Arbed I:
Retrofitted External Wall Insulation

Wall Insulation:

getting it right in old buildings

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UWIC

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Introduction

- Background
- Context
- EWI Specification: Manufacturers
- EWI Installations
- Case study dwellings: Pre-retrofit and Post-retrofit comparison
  - Photographs
  - Thermographic images
- Other observations
- Pros & Cons

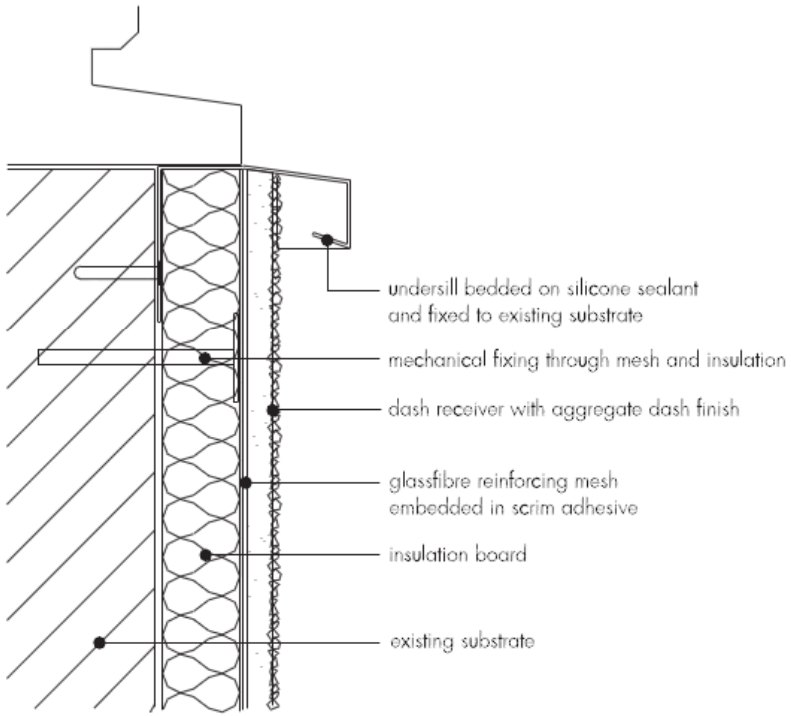
Background

- PhD research project
  - Entitled *'A study to investigate the impact of retrofitted external wall insulation at existing dwellings in Swansea'*
  - Collaboration with two housing associations
  - Case study dwellings in Swansea
  - External wall insulation (EWI) installed through Arbed Phase 1

Context

- Over 200 dwellings
- All were built pre-1919
- All were in fuel poverty (funding criterion)
- 30 dwellings took part in study
- Focus: Execution quality of retrofitted EWI

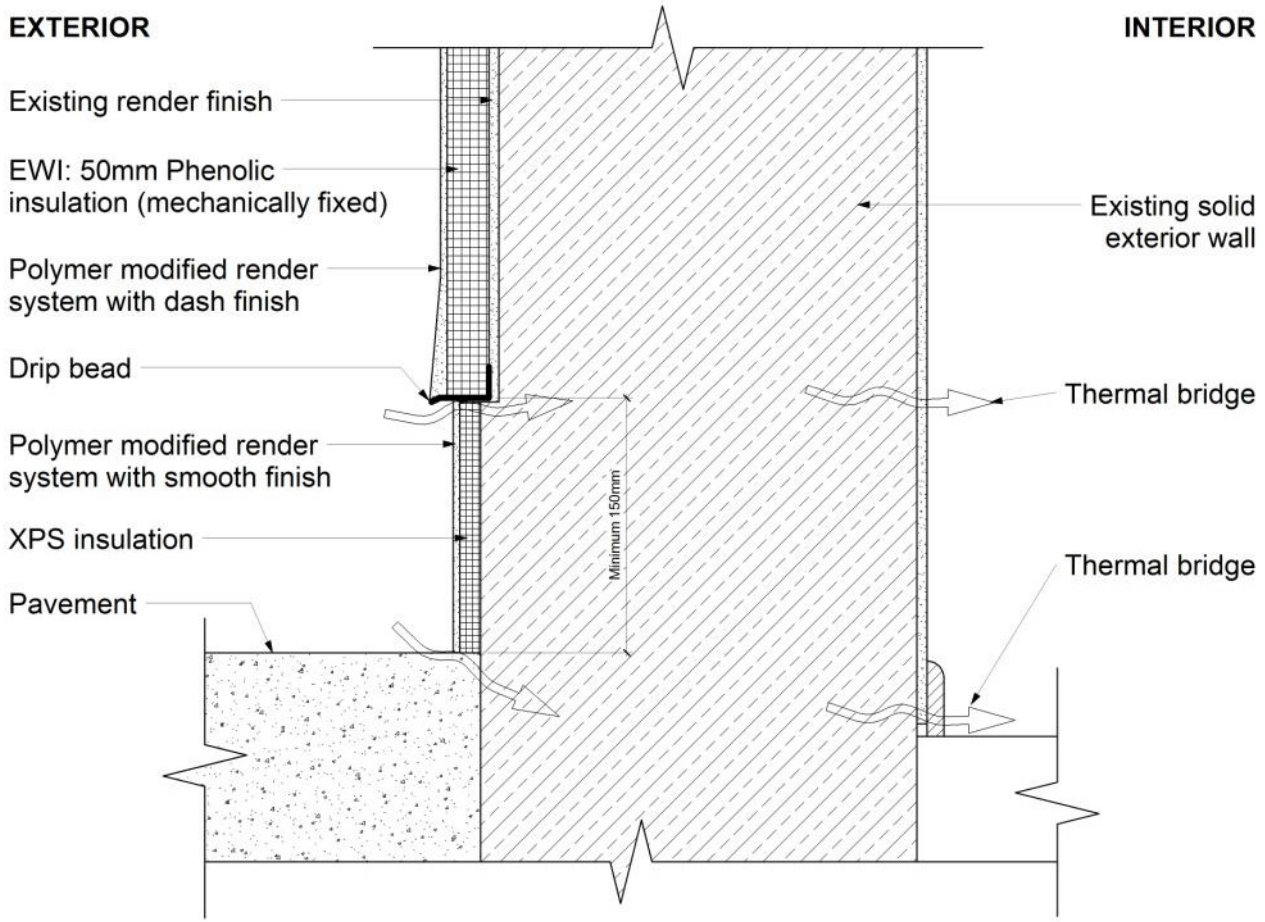
EWI Specification: Manufacturers



Hopper, 2012c

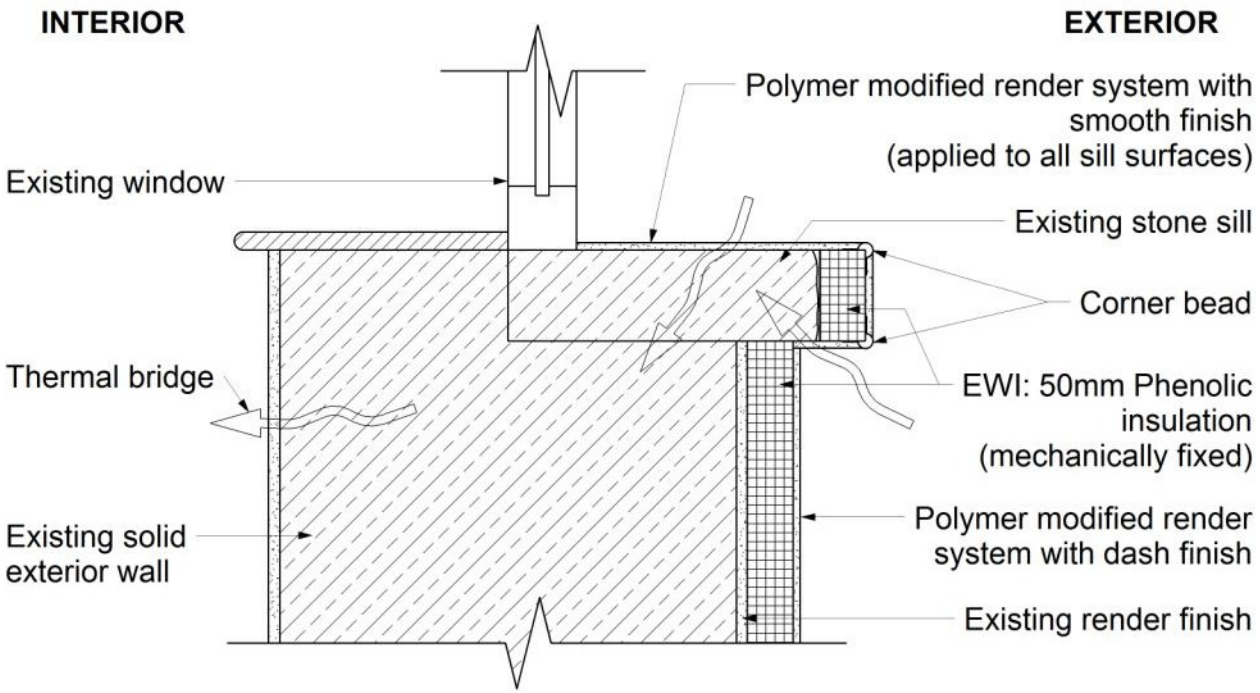
- *Example:* Under sill detail provided by manufacturer
- Used where existing sill remained untouched
- The same capping detail used for eaves and verges (where there is no roof overhang)

EWI Installations:
Pavement to external wall junction



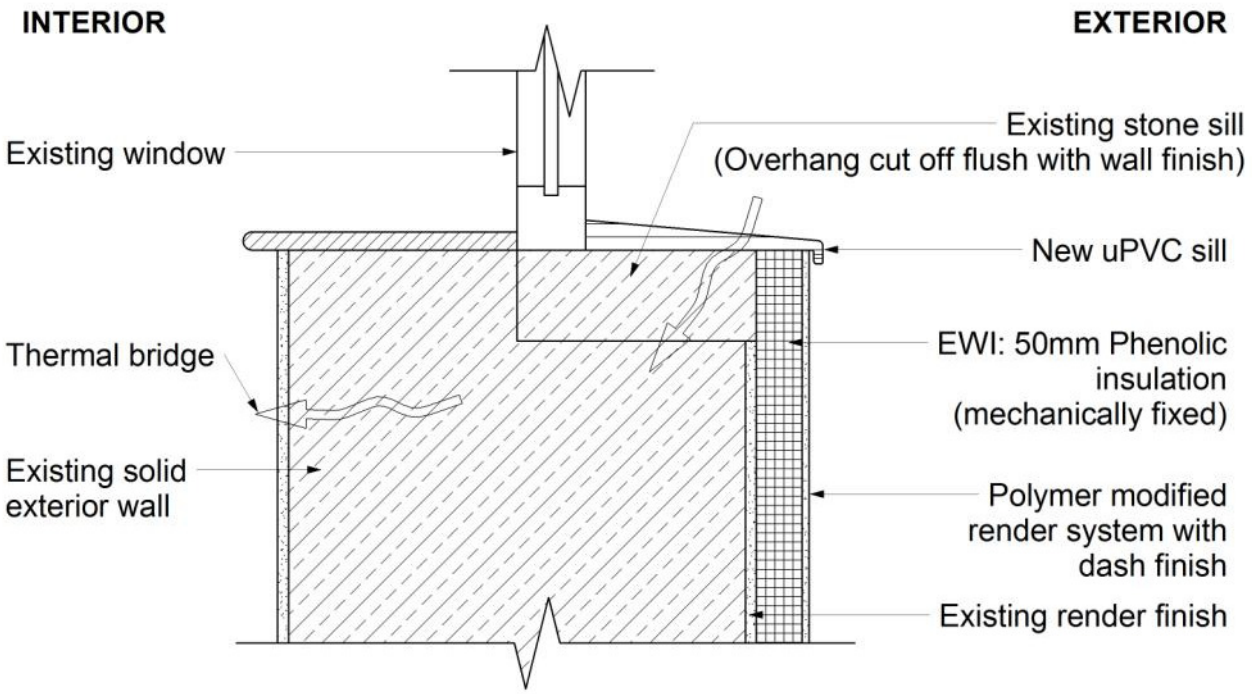
Hopper, 2012a

EWI Installations: Sill detail (1)



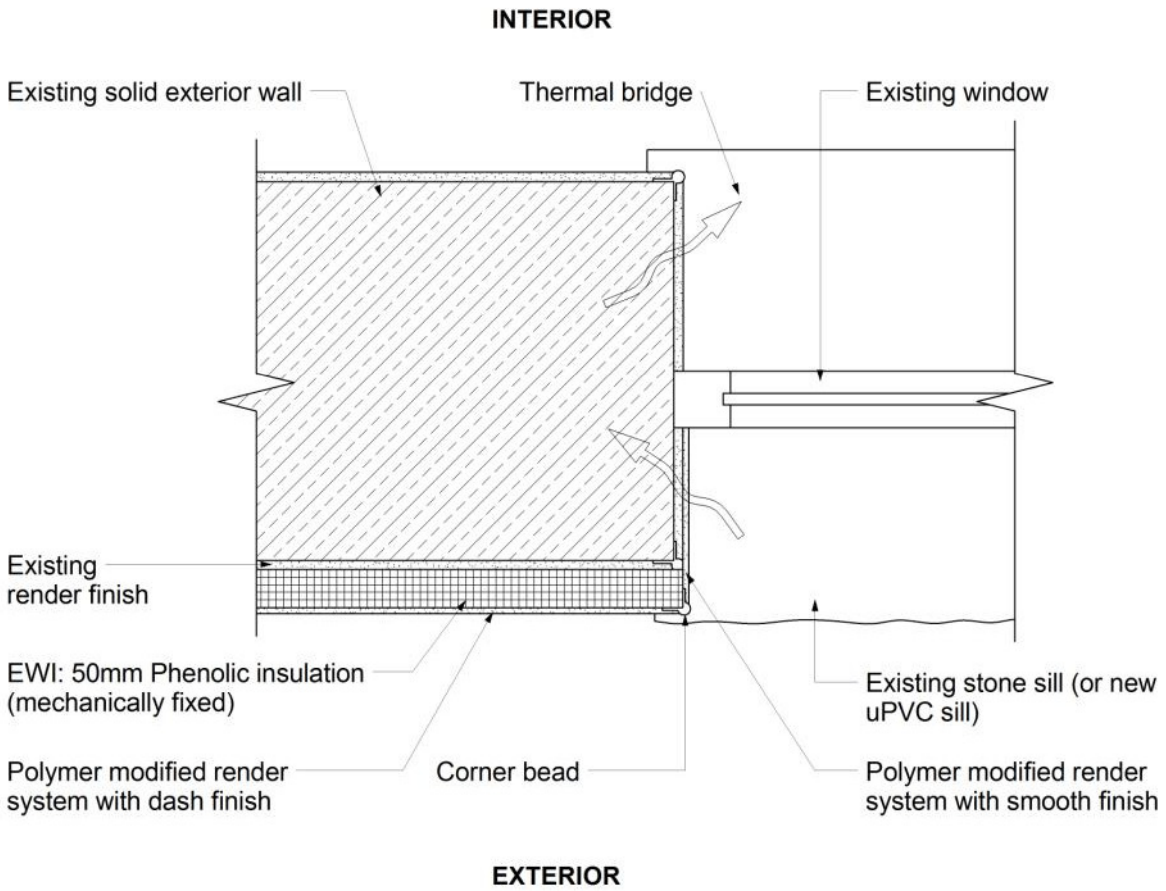
Hopper, 2012a

EWI Installations: Sill detail (2)



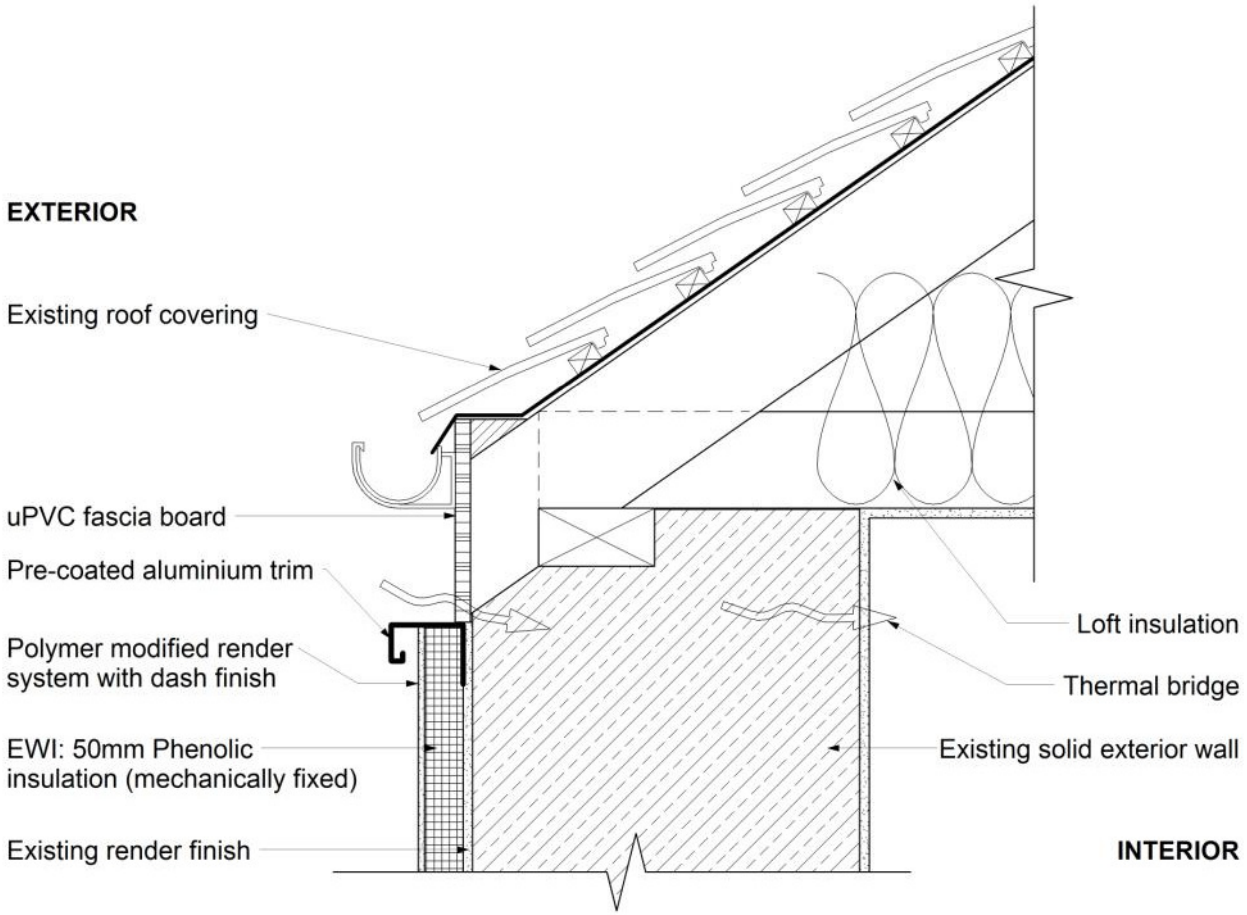
Hopper, 2012a

EWI Installations: Reveals detail



Hopper, 2012a

EWI Installations: Eaves detail

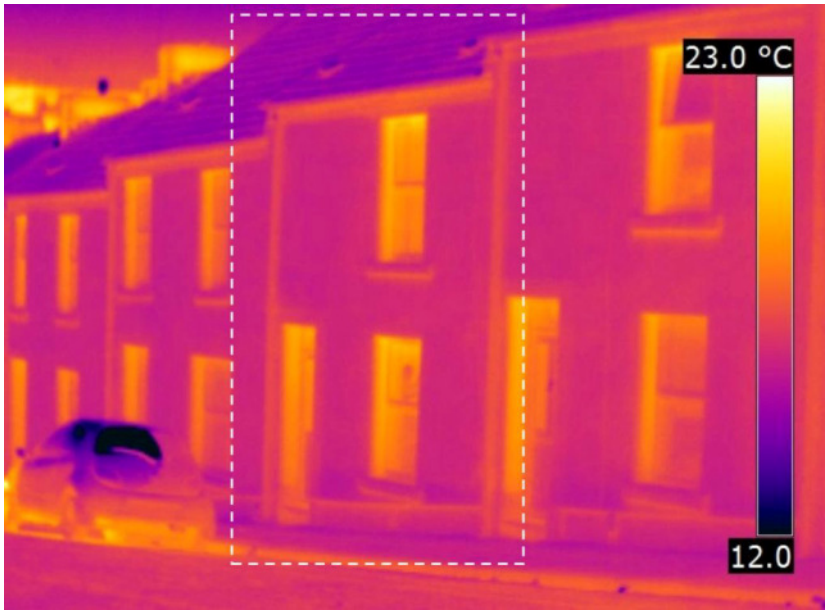


Hopper, 2012a

Case study 1: Pre-retrofit

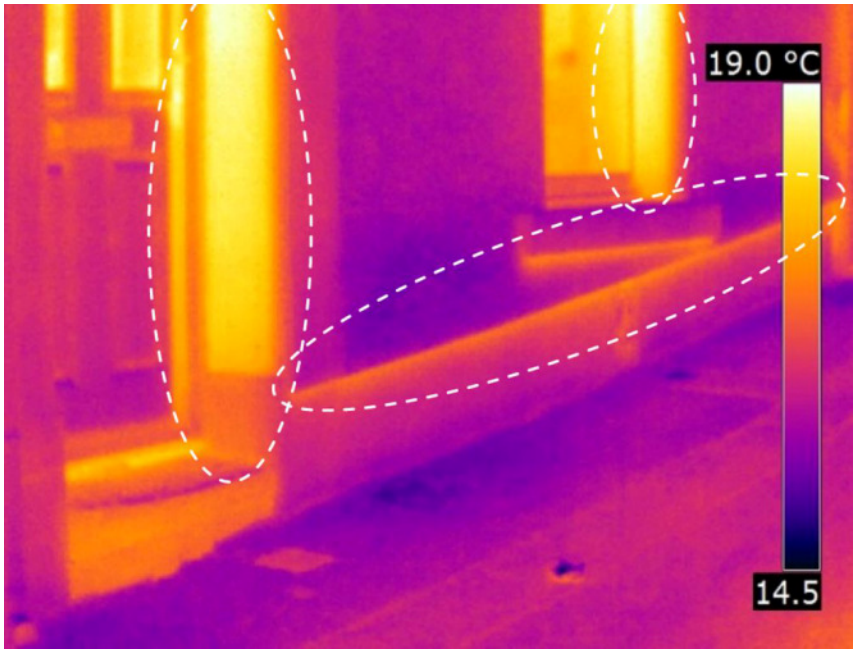
Hopper, 2012a

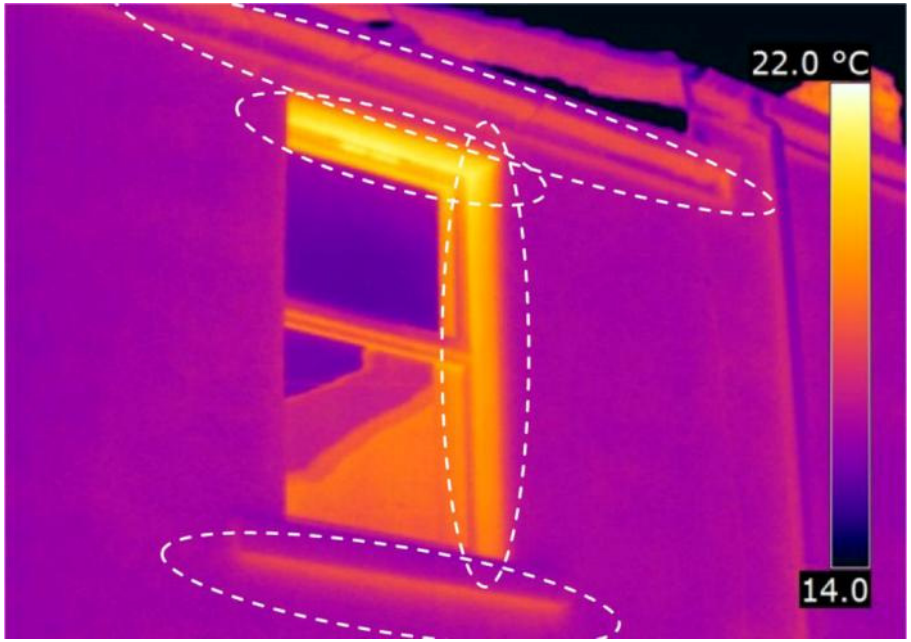
Case study 1: Post-retrofit



Hopper, 2012a

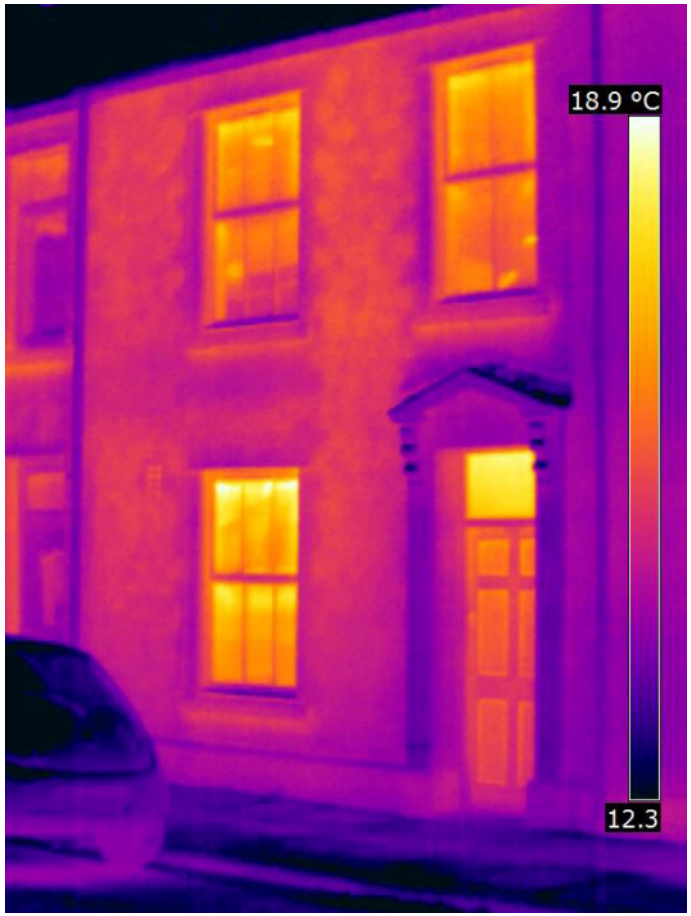
Case study 1: Post-retrofit details





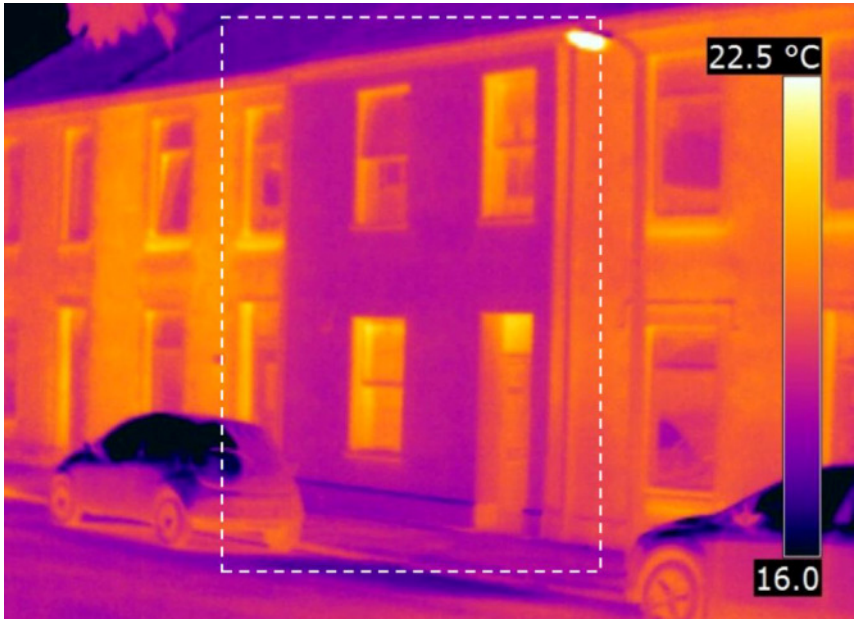
Hopper, 2012a

Case study 2: Pre-retrofit



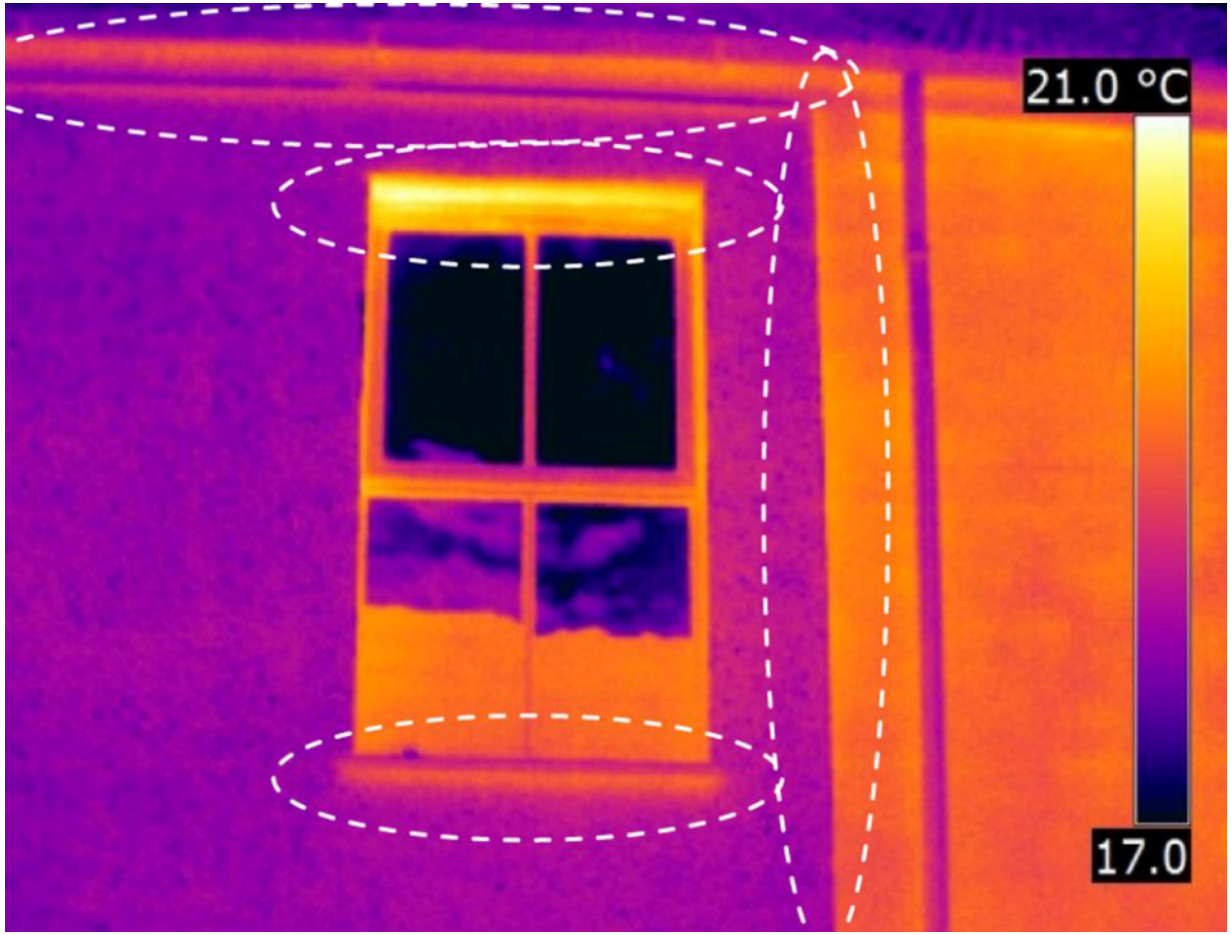
Hopper, 2012a

Case study 2: Post-retrofit



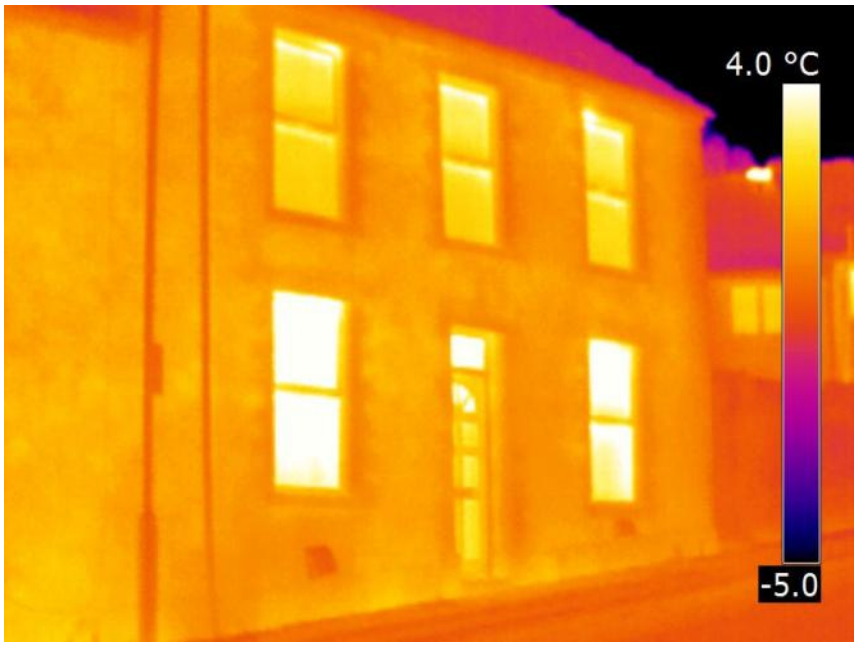
Hopper, 2012a

Case study 2: Post-retrofit details



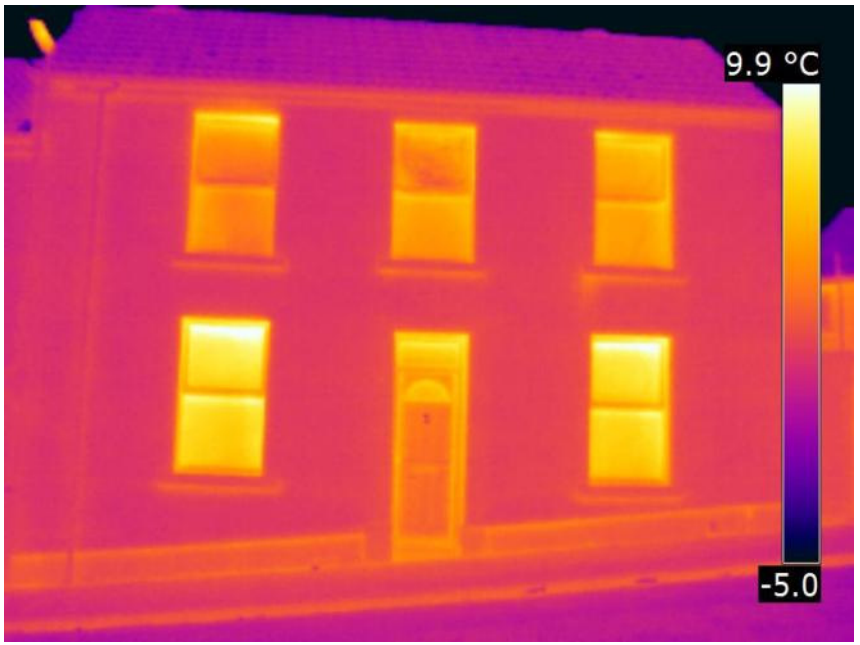
Hopper, 2012a

Case study 3: Pre-retrofit



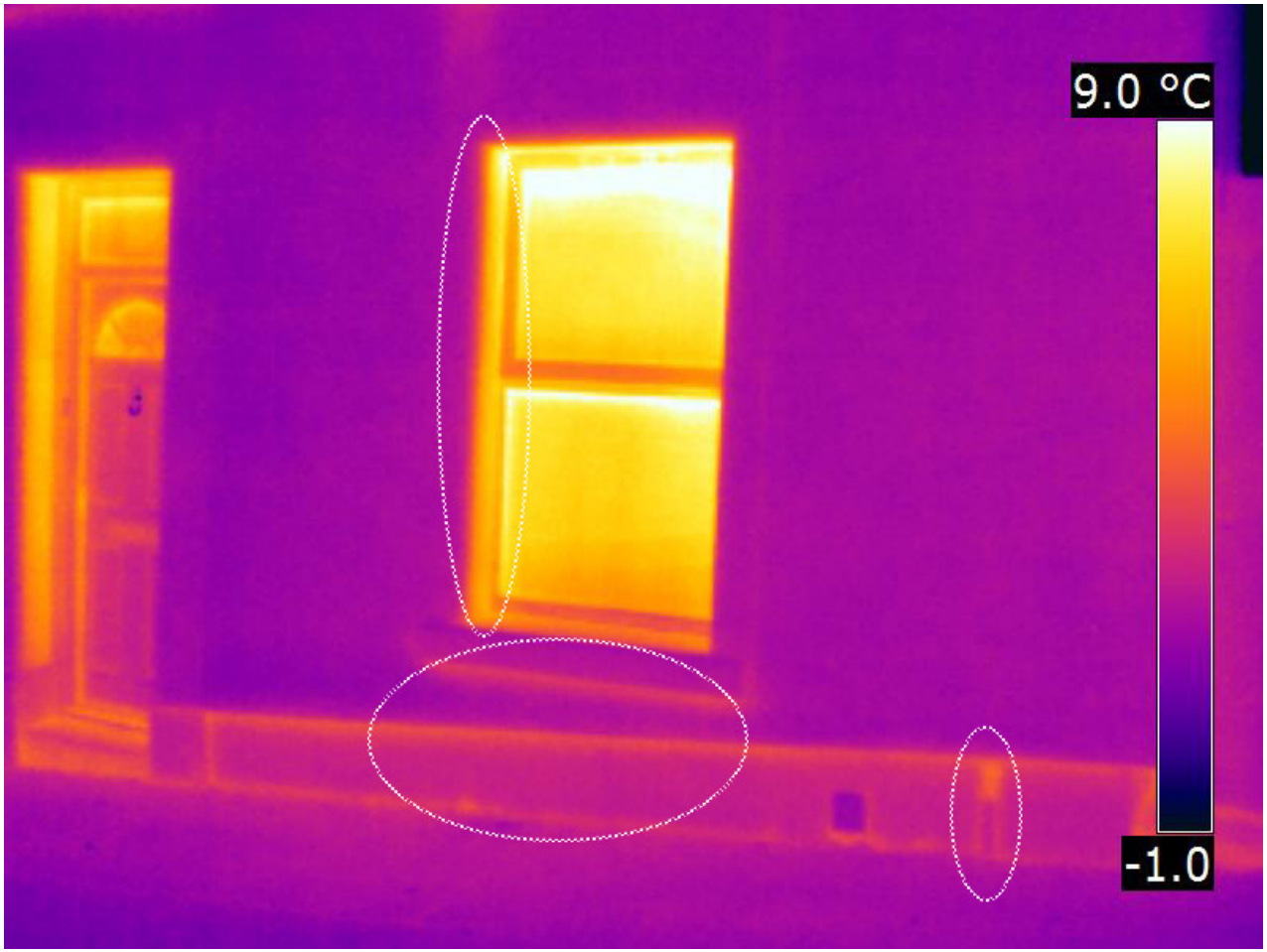
Hopper, 2013

Case study 3: Post-retrofit



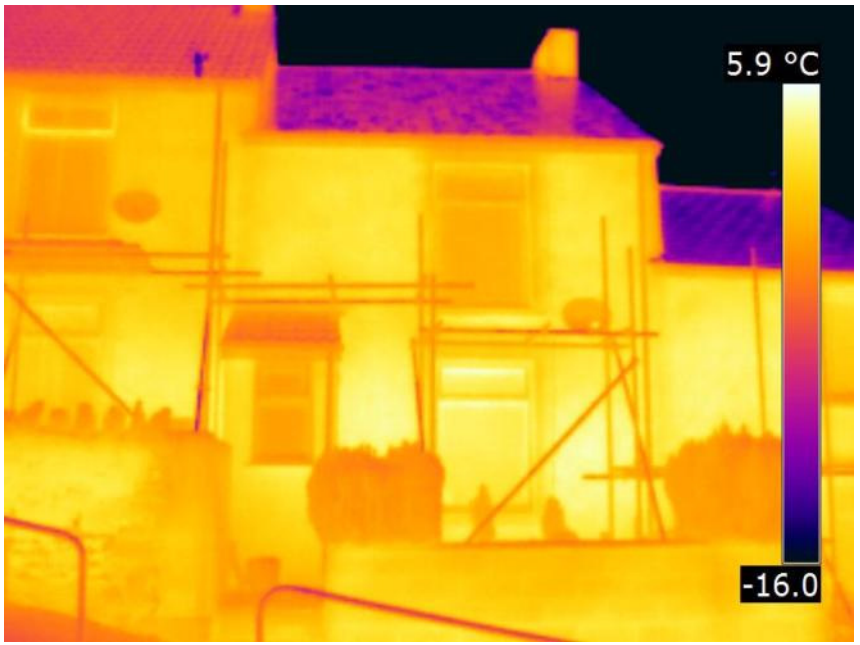
Hopper, 2013

Case study 3: Post-retrofit details



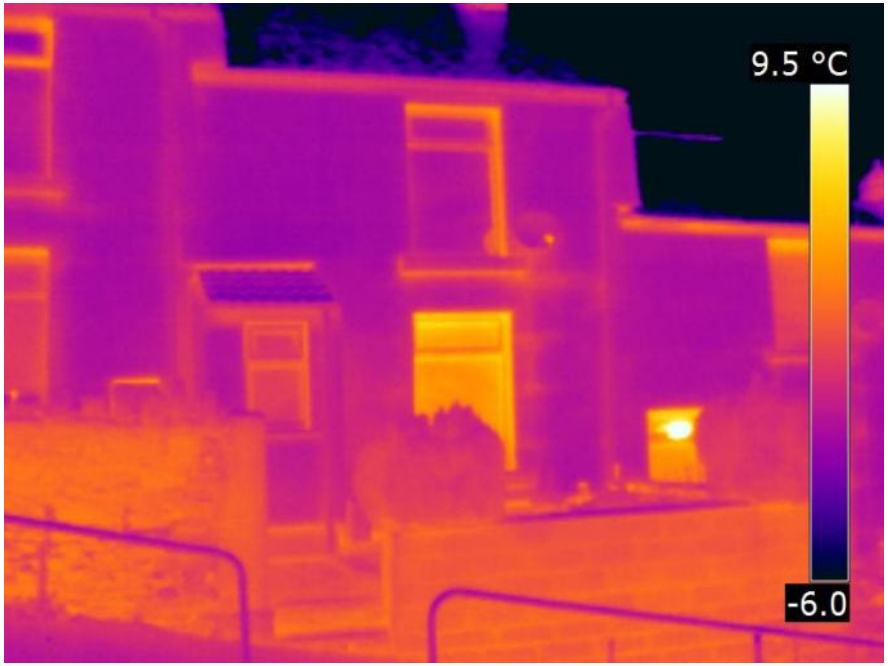
Hopper, 2013

Case study 4: Pre-retrofit



Hopper, 2012b

Case study 4: Post-retrofit

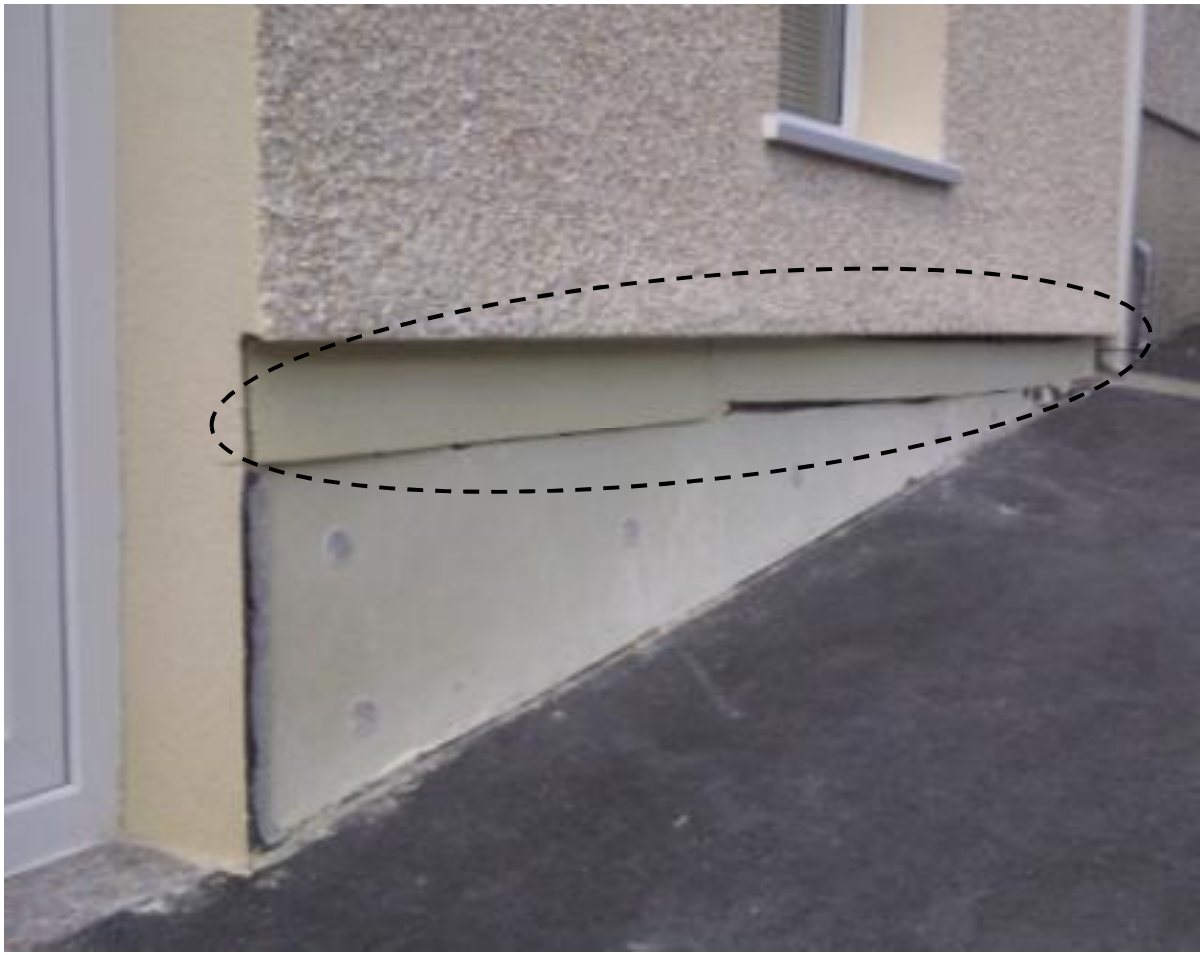


Hopper, 2012b

Case study 4: Post-retrofit details

Hopper, 2012b

Other observations



Hopper, 2012c

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Hopper, 2013

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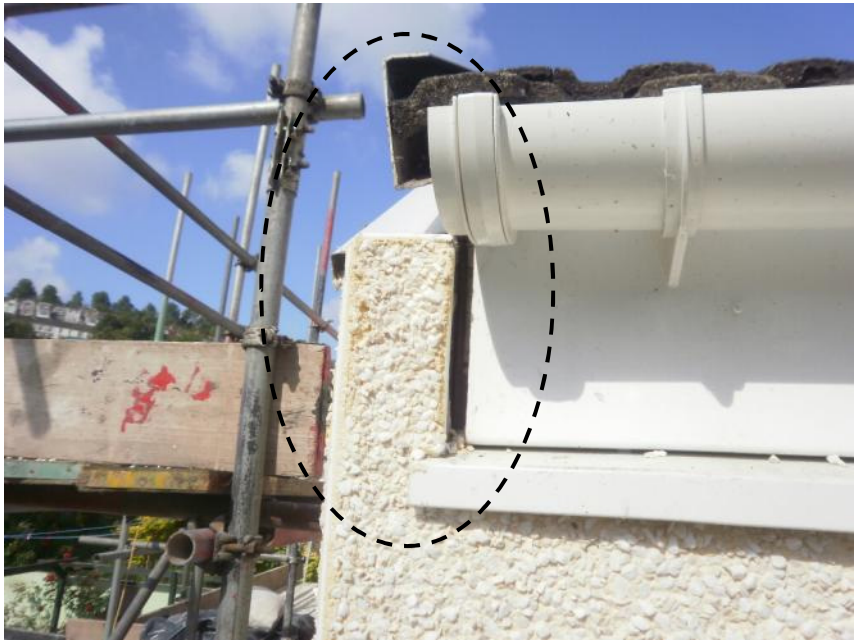

Hopper, 2013

Challenges with retrofitting EWI

- Thorough preliminary surveys are essential for avoiding unnecessary thermal bridging
- Poor design and execution can result in disastrous consequences
- The configuration of older existing dwellings can make it difficult to ensure there is continuity of EWI
- Roofs should be extended where there is no existing overhang
- If necessary, windows should be replaced at the same time to ensure there is room to return EWI at the reveals
- Installers do not appear to understand the consequences of not ensuring a continuous covering (no gaps!)
- Thermal bridging can have significant detrimental effects on both the health of the building and occupants
- Can remove the original character of facades (and the whole building!)

Benefits of retrofitting EWI

- **Reduces overall heat loss**
- **Increases occupant thermal comfort**
- (*should*) minimises avoidable thermal bridging
- Can improve the overall appearance of tired facades

References

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