



AECB
the sustainable building association

2011 Annual Conference

**Retrofit: Moving
in and Moving on**

16-17 September 2011

Jubilee Campus, University of Nottingham

Earby EcoHaus Refurbishment by Peter Wilkinson of EcoDesign

Organised by:

AECB
the sustainable building association

In association with:

 **The University of
Nottingham**

Department of Architecture
and Built Environment

Earby EcoHaus - refurbishment



Project details:

- **Site address;** 2 Kenilworth Drive, Earby, Lancashire.
- **Client;** Peter & Linda Wilkinson.
- **Design team;** EcoDesign, Earby, Lancashire.
- **Contractor;** Dales Contracts Ltd. Earby, Lancashire.
- **Local Authority;** Borough of Pendle, Nelson.
- **Property;** 67m² 3 bedroom end terrace. Spooner system timber framed, brick clad Local Authority built in the 1950s.

Earby EcoHaus – refurbishment



Project Aims;

1. Refurbish the run down property for letting purposes as a long term investment.
2. Reduce energy requirements to a minimum *within the equity of the property's current market value.*
3. Equity & working budget; £45,000.

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Programme:

- Acquired April 2010.
- Commenced June 2010.
- Completion July 2011.
- Occupied July 2011.

NB – Project used as an infill for Dales Contracts Ltd.



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Existing external wall:

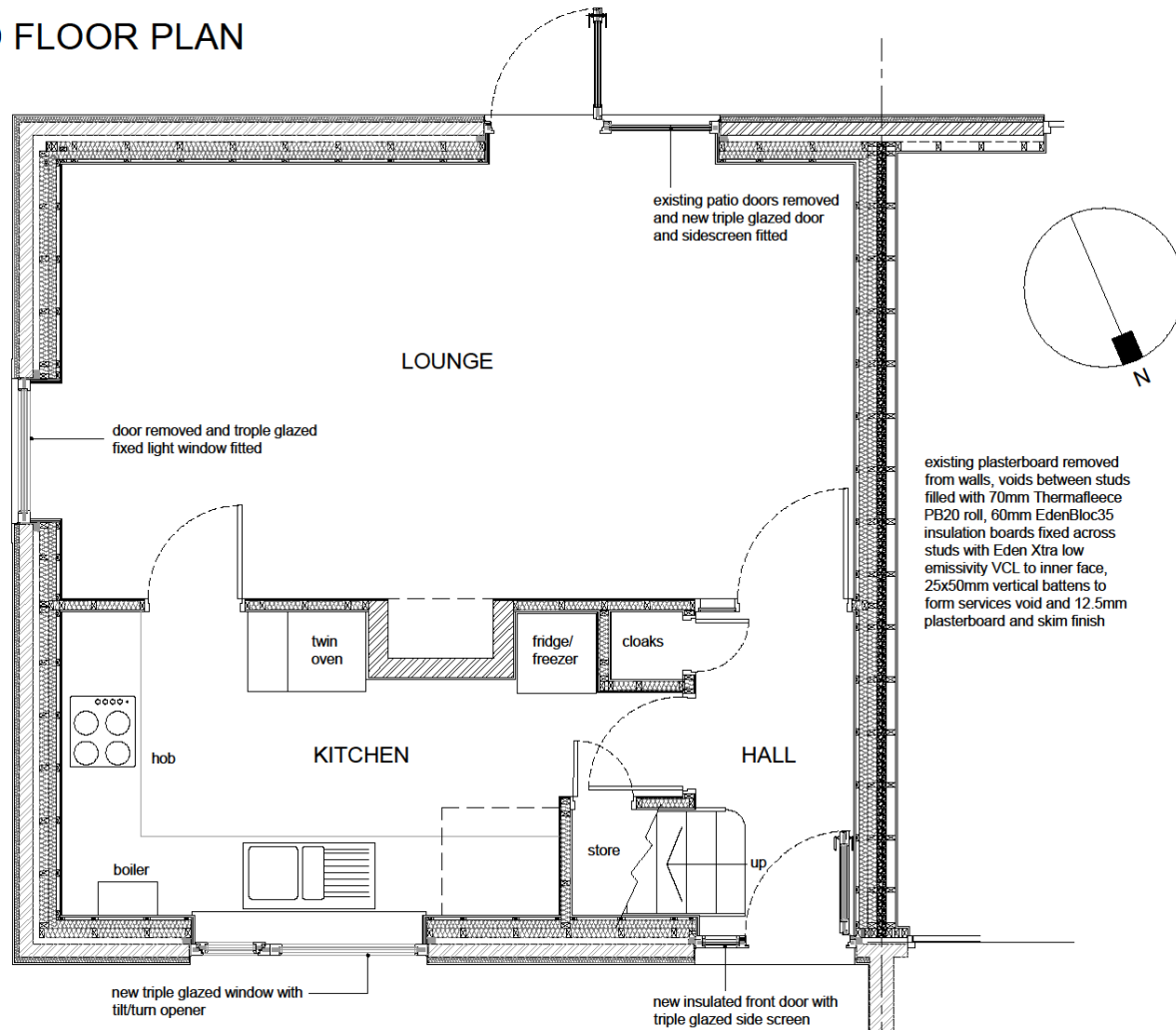
- Render & dash finish on 40mm EPS insulation on brick outer leaf.
- 50mm partially ventilated clear cavity.
- Bituminous sarking felt to cavity face of 70mm timber stud.
- Plasterb'd & skim finish.



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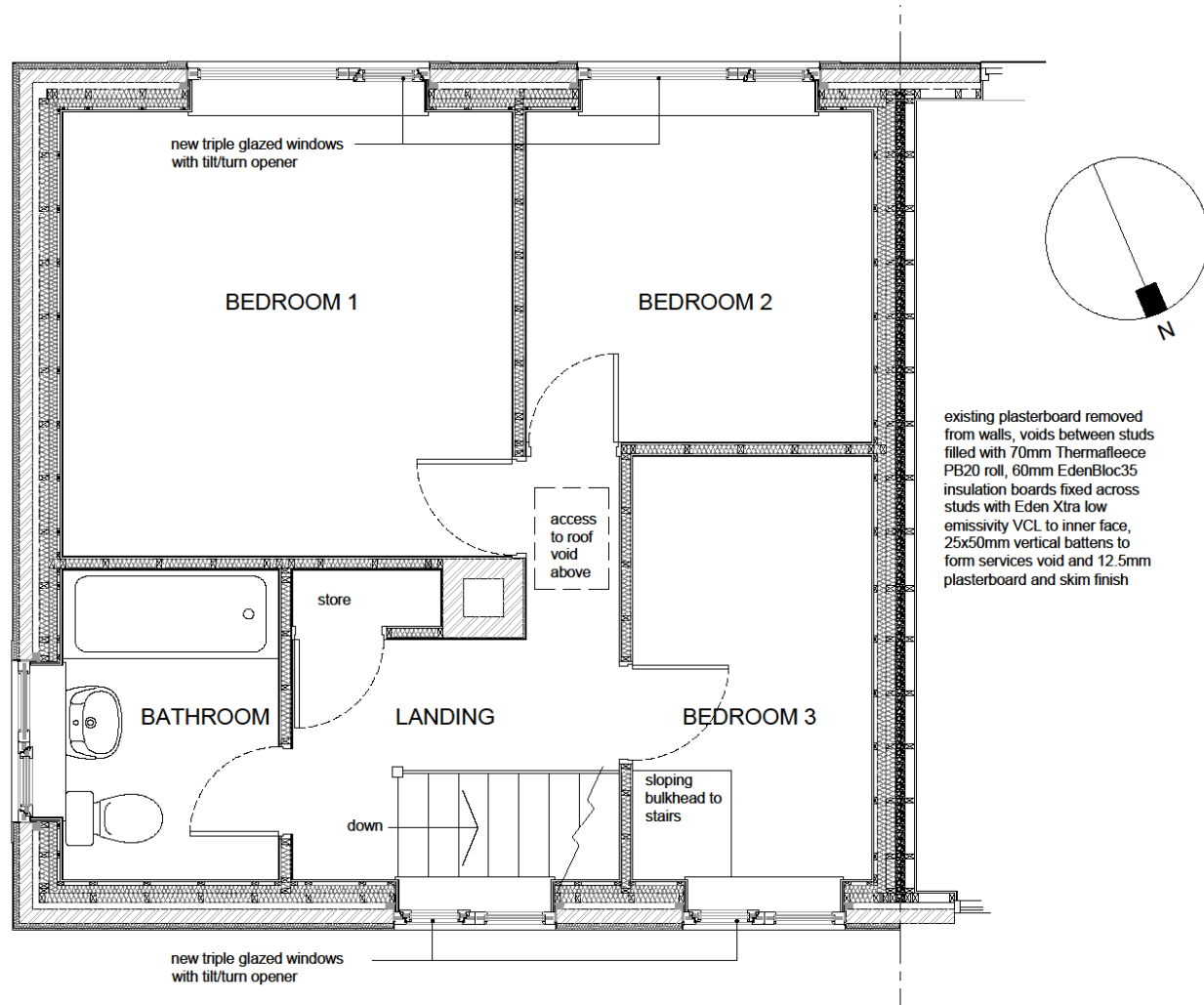
GROUND FLOOR PLAN



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FIRST FLOOR PLAN



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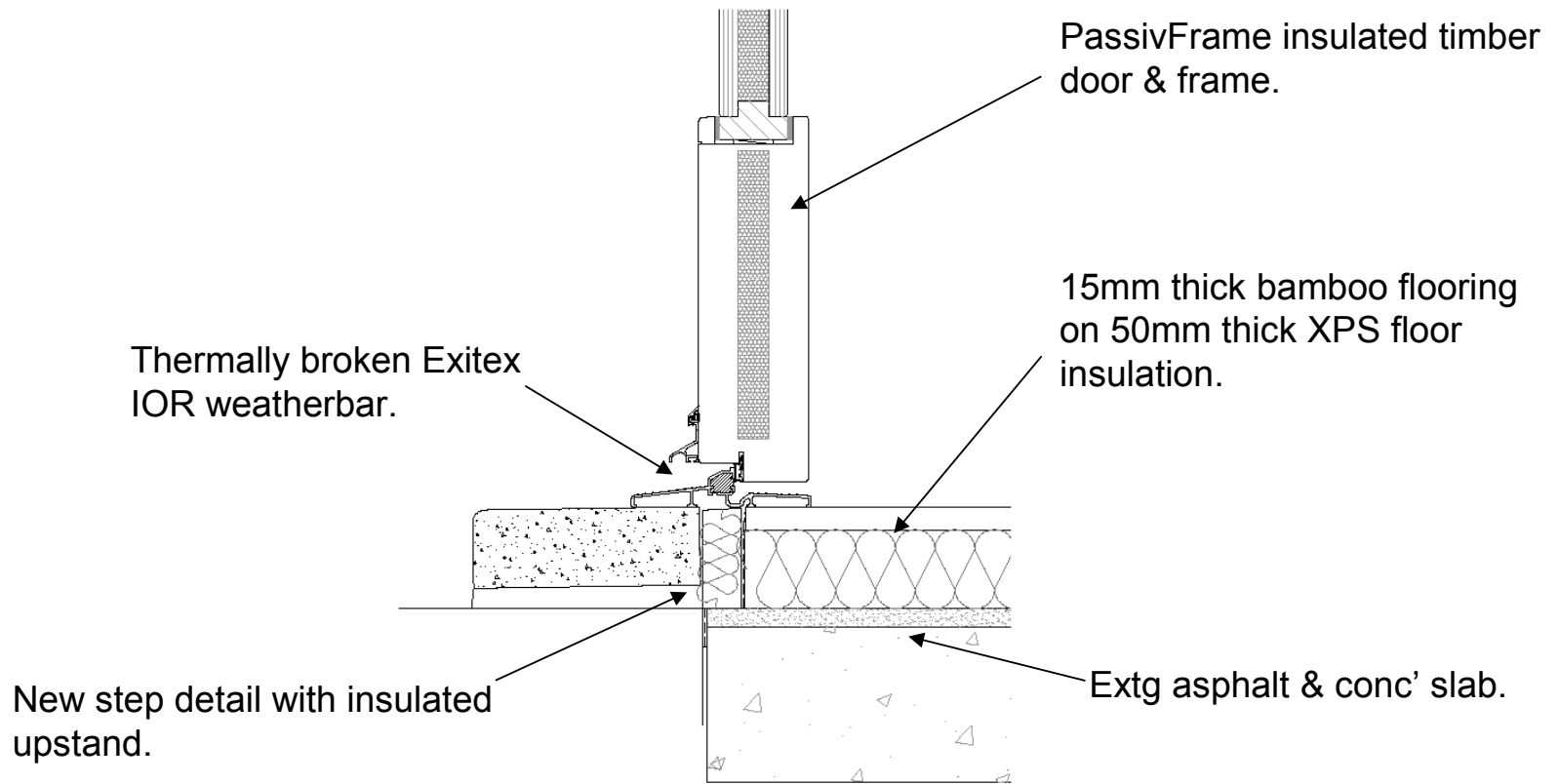
Original metal cavity closer sealed with expanding foam to make air tight.



Original air grate filled with insulation & sealed with VCL & made air tight.

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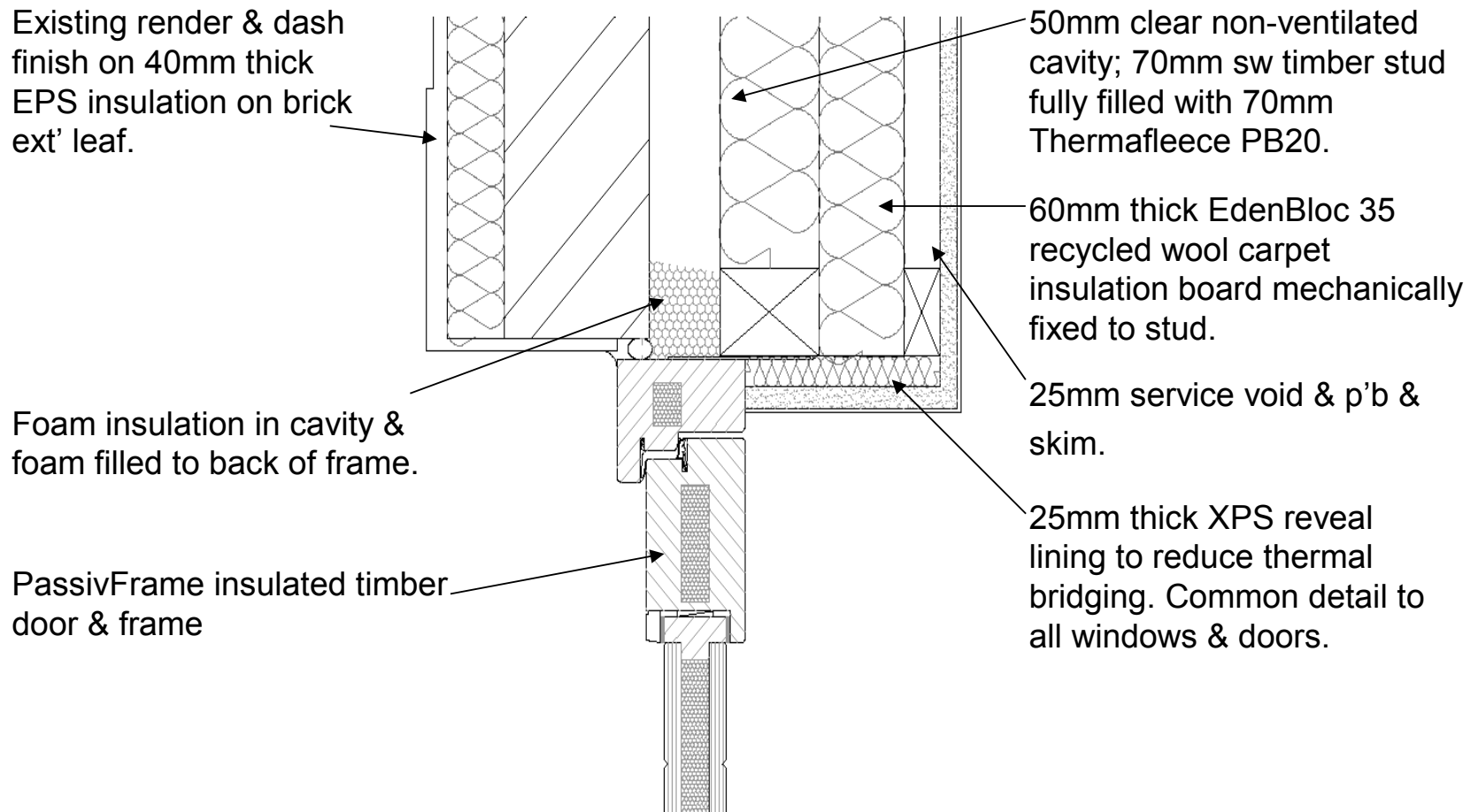
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External Door Threshold Detail

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Head Detail – door & window

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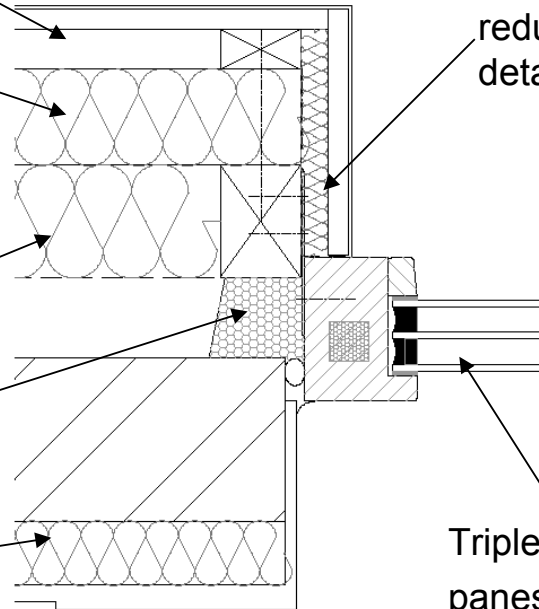
25mm service void & p'b & skim.

60mm thick EdenBloc 35 recycled wool carpet insulation board mechanically fixed to stud.

50mm clear non-ventilated cavity; 70mm sw timber stud fully filled with 70mm Thermafleece PB20.

Foam insulation in cavity & foam filled to back of frame.

Existing render & dash finish on 40mm thick EPS insulation on brick ext' leaf.



25mm thick XPS reveal lining to reduce thermal bridging. Common detail to all windows & doors.

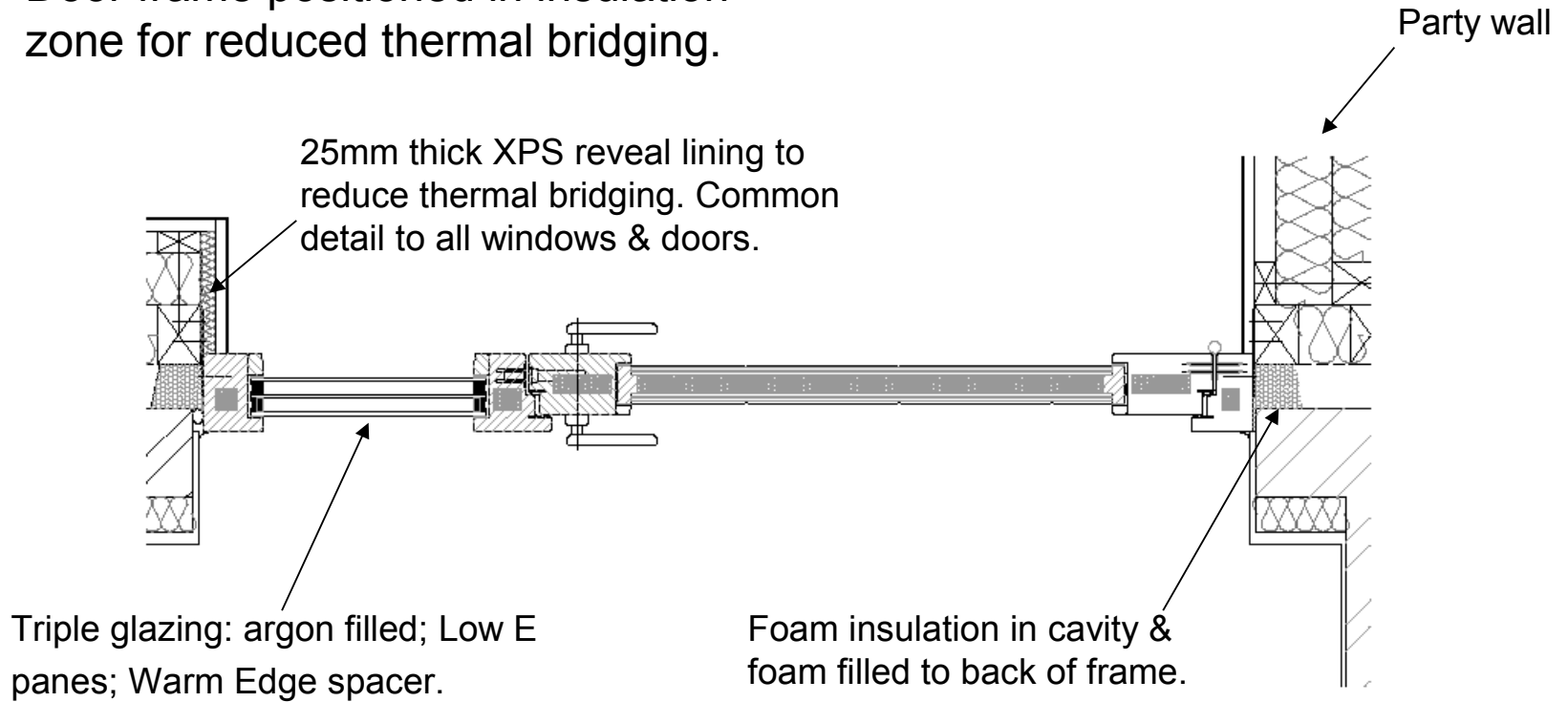
Triple glazing: argon filled; Low E panes; Warm Edge spacer.

Jamb Detail – door & window

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Door frame positioned in insulation zone for reduced thermal bridging.



Door Detail - plan

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Existing structural elements	Existing U value (W/m2K)	Refurbished structural elements	Refurbished U value (W/m2K)
Ground floor: ground bearing conc' slab (100mm)	0.65	Ground floor: 60% reduction in heat loss ground bearing conc' slab (100mm) 50mm XPS insulation 15mm bamboo flooring	0.26
External walls: render & dash finish 102mm brick outer leaf 50mm clear ventilated cavity!!! bituminous sarking felt 70mm SW stud 15mm plasterboard & skim finish	1.35	External walls: 87% reduction in heat loss existing wall structure but vented cavity sealed 70mm Thermafleecce PB20 insulation between extg stud 80mm thick EdenBloc recycled wool carpet rigid insulation b'd Second Natures Eden Xtra reflective air-tight vapour barrier - joints taped & perimeters sealed & taped 25mm service void - 25x50 SW battens 12.5mm plasterboard & skim finish	0.17
Roof: flat ceilings 12.5mm plasterboard & skim 38x70 ceiling joists & 400mm cts 50mm glass fibre insulation ventilated roof void	0.74	Roof: 90% reduction in heat loss flat ceilings 12.5mm plasterboard & skim air-tight barrier - taped & edges sealed 47x97 ceiling joists & 400mm cts 800mm glass fibre insulation (100mm laid between joists) ventilated roof void	0.07
Windows: plastic double glazed & draught stripped. NB some sashes distorted-draught stripping ineffective	2.80	Windows: 68% reduction in heat loss PassivFrame insulated FSC SW laminated frames, double sealed, triple glazed with Warm Edge spacer, argon filled & 2nr.panes Low E soft	0.90
External Doors: plastic panelled/double glazed panels & draught stripped. NB draught stripping ineffective	2.80	External Door: 71% reduction in heat loss PassivFrame insulated FSC SW laminated frames & insulated composite panels (12mm ext ply; 25mm XPS; 12mm ext ply)	0.80
Ventilation: Mechanical extractor fans to bathroom & kitchen 30ltrs/min.		Ventilation: 90% reduction in heat loss Mechanical Ventilation & Heat Recovery system Vent Axis Sentinel Kinetic BH (including summer bypass)	

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£/m2 rates based on total floor area		67.50 m2		Materials		Site Labour		Total Costs	
		€	€/m2	€	€/m2	€	€/m2	€	€/m2
1	Demolition/stripping out	850.00	9.63	2,690.00	39.85	3,340.00	49.48		
2	Remedial Works to existing structure	130.00	1.93	780.00	11.56	910.00	13.48		
3	Ext' wall insulation & air tightness: Second Nature products PB 20; EdenBloc; vapour/air tight barrier; service void; p'b linings	4,107.00	60.84	3,034.00	44.95	7,141.00	105.79		
4	Internal joinery: mineral wool insulation & plasterb'd & skim to partitions	1,032.00	15.29	4,644.00	68.80	5,676.00	84.09		
5	Ground floor insulation: (50mm XPS) & bamboo flooring	430.00	6.37	1,035.00	15.33	1,465.00	21.70		
6	First floor & ceilings: insulation (mineral wool); bamboo flooring all partitions & EdenBloc insulation to party wall;skirt's & arch's	350.00	5.19	1,250.00	18.52	1,600.00	23.70		
7	First floor ceilings: air tightness; insulation (mineral wool)	1,690.00	25.04	1,123.00	16.64	2,813.00	41.67		
8	New staircase & balustrade: exposed FSC redwood	432.00	6.40	1,500.00	22.22	1,932.00	28.62		
9	Tilt-n-turn windows & ext' doors: insulated PassivFrame; FSC Triple glazed; argon filled; Low E; SuperSpacer; pre-finished	9,466.00	140.24	1,073.00	15.90	10,539.00	156.13		
10	Plumbing & heating installation: extg 18kw combi boiler reused new pipework & reduced size radiators & TRVs	1,106.00	16.39	780.00	11.56	1,886.00	27.94		
11	Sanitary ware: 5ltr/min' shower, new bath & screen only; extg WC & WHB reused	506.00	7.50	243.00	3.60	749.00	11.10		
12	Electrical installation: Internal & external low eevrgy light fittings & lamps extra (£778)	769.00	11.39	1,020.00	15.11	1,789.00	26.50		
13	MVHR;commissioning-Vent Axis Sentinel Kinetic BH Roof void mounted unit	2,319.00	34.36	600.00	8.89	2,919.00	43.24		
14	kitchen installation: not including appliances (note: recirculation hood used)	2,293.00	33.97	1,211.00	17.94	3,504.00	51.91		
15	Decorations: natural oil paints (Aglaia)	1,595.00	23.63	4,032.00	59.73	5,627.00	83.36		
Total Costs:		£26,875.00	£398.15	£25,015.00	£370.59	£51,890.00	£768.74		

Earby EcoHaus – refurbishment



Summary & lessons learnt:

1. As contractors, Dales Contracts had learnt many lessons on air-tightness on previous schemes. We applied that knowledge to this particular house construction. New obstacles raised new challenges, which took additional time to resolve.
2. The project came £6,890 over budget (13%).
3. We did not carry out an air-tightness test. This may be carried out at a later date.
4. Elemental U values have been dramatically reduced between 60% & 90%.
5. Tenants have been in since beginning of August 2011 & reported that the property is very comfortable, no heating has been used as yet & the air quality is good & fresh. No issues with MVHR noise when on low.
6. The property will have its energy monitored over the next 2 years.
7. We are proposing to have a number of open days for local groups, Local Authorities & the AECB Lancashire/Yorkshire groups to attend.
8. This project allowed us to achieve a great deal of improvements due to the financial equity in the property & a desire to maximise the properties potential.