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
2. Airtightness strategy

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

• Move membrane folding detail above structural elements
2. Airtightness strategy

- Existing joists sitting in the wall

1. EXISTING

2. PREP

   - AIRTIGHT TAPE
   - RENDER

3. FINISH

   - AIRTIGHT TAPE
   - WALL PRIMER
2. Airtightness strategy

- Existing floor joist left.

1. EXISTING
2. Airtightness strategy

- Existing floor joist left.

2. PREP
2. Airtightness strategy

- Existing floor joist left.

3. FINISH

- AIRTIGHT TAPE
- WALL PRIMER
2. Airtightness strategy

Where existing structure restricts access

1. EXISTING
   - REMOVE PLASTER & RUBISH

2. PREP
   - TEMPORARY SUPPORT
     - RENDER

3. FINISH
   - RENDER
   - STRUCTURAL GROUT
2. Airtightness strategy

Where existing structure restricts access
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

1. EXISTING

REMOVE PLASTER & RUBISH
3. Existing Staircase

2. PREP

TEMPORARY SUPPORT

RENDER
3. Existing Staircase

3. FINISH

- RENDER
- STRUCTURAL GROUT
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
4. Windows – summary
4. Roof Windows

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

- We fit water filters to all our projects.

Reduce plastic bottle waste