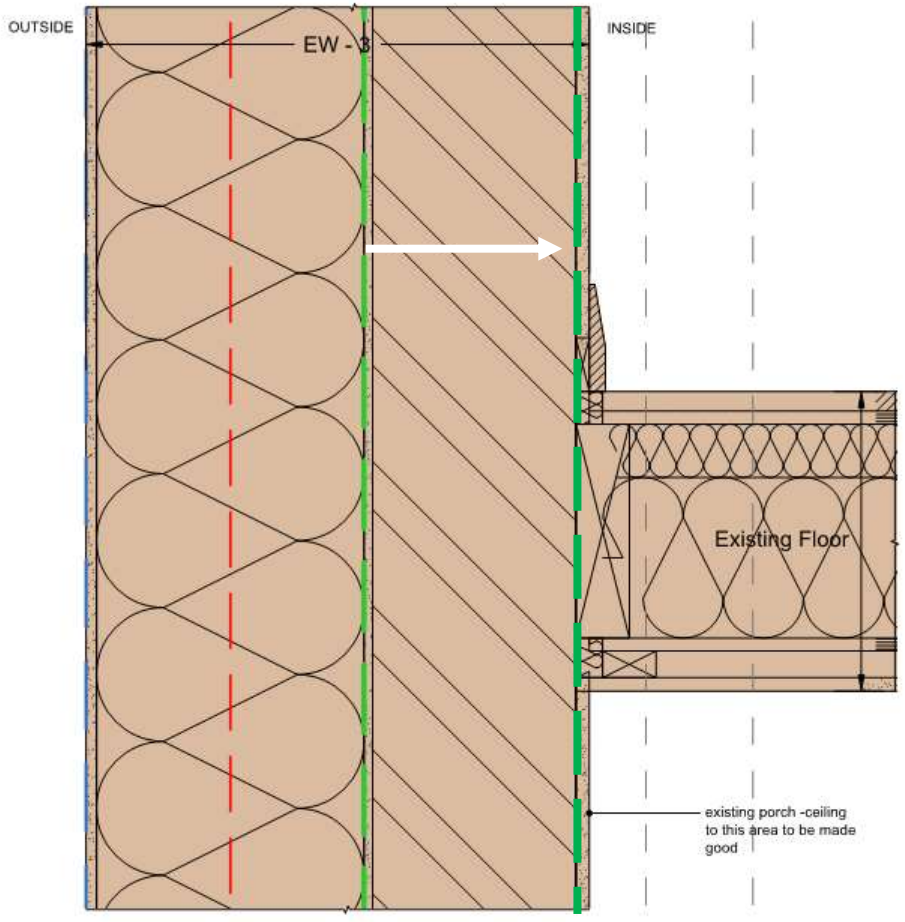
- Façade detailing replicated with Sytex (engineered foam stone) glued to the EWI

1. External Wall Insulation

- 250mm of insulation for terrace house refurbishment is a builder's nightmare
- All refurbishments should be done to EnerPHit standard only (in my opinion)
- Problems with external wall caused serious financial and contractor problems

2. Airtightness strategy

- Original strategy to use adhesive for EWI as airtightness layer was changed.



2. Airtightness strategy

- Too many air leaks through party walls existing plaster and on the joints between old and new.
- Keep existing plaster

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2. Airtightness strategy

- Airtightness between plaster and new loft
- Fold membrane on the same level all the way around.

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2. Airtightness strategy

- Move membrane folding detail above structural elements

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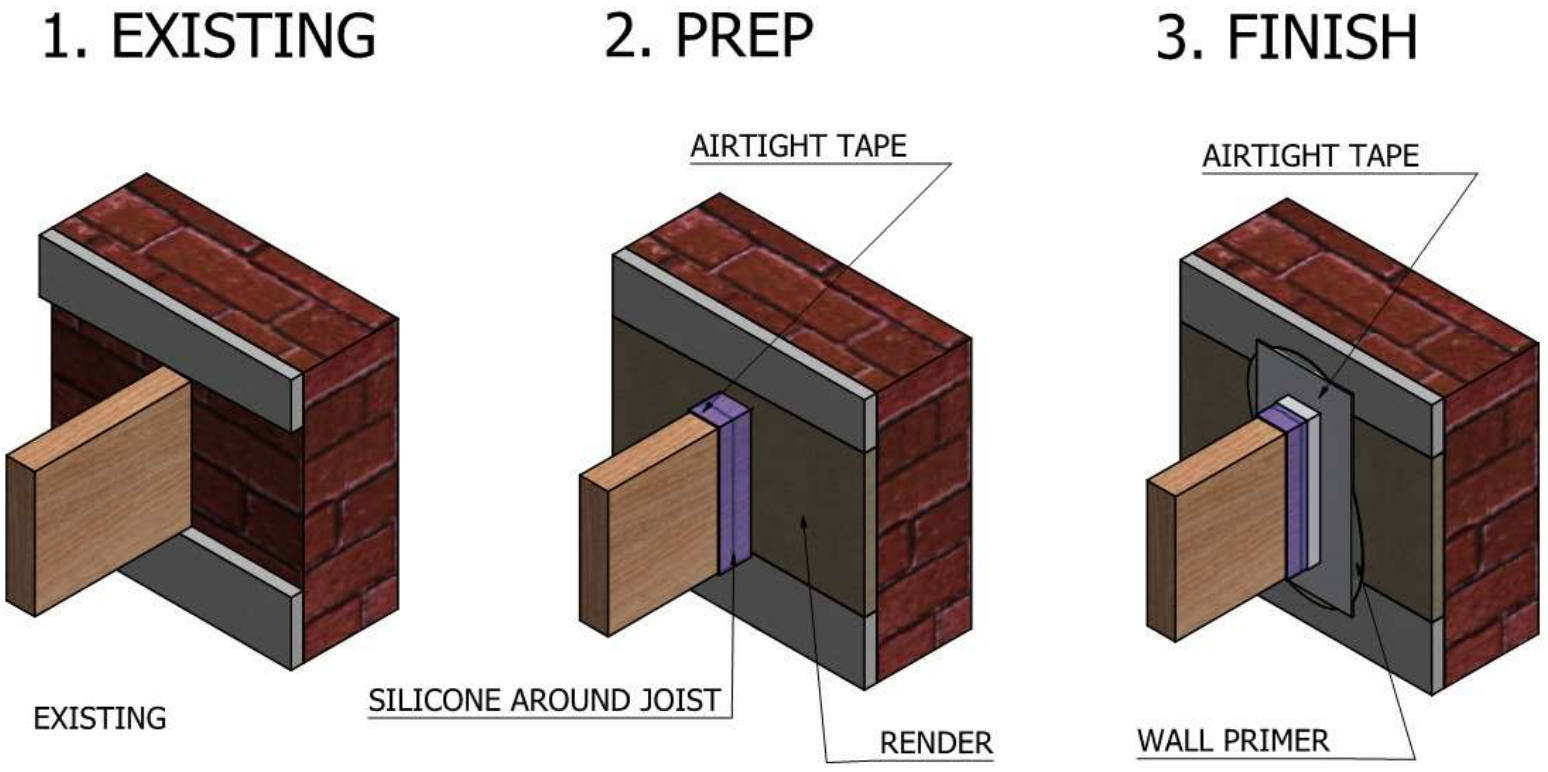
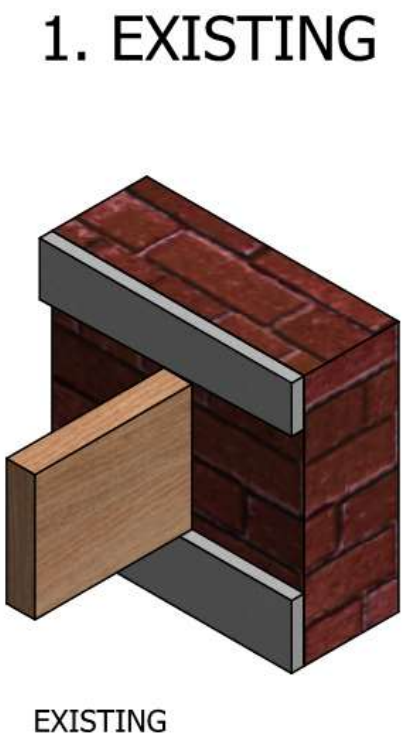
2. Airtightness strategy

- Existing joists siting in the wall



2. Airtightness strategy

- Existing floor joist left.



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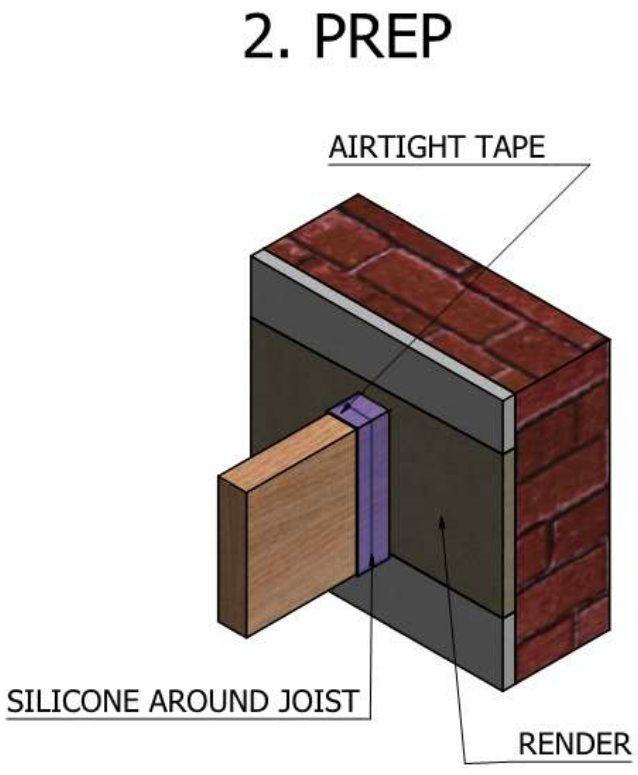

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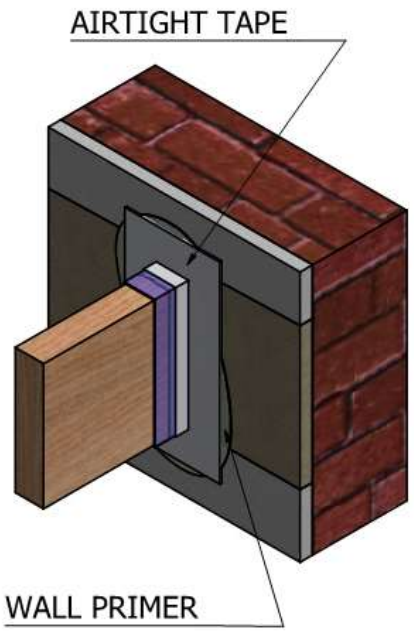
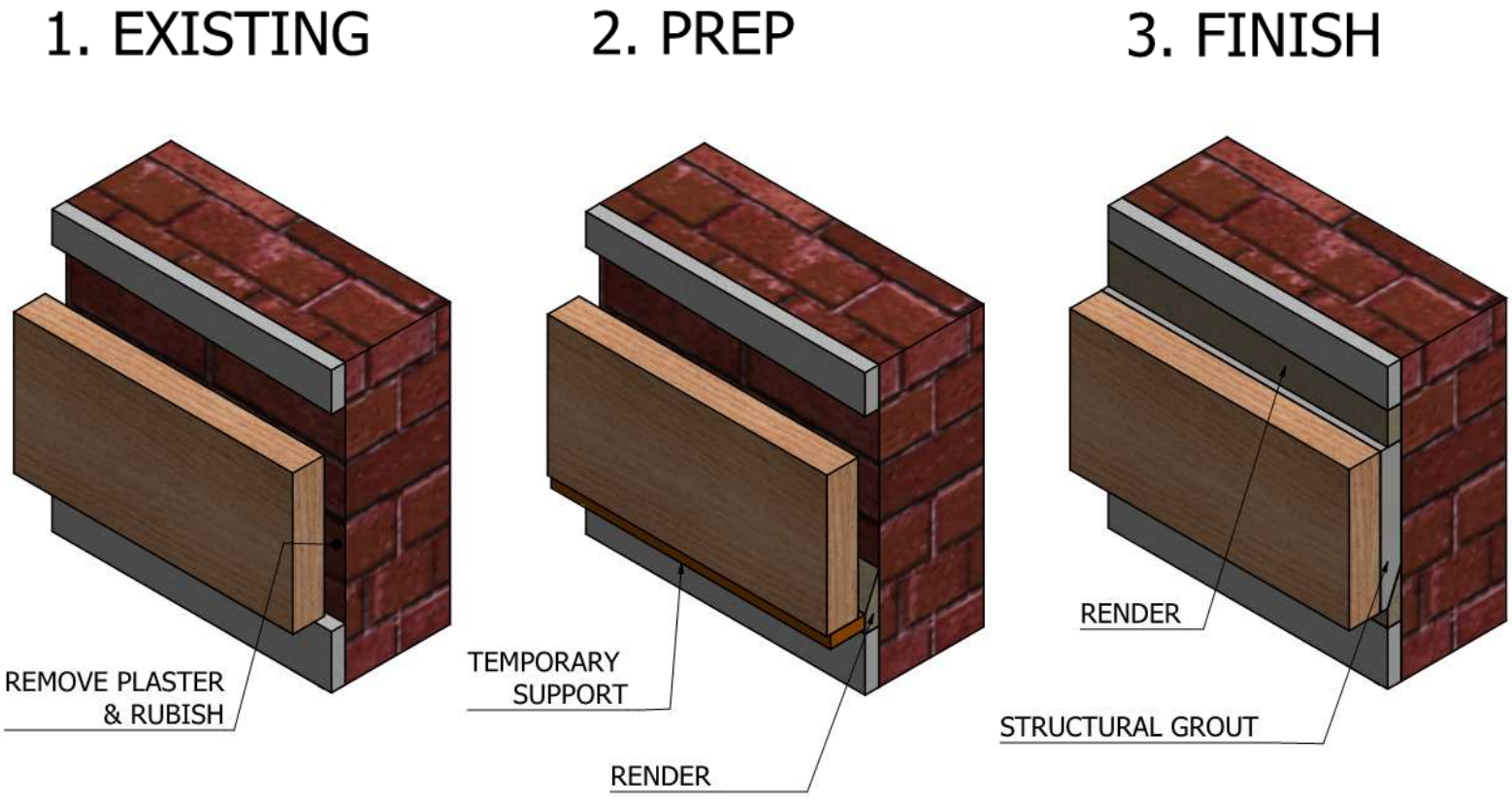


2. Airtightness strategy

Where existing structure restricts access



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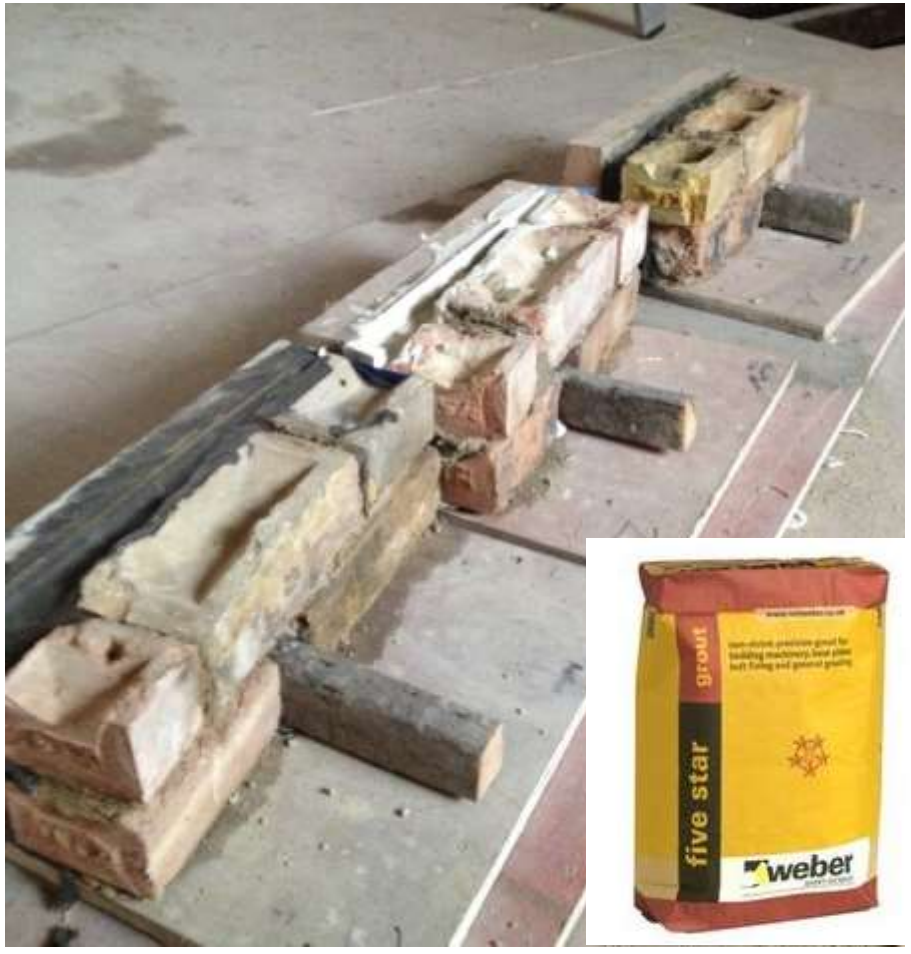
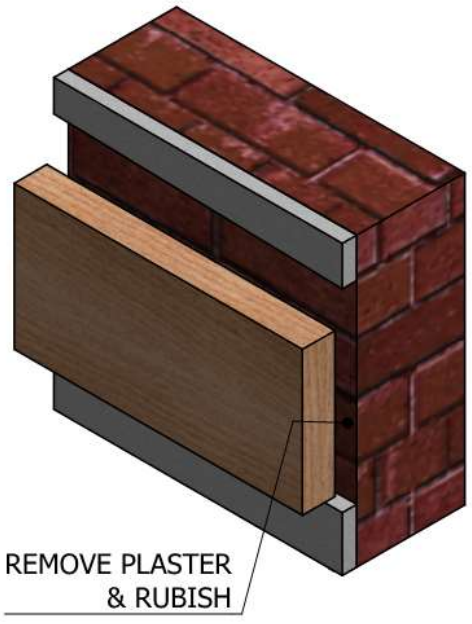


3. Existing Staircase

- Retaining stair benefits
  - Retaining original fabric
  - Good access to other floors
- Negatives
  - Airtightness more difficult
  - Labour cost is expensive

3. Existing Staircase



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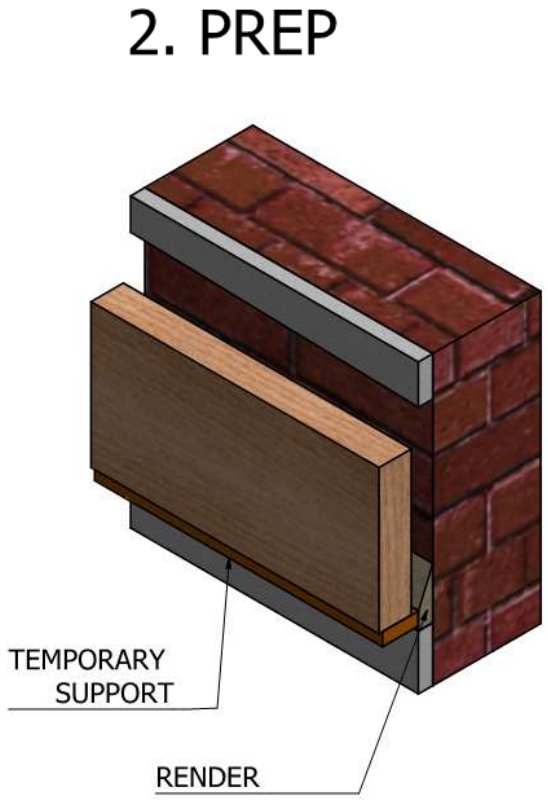

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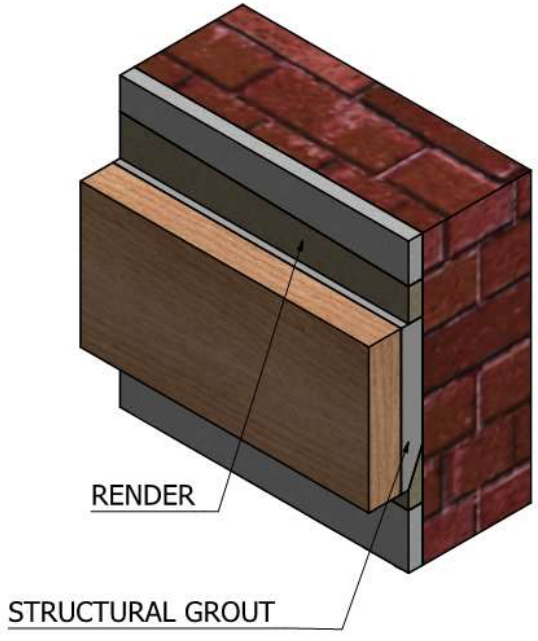

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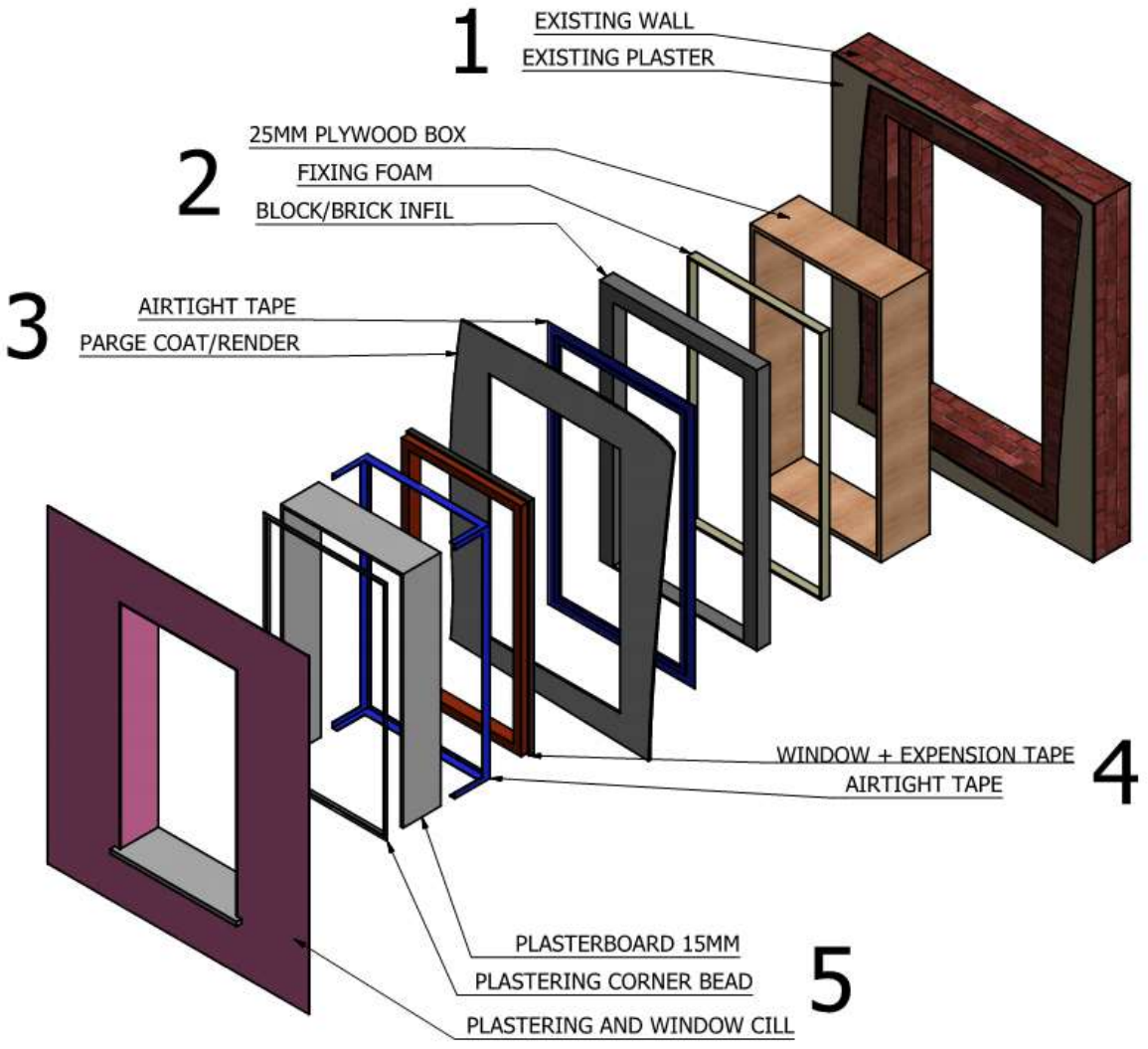
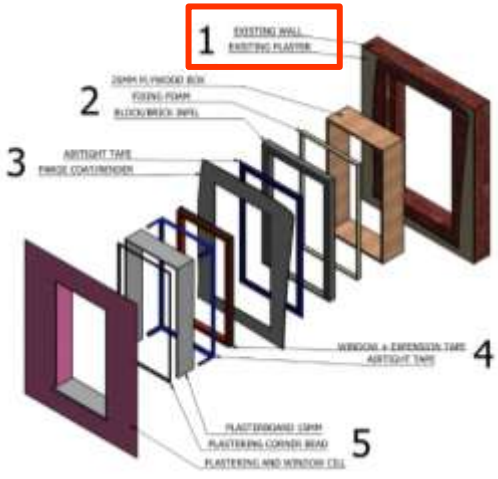
4. Windows – 5 steps

- Excellent airtightness
- Easy to build
- Allows early testing
- & window ordering
- Cost £100 per window



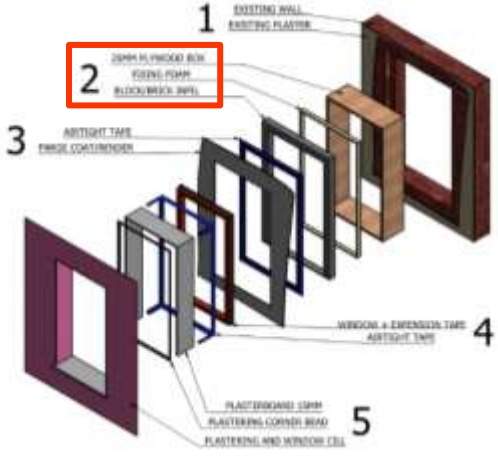
4. Windows – 1

- Remove windows early in the project.
- Repair structural condition of the openings. Keep existing plaster if in good condition.



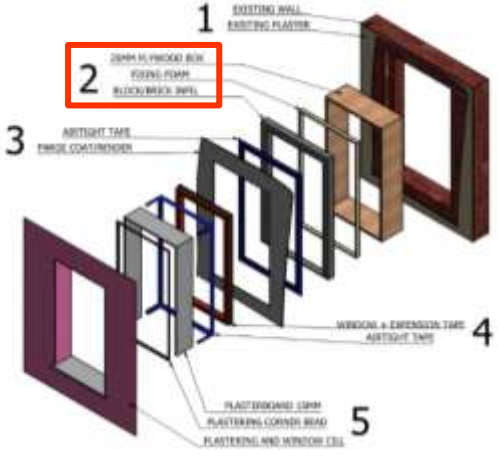
4. Windows – 2

- 25mm plywood frame fixed with foam (do not use thinner plywood or OSB)
- Restrain plywood from bending.



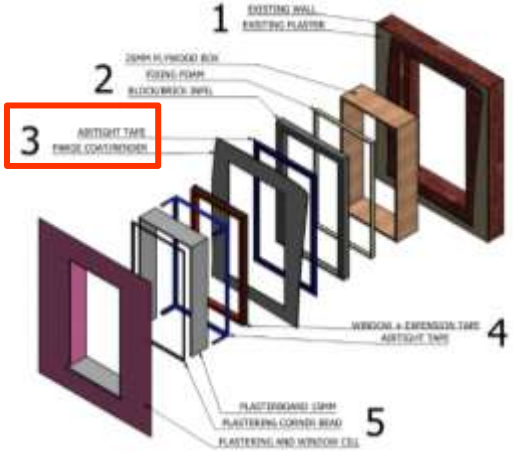
4. Windows – 2

- Block up voids next day.
- Confirm window sizes accurate and early (allow for 10mm gap between ply and window).



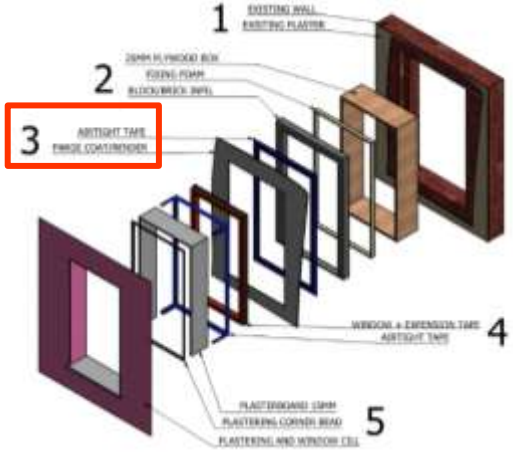
4. Windows – 3

- Prime new blockwork or plaster. Fit airtightness tapes. Have specialist airtight adhesive glue handy.



4. Windows – 3

- Install parge coat or render walls flush.



4. Windows – Sealing works with fan

- Board plywood boxes to prepare site for airtightness test and site security.

4. Windows – Sealing works with fan

- Fit plastic sheets to plywood with battens to gain day light.

4. Windows – Sealing works with fan

- Hire Wincon fan for test
- Use specialist silicone, tapes and plaster to seal building.
- Allow 2 days

4. Windows – Sealing works with fan

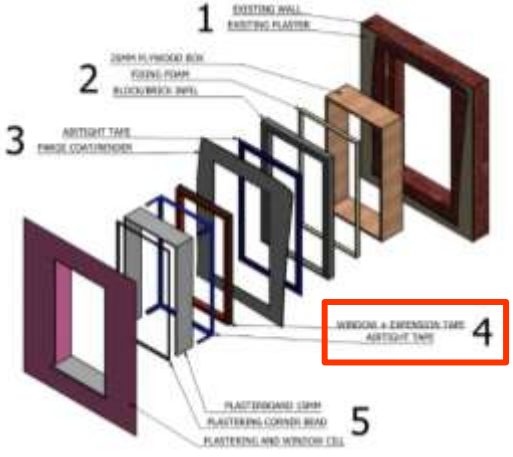
- Confirm that design works
- Best moment to learn and teach

“Details matter. It’s worth waiting to get it right.“

Steve Jobs

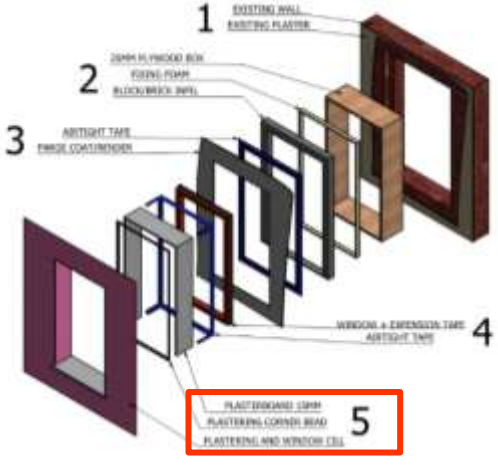
4. Windows – 4th step

- Fix steel or aluminium brackets to window frame.
- Fit expansion tape around window (keep it in the fridge before use to slow down expansion). Fit window to position.
- Tape window to plywood, plywood corners and over mechanical fixings.



4. Windows – 5th step

- Dry-lining, plastering works and tiling



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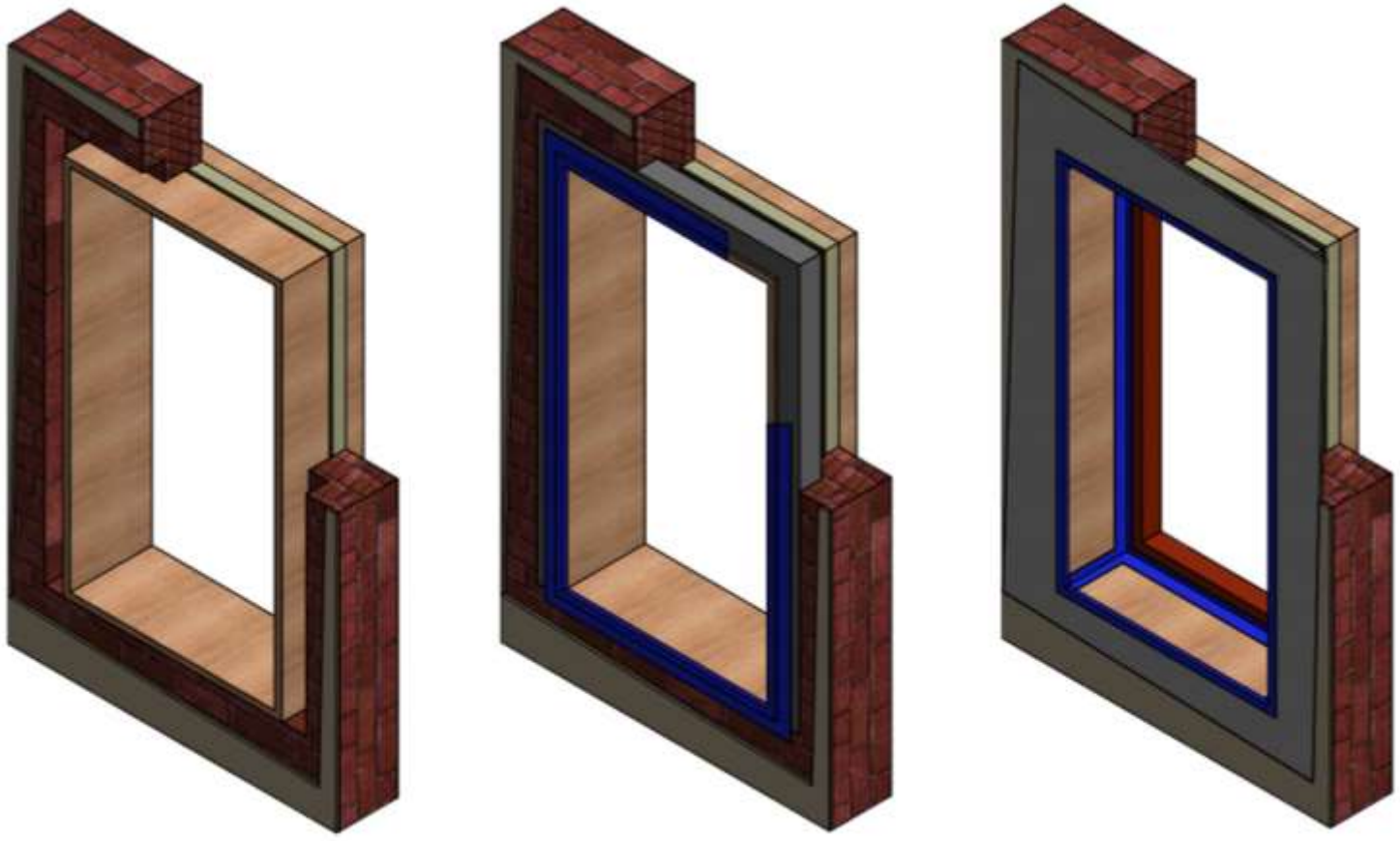
4. Windows – summary



4. Roof Windows

- Similar approach used for roof windows.
- Plywood fitted after windows have been installed.

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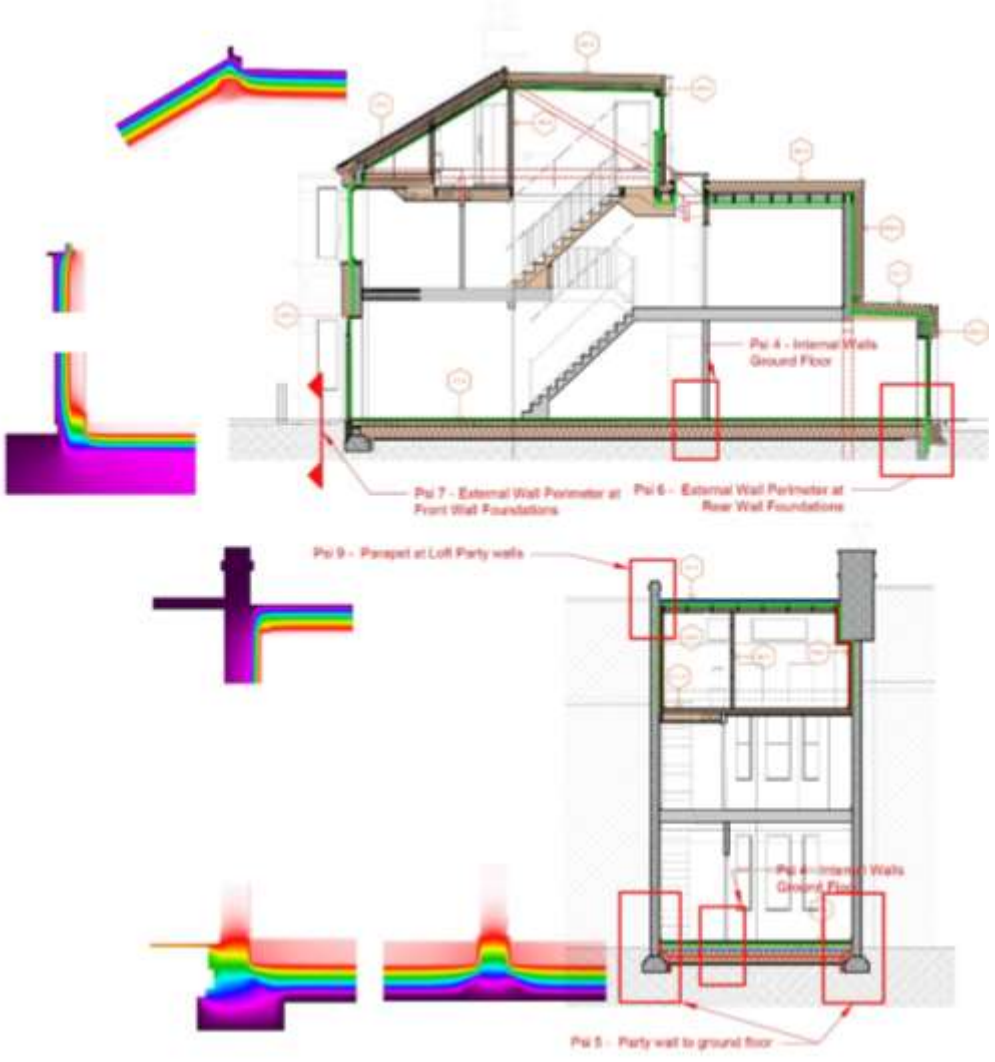
5. Doors threshold

- We fit GRP structural angle 75x75x10mm
- Cover all fixings with insulation.

3. Lessons learnt

- Existing structure can be atypical
- SVP Pipe vent externally – added 3kWh/m^{2}a to annual heat demand
- To make it simple, remove as many as possible internal ground floor walls



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7. Water filters

- We fit water filters to all our projects.

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