‘Retrofit and the Niddrie Road Tenement’

12th Scottish Empty Homes Conference 01.03.23

Chris Morgan
Architect + Director
John Gilbert Architects

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Expertise	Practice	Knowledge	Expertise
Passivhaus	New Build	Strategy	Masterplans
Affordable Housing			Town Centres
Community Projects			Regeneration
Work / Leisure / Care			Community-led
Tenement Toolbox	Conservation & Retrofit	Performance	Hab-Lab: BPE / POE
20th Century			Sussed
EnerPhit, AECB			Zero Carbon Metrics
PAS 2035 / 2038			WUFI / THERM Calcs

ISO 9001 : ISO 14001 : ISO 45001 : CDM 2015 (Principal Designers) : Equality, Diversity & Inclusion: Living Wage Accredited : BIM : Bespoke Document Management : CPD : CSCS

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What level of Energy Efficiency should we aim for?

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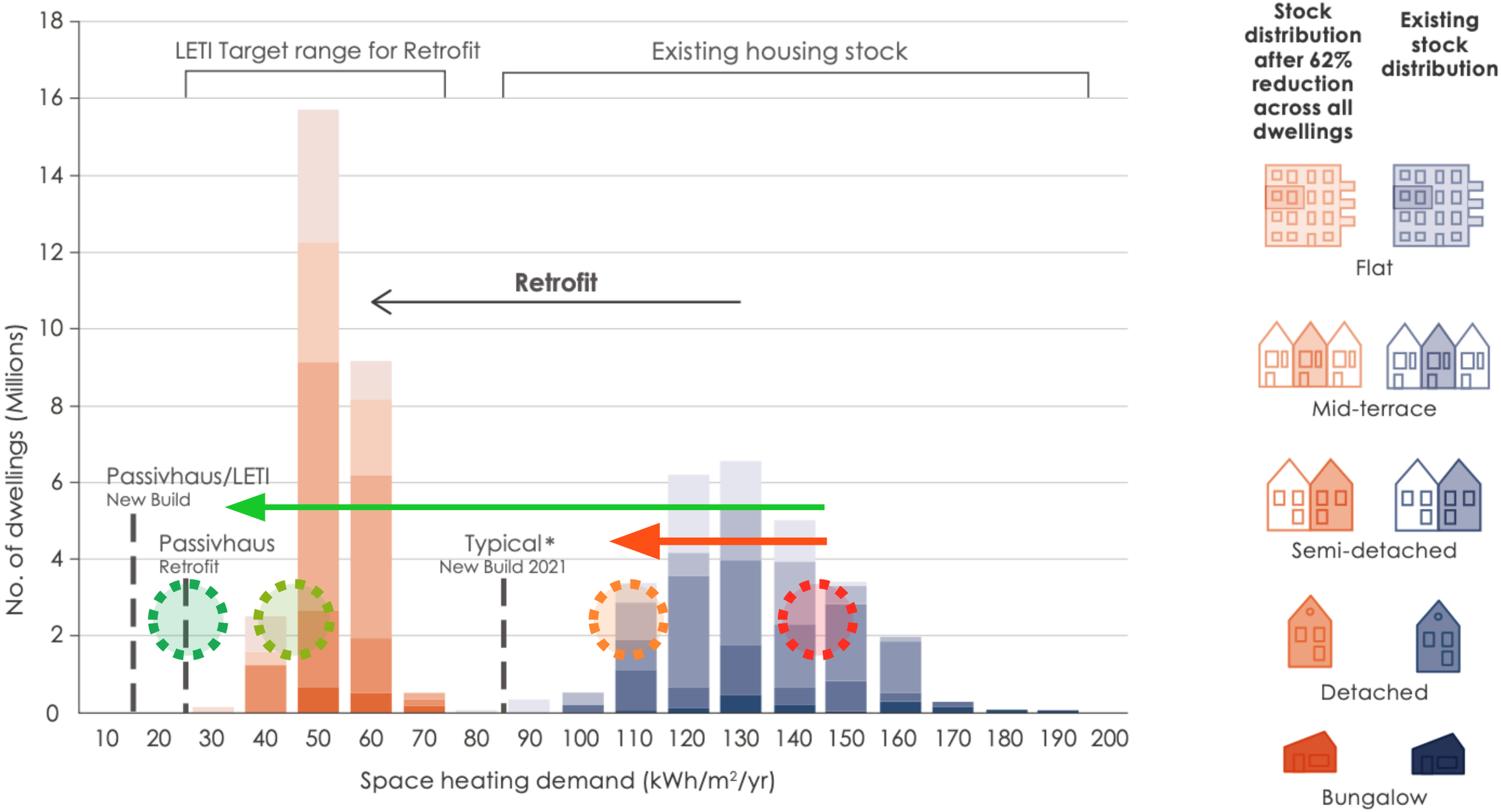

* Includes for an assumed performance gap

Figure 0.1 - Total number of UK dwellings broken down by their space heating demand, showing the transition required from existing levels of high demand to the LETI retrofit target range. Figure based on stock modelling carried out by LETI.

EnerPHit / AECB Retrofit Standard

- Level of aspiration / achievement is about right -80-90% reduction in BOTH carbon emissions and fuel costs
- We know we will achieve what we set out to achieve (i.e. we close the performance gap)
- Works well with future renewable energy supply scenarios
- Significant improvement in comfort (winter-proofing and summer-proofing)

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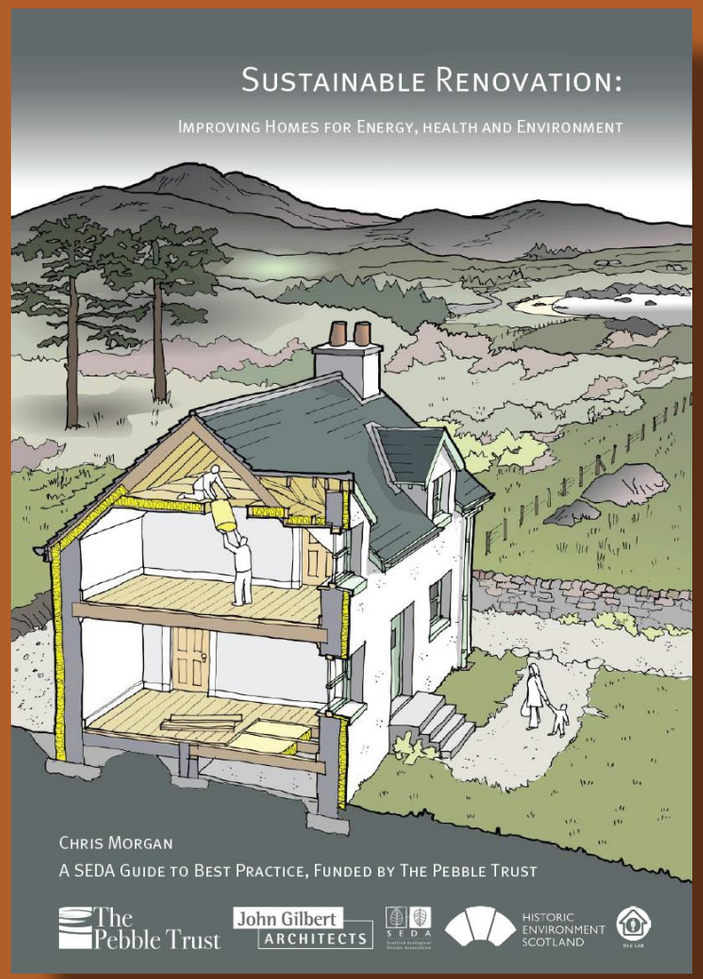
BUT… its not just about energy and carbon - Holistic / Sustainable Renovation

Table 3.5: UK treatment cost burden estimates to the NHS for selected hazards

Risk Factor	Total cost burden estimates to the NHS
Physical inactivity	£0.9-£1.0 billion
Overweight and obesity	£5.1-£5.2 billion
Smoking	£2.3-£3.3 billion
Alcohol intake	£3.0-£3.2 billion
Poor housing	£1.5-£2.5 billion

Using this approach, it is estimated that the total cost to society of poor housing in England, Wales and Northern Ireland is some £20 billion per annum (Table 3.4). This suggests that the annual treatment costs to the NHS is around 7.7% of the societal costs of all poor housing in these countries.

BRE: The Housing Stock of the United Kingdom



Our Guide and how it is different from other guidance

4 Principles

Balance

Reality

People

Heritage

The Pebble Trust

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S E D A
Scottish Ecological Design Association

The Need for Balance:

- The current focus on energy efficiency creates ‘unintended consequences’:

- Energy Efficiency
- Comfort & Health
- Building Fabric

Balance

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Reality:

- Better Surveys
- Modelling vs Reality
- Construction Quality
- Moisture

Reality

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Engaging with People:

- Often the largest variable in building performance

- Better Controls
- Education
- Engagement

People

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Heritage Considerations:

- Drawing on the lessons of the conservation sector to improve the retrofit sector

- Different construction
- Maintenance
- Significance

Heritage

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Details & Specification:

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Works:

Maintenance
Airtightness
Space and Time

Roofs & Ceilings
Walls
Windows & Doors
Ground Floors

Heating
Ventilation
Lighting & Appliances

(Resources & Glossary)

Niddrie Road Case Study

Niddrie Road Case Study

- 8 x 1 bedroom flats
- All owned by Southside HA
- All void

- 3 Options for refurbishment:
    - Standard
    - ‘Whole House'
    - EnerPHit

- COP 26…

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Niddrie Road Case Study

- Heavily overshadowed by adjacent buildings and trees
- V small SE facing windows only
- Large amounts of NW facing windows
- Significant unavoidable thermal bridging

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Niddrie Road Case Study

- Complete overhaul internally (full strip out including all services
- Some urgent long-term maintenance (timber repair)
- EnerPHit energy performance + more holistic approach

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107 Niddrie Road Glasgow

Tenement EnerPHit Passivhaus Retrofit

1. Top up insulation up to 450mm thick

2. Lower area of slates removed to check for timber decay and ensure insulation wraps over wall head to meet EWI

3. Two smaller windows knocked into one larger window for more light and heat gain into living areas

4. New high performance triple glazed windows and doors

5. External wall insulation to rear and gable walls, extended below floors, into window reveals, all downpipes replaced

6. Mechanical ventilation with heat recovery unit in bathroom ceiling removes almost all outgoing heat keeping flats warm with lots of fresh air

7. Wastewater heat recovery from baths and showers

8. Internal wall insulation to front elevation, walls stripped back to stone, wood fibre insulation and lime plaster added

9. Street side stone wall repaired with stone repair and repointed using lime

10. First floor joists removed from wall to avoid decay, allowing for continuous insulation and airtightness

11. Layout altered for better space planning

12. Ground floor insulated along with careful airtightness measures

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Southside HOUSING ASSOCIATION

UK COLLABORATIVE CENTRE FOR HOUSING EVIDENCE

University of Strathclyde

Glasgow CITY COUNCIL

CCG

Niddrie Road Case Study - Masonry Repair

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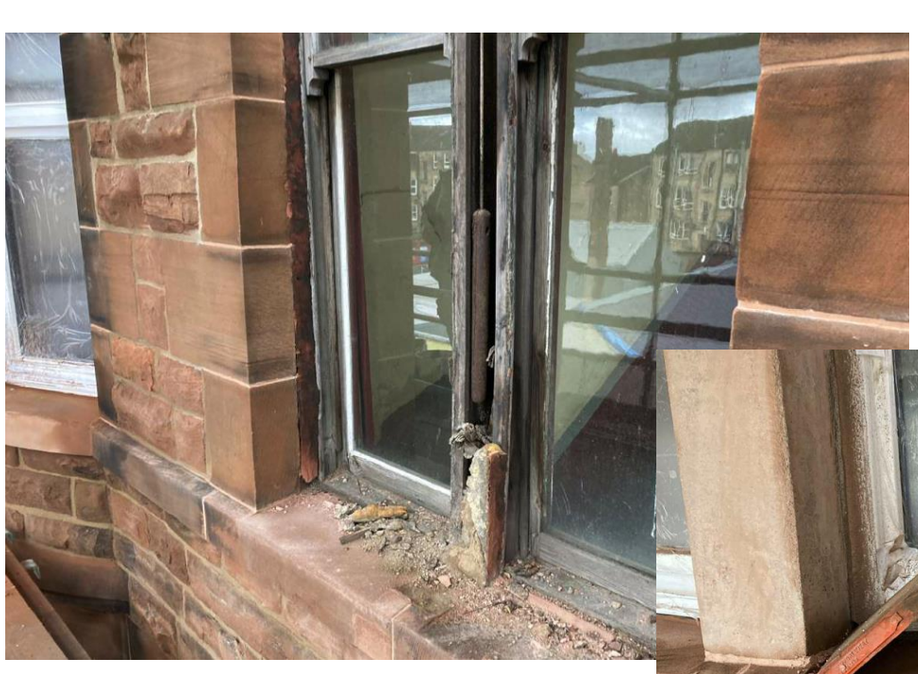
Niddrie Road Case Study - Masonry Repair

- DOFF cleaned
- Complete repointing in lime
- Stone replacement
- Lithomex repairs
- Keim painting of some areas



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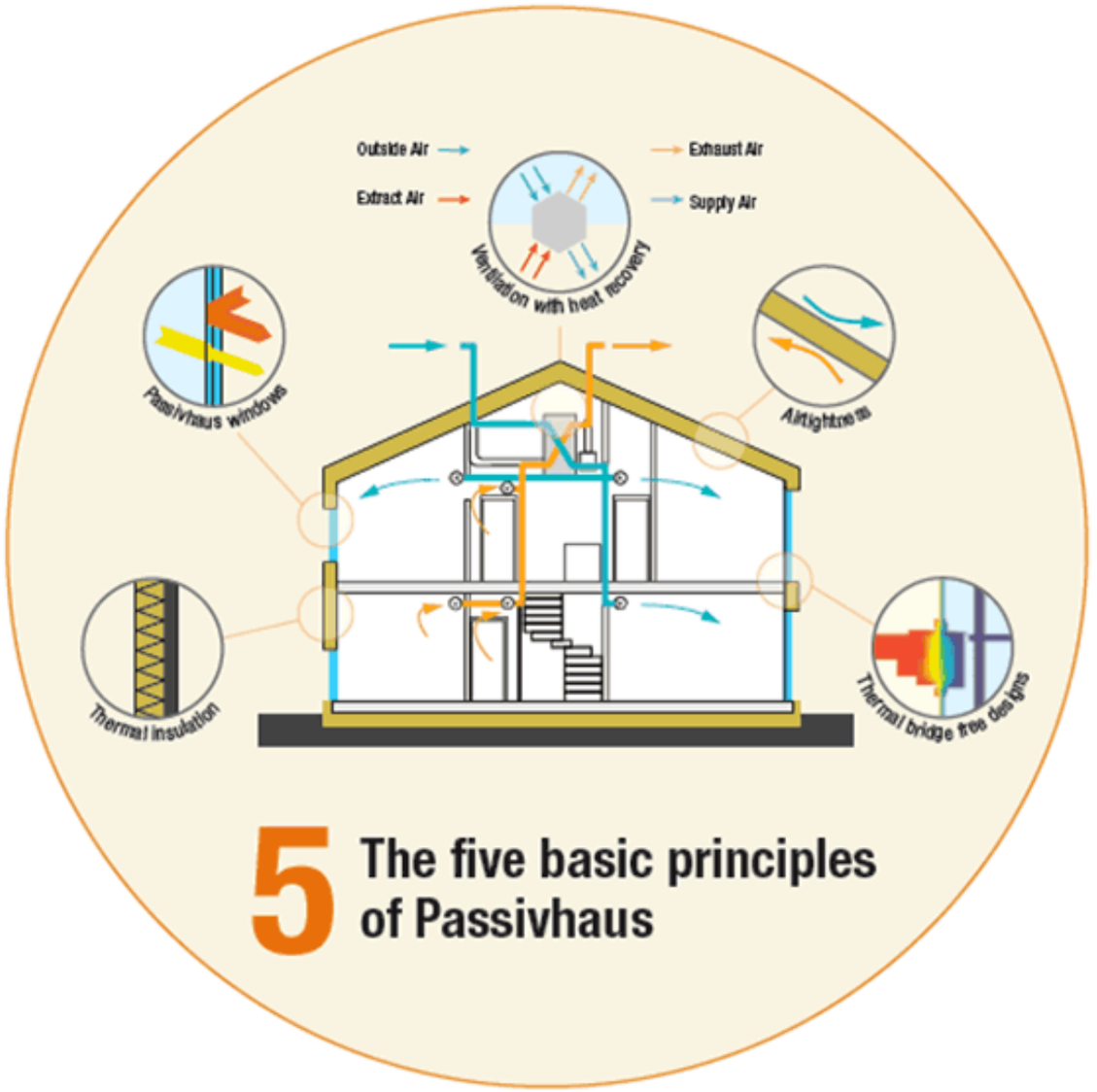
Niddrie Road Case Study - EnerPHit

Achieved by:

- Insulation (lots!)
- No thermal bridging
- Airtightness
- Triple Glazing
- MVHR



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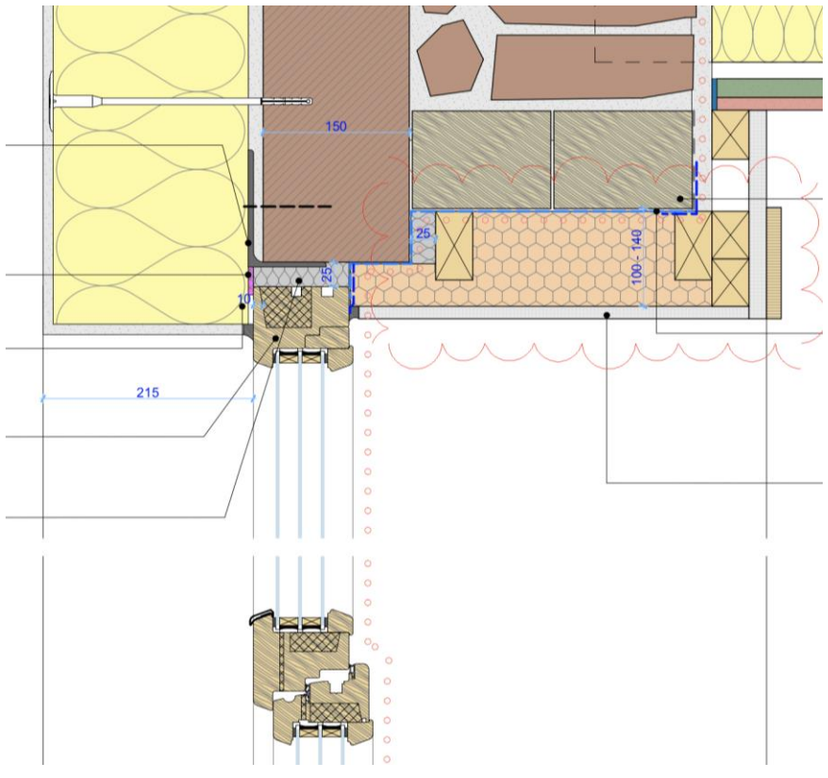
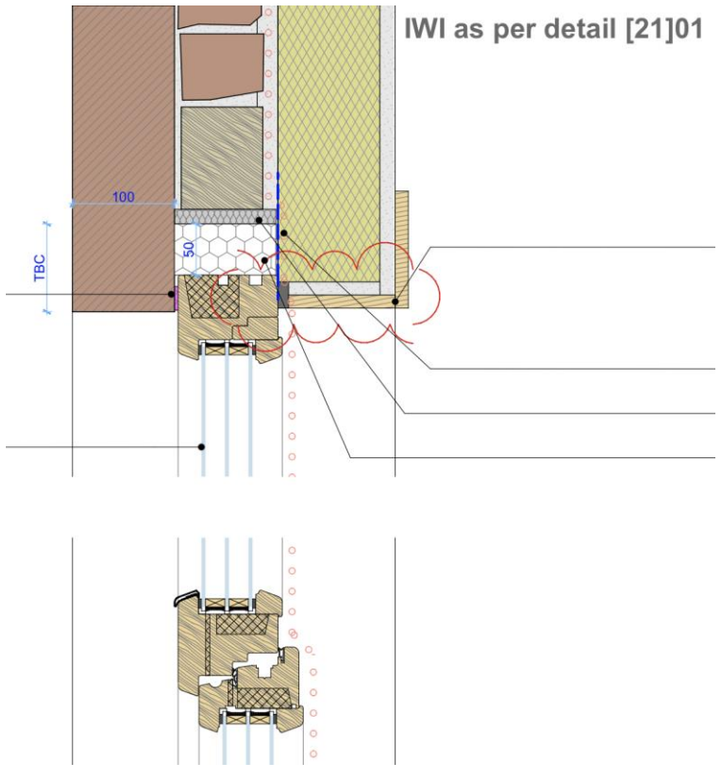
Niddrie Road Case Study - EWI + IWI

Niddrie Road Case Study - Airtightness + TG

- Airtightness
- Triple Glazing





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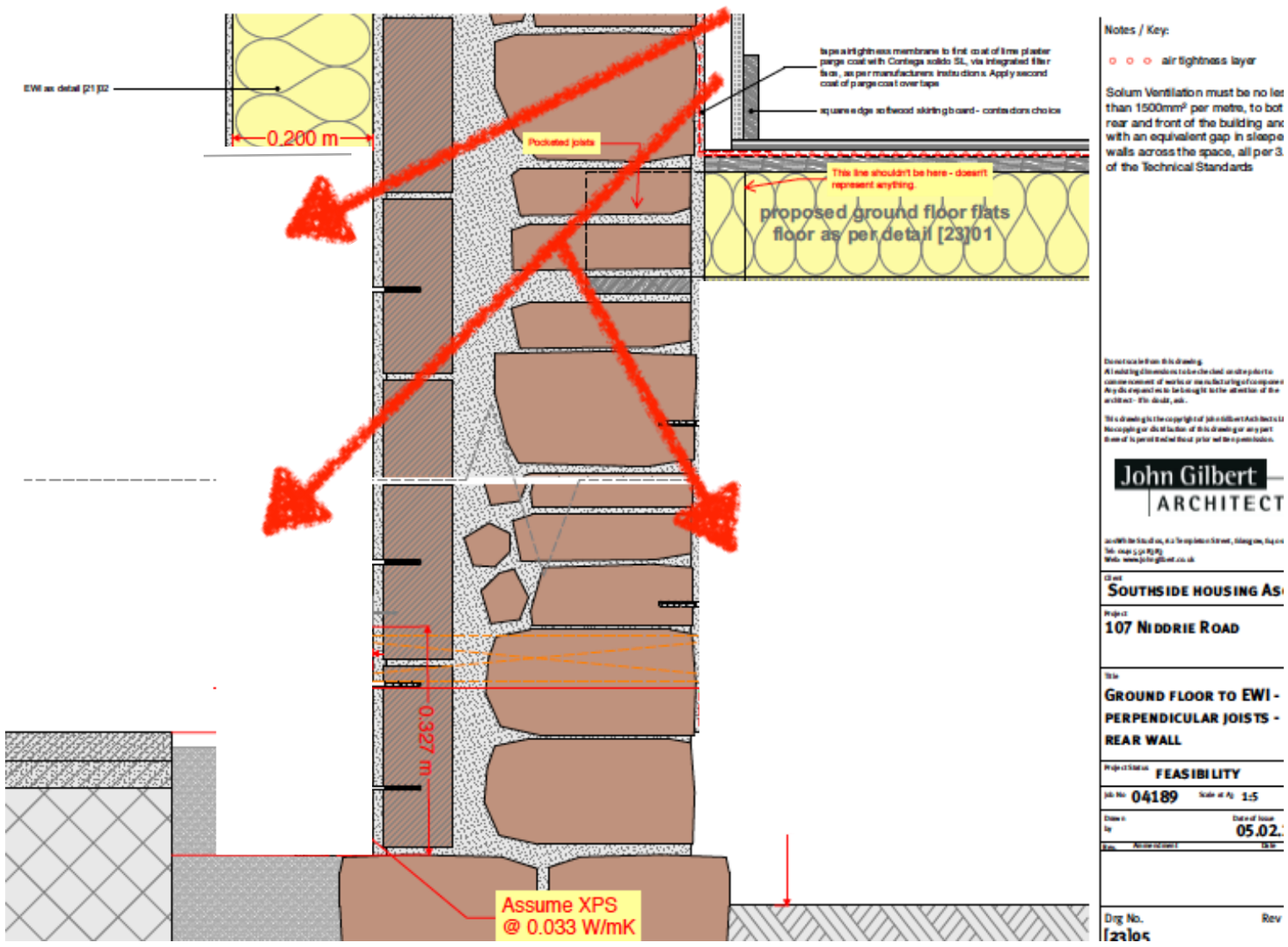
Niddrie Road Case Study - continuous insulation

- Thermal bridges….



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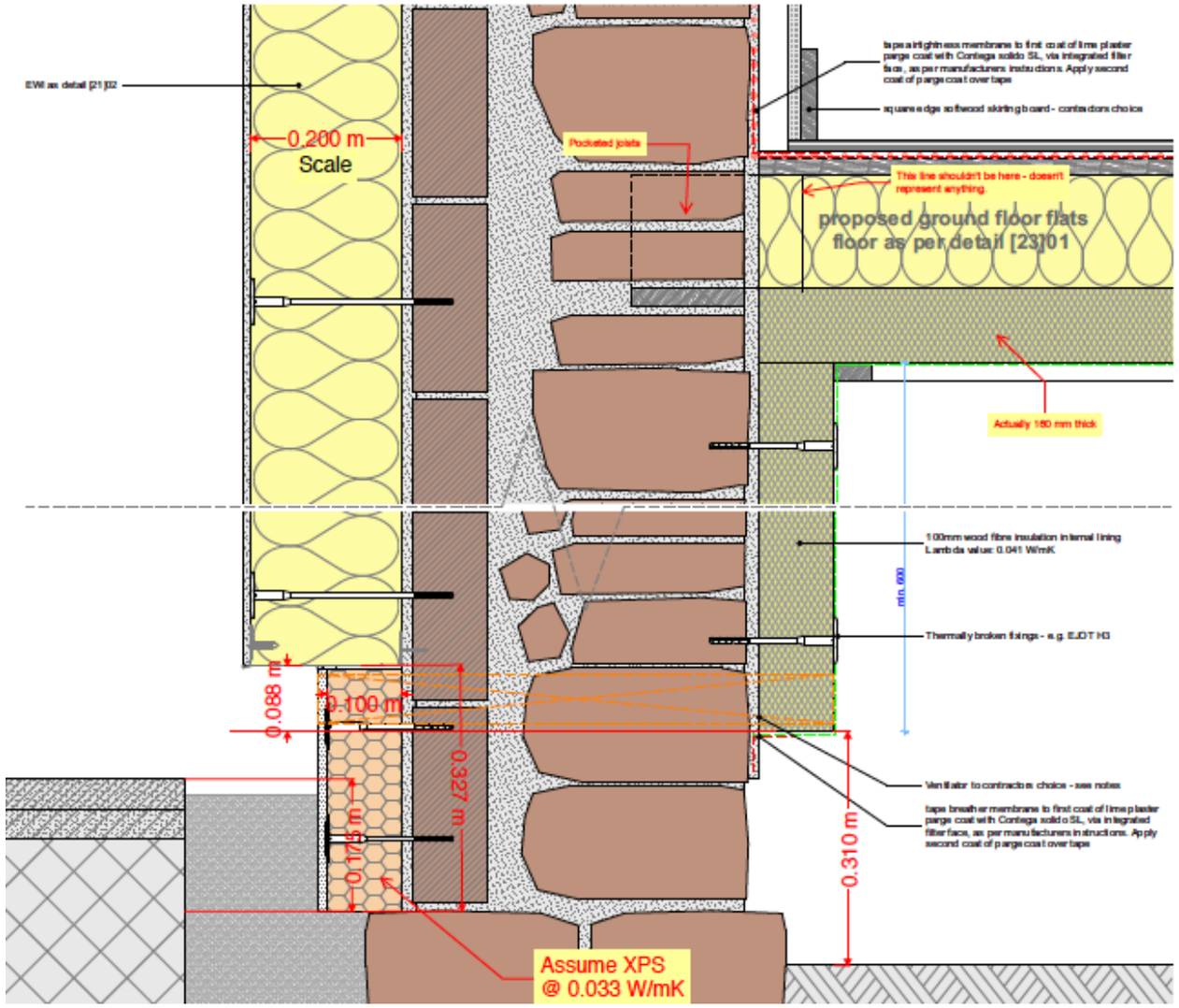
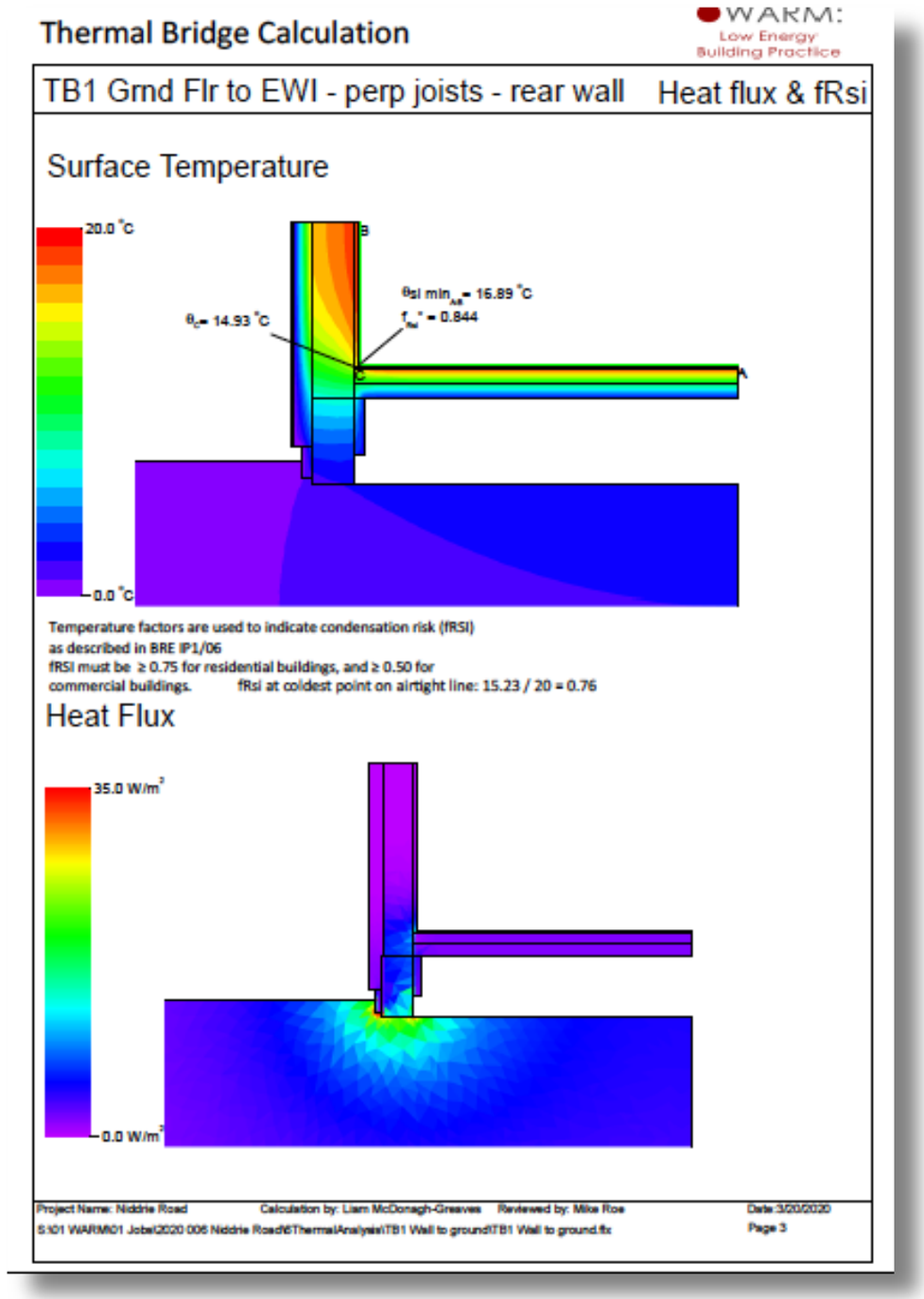
Niddrie Road Case Study - continuous insulation

- THERM calc to all TBs





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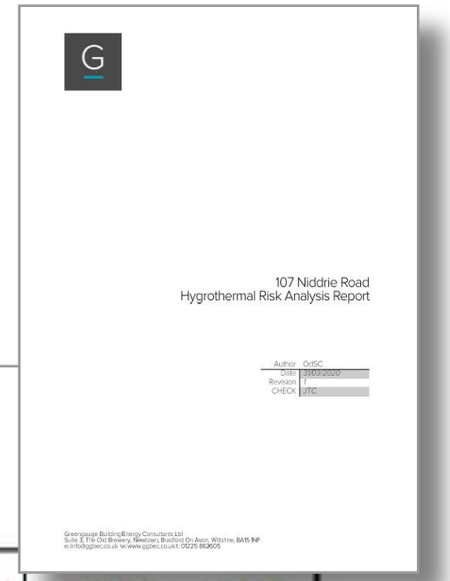
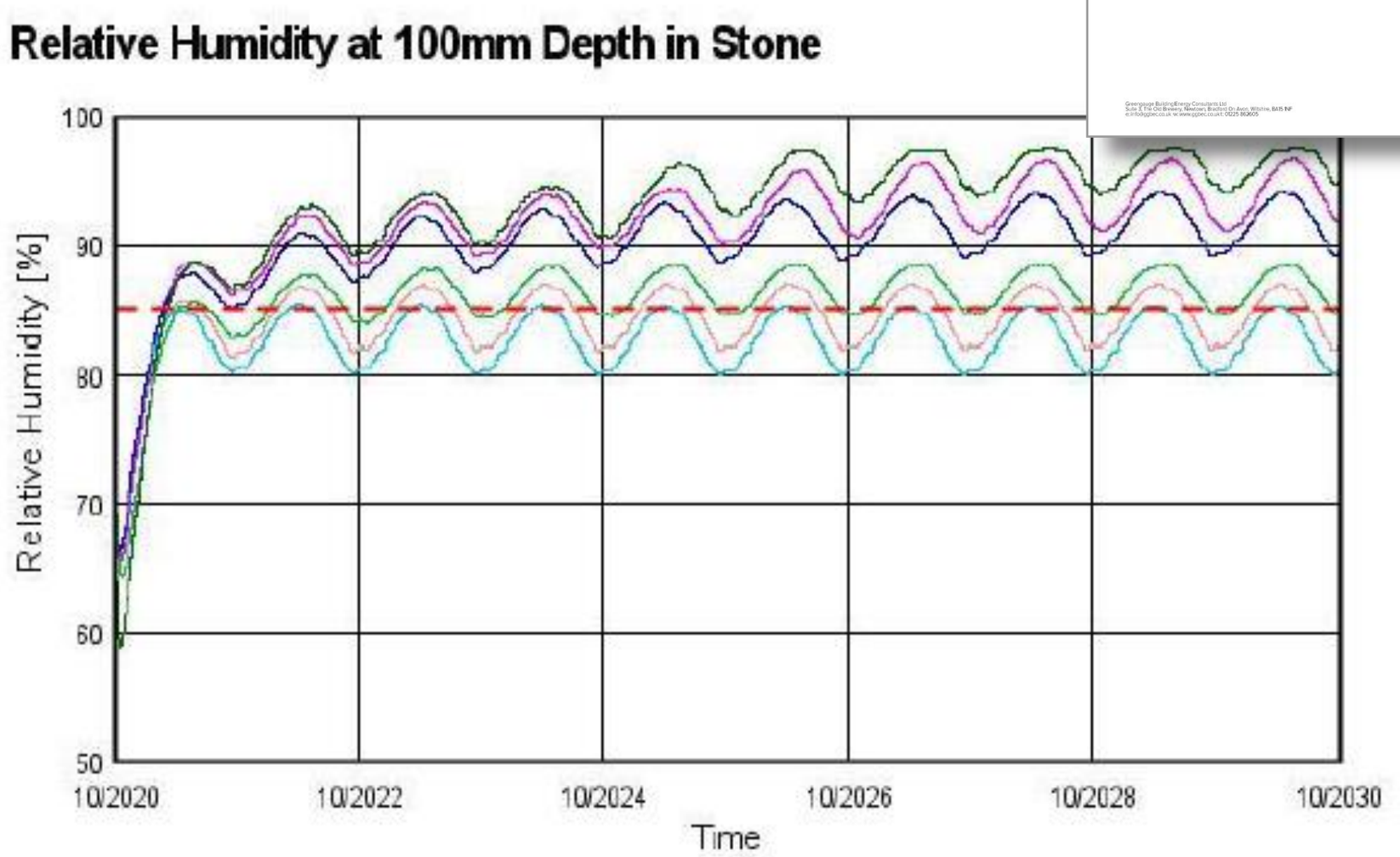
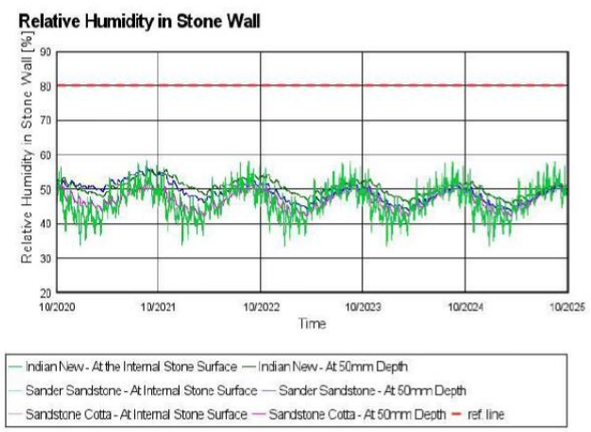
Niddrie Road Case Study - IWI



- Wall at EWI is OK
- IWI itself is OK
- Stone wall at IWI NOT OK, joist removal required
- Conservation vs. Energy efficiency





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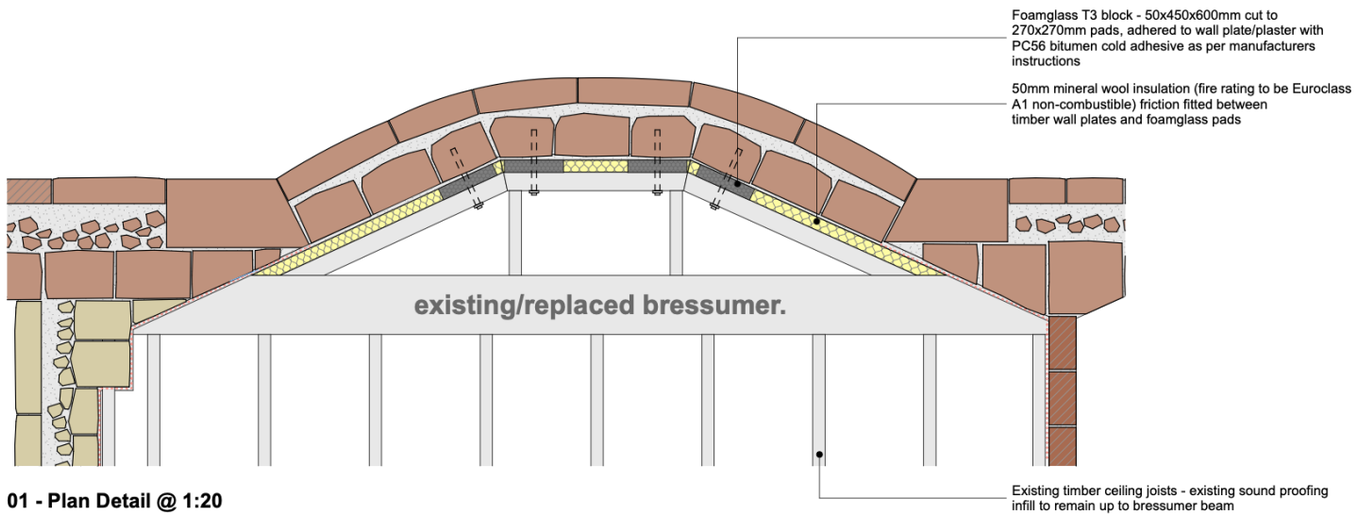
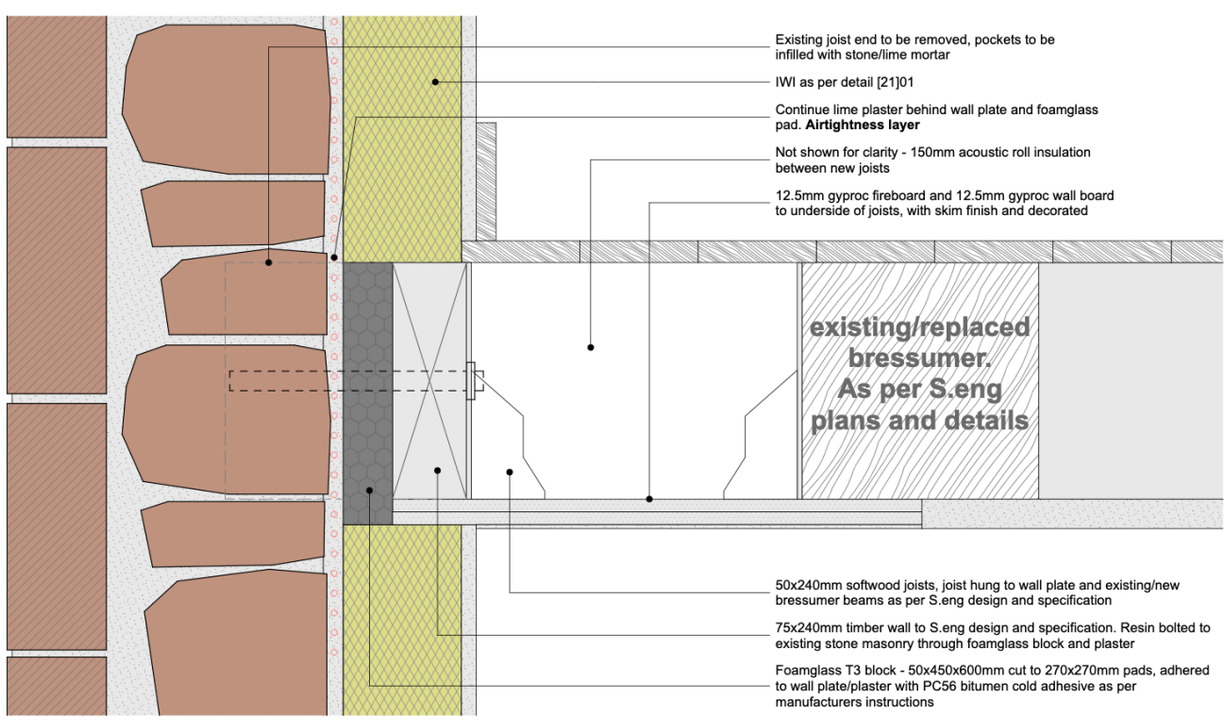
Niddrie Road Case Study - continuous insulation



01 - Plan Detail @ 1:20



02 - Section Detail - Joist End Removal @ 1:5

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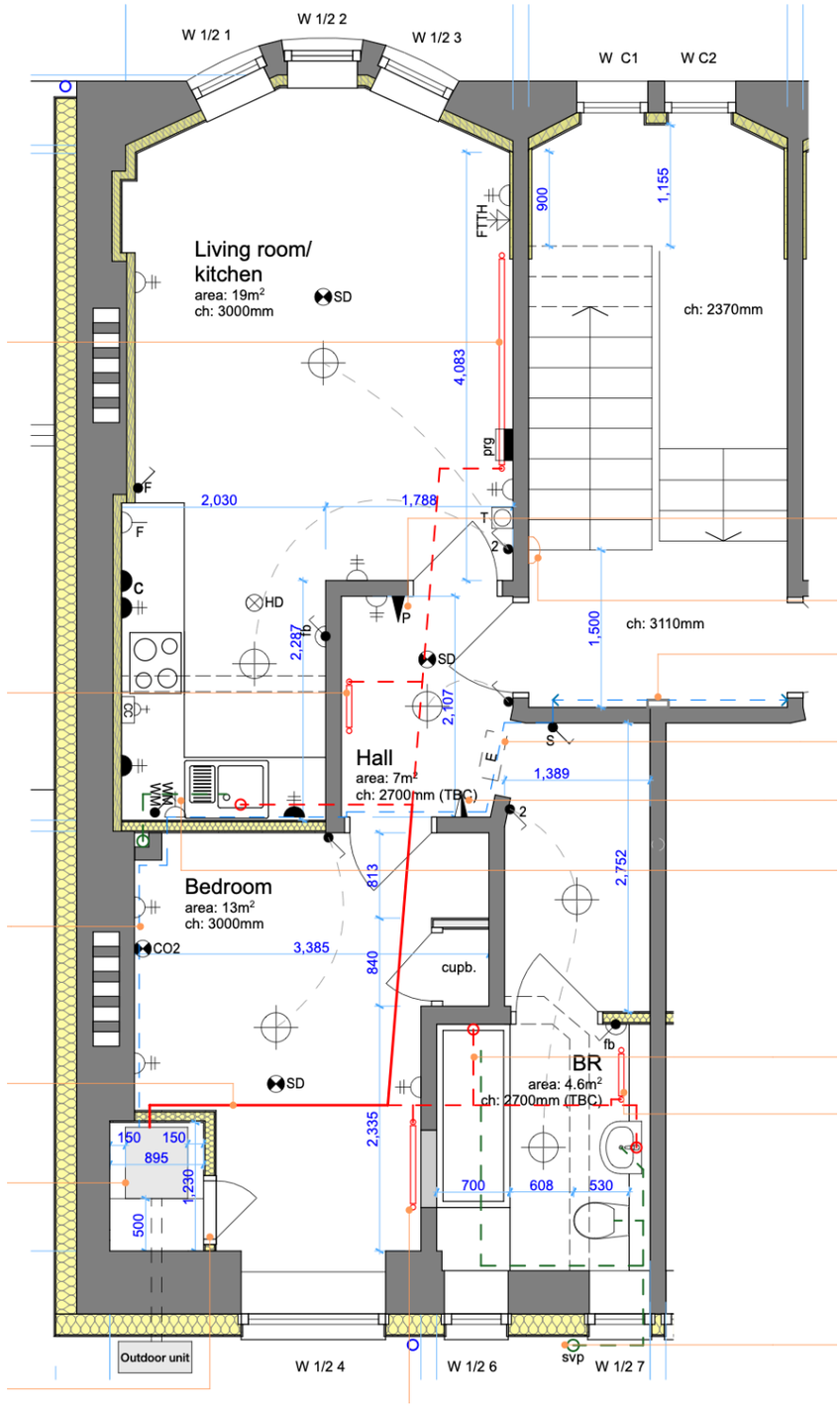
Niddrie Road Case Study - Heating

- Lower four flats have an Air Source Heat Pump (ASHP) installed
- Upper four flats have new energy efficient gas boilers
- Monitoring to compare and contrast technologies



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Niddrie Road Case Study

EnerPHit

- EnerPHit approach will deliver real energy savings. Monthly heating bills reduced by approx 90% - zero fuel poverty and *cheaper than a new property*

- Warm, comfortable, excellent air quality, lots of warm, fresh air, natural materials, zero risk of condensation and mould, quiet

- The flats will be monitored, so we will discover the truth…!

John Gilbert
ARCHITECTS

107 Niddrie Road
EnerPHit
Tenement Retrofit

Thank you!

Chris Morgan
Director / Architect
John Gilbert Architects

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