

3 Admirals Hard Retrofit

Warmhomes



UK PASSIVHAUS AWARDS 2015
07 July – Residence of the Austrian Ambassador

UK PASSIVHAUS AWARDS 2015
RETROFIT

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WARM:
Low Energy
Building Practice

PROJECT OVERVIEW

Admirals Hard

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Location: Plymouth, UK

Building type: Shop and Office refurbishment

TFA: 80.9 m²

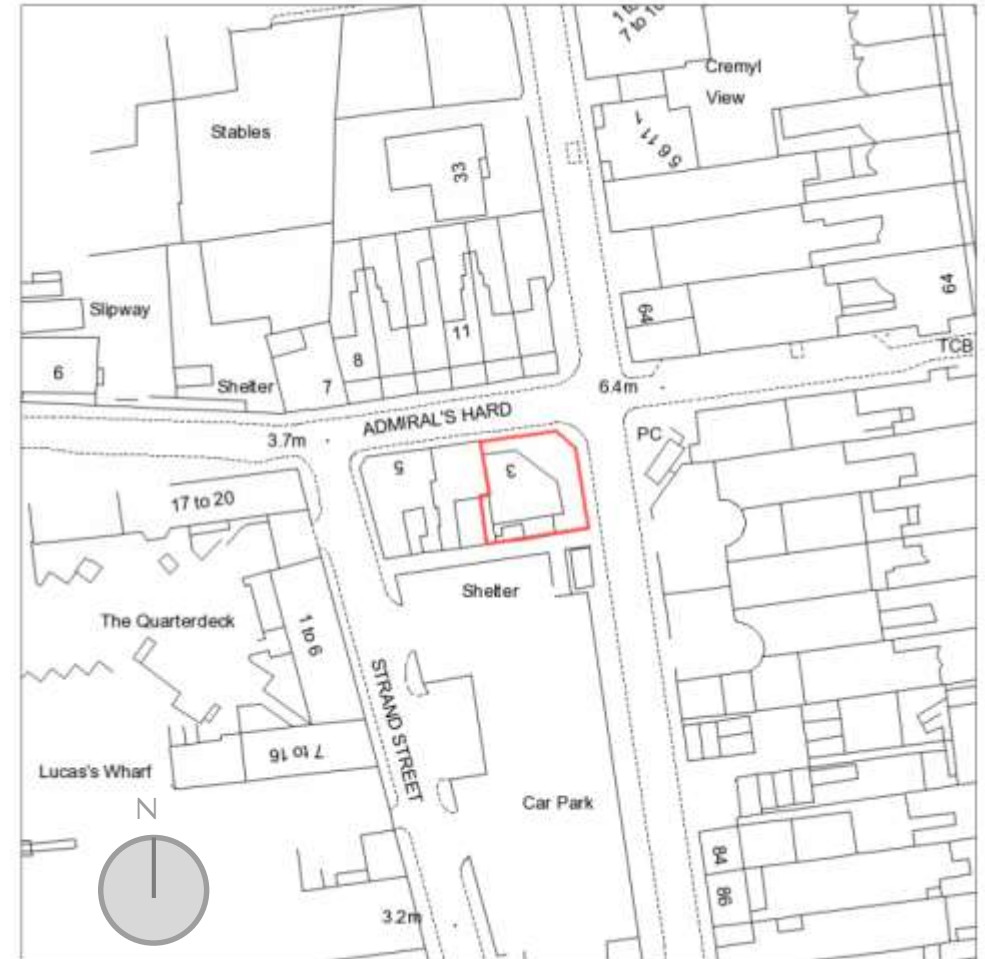
Construction type: Filled cavity with external insulation.

Completion date: August 2013

Occupancy: Occupied since August 2013

Budget: £1335/m² inc balcony

Key team: WARM: Low Energy Building Practice



DESIGN PHILOSOPHY

Situated on the Stonehouse peninsula, by the banks of the River Tamar,

Number 3 Admirals Hard was built in the 1960s and comprises a shop on the ground floor and WARM's office, originally a flat, on the first floor. The extensive retrofit works included external wall insulation, cavity wall fill, floor insulation (between the office and the shop), roof insulation at rafter level, high levels of air tightness and high-performance triple-glazed windows, as well as a self-balancing MVHR system.

The first floor is EnerPHit certified. The shop has triple glazed windows and external insulation, but requires floor insulation and ventilation which will be installed at the next break in the lease.

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AESTHETICS



The original shop blinds were refurbished, both on the shop front and on the balcony to provide summer shading and an appropriate aesthetic. Attaching these to the building through the 250mm of insulation required a very bespoke solution.



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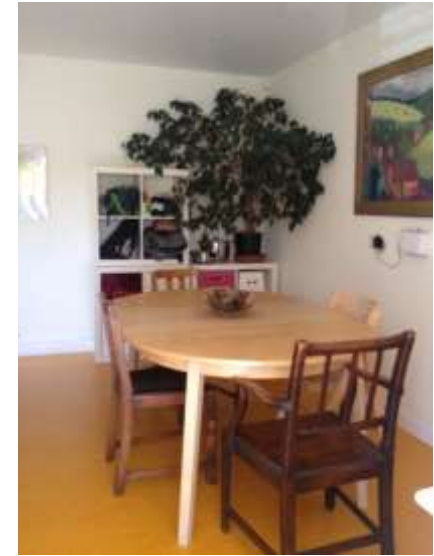


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ENERGY PERFORMANCE

Primary Energy Demand:
115 kWh/m².yr

HEATING DEMAND
WELL BELOW
15 KWH/M²

AIR PRESSURE RESULTS:
1.0 ACH@50PA

HEATING/COOLING LOAD:
16 KWH/M².YR

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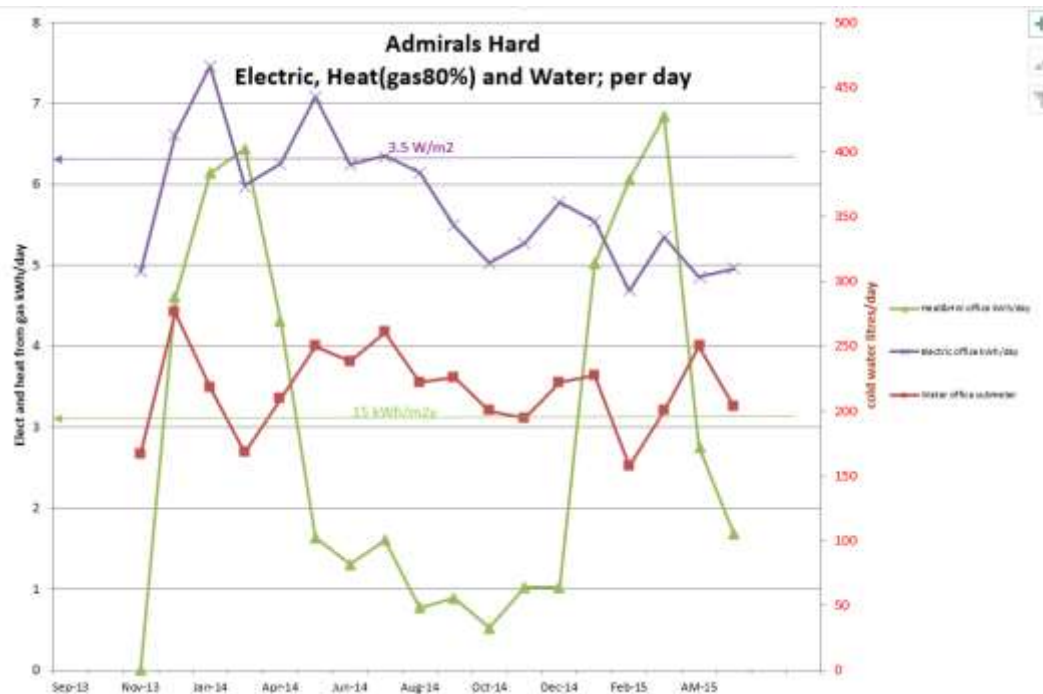
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Predicted running costs for heating: £0.40 /m²/a

Energy Consumption data:

		Water	Gas	Electric
		office	sub office	office
meter no:				
Units	Data label	m3	m3	kWh
date		reading	reading	reading
07/09/2013	Sep-13	345	13524	460
01/10/2013	Oct-13	349	13524	578
16/11/2013	Nov-13	361.7	13547	882
19/12/2013	Dec-13	368.9	13569	1128
07/02/2014	Jan-14	377.3	13604	1427
11/03/2014	Feb-14	384	13619	1627
08/04/2014	Apr-14	391	13624	1825
20/05/2014	May-14	401	13630	2087
12/06/2014	Jun-14	407	13634	2233
18/07/2014	Jul-14	415	13637	2454
18/08/2014	Aug-14	422	13640	2624
22/09/2014	Sep-14	429	13642	2800
28/10/2014	Oct-14	436	13646	2990
24/11/2014	Nov-14	442	13649	3146
16/12/2014	Dec-14	447	13661	3268
23/01/2015	Jan-15	453	13686	3446
27/02/2015	Feb-15	460	13712	3633
19/03/2015	Mar-15	465	13718	3730
07/05/2015	AM-15	475	13727	3973



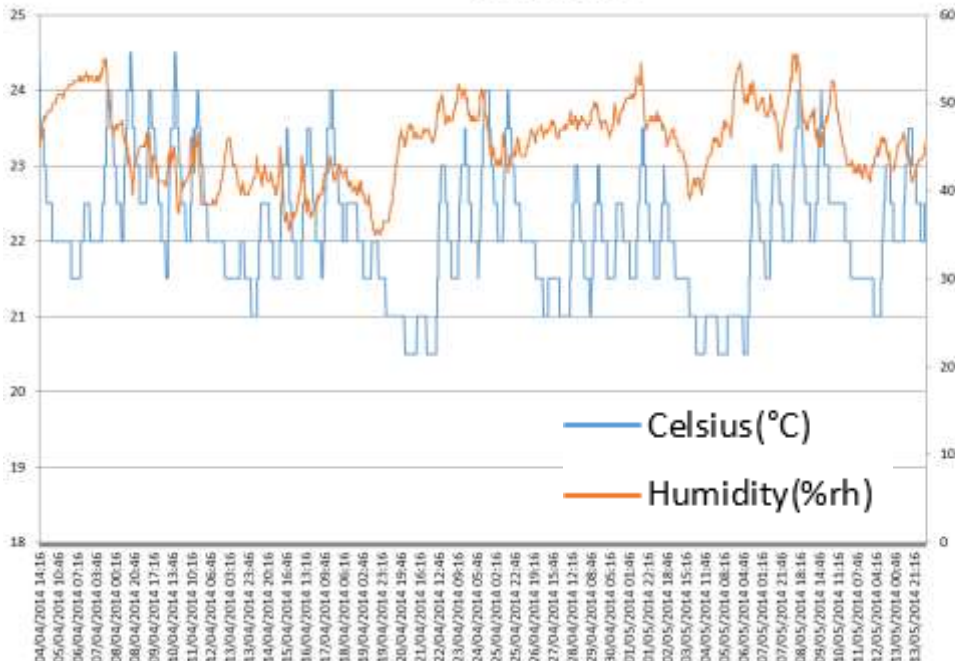


OCCUPANT QUOTE:

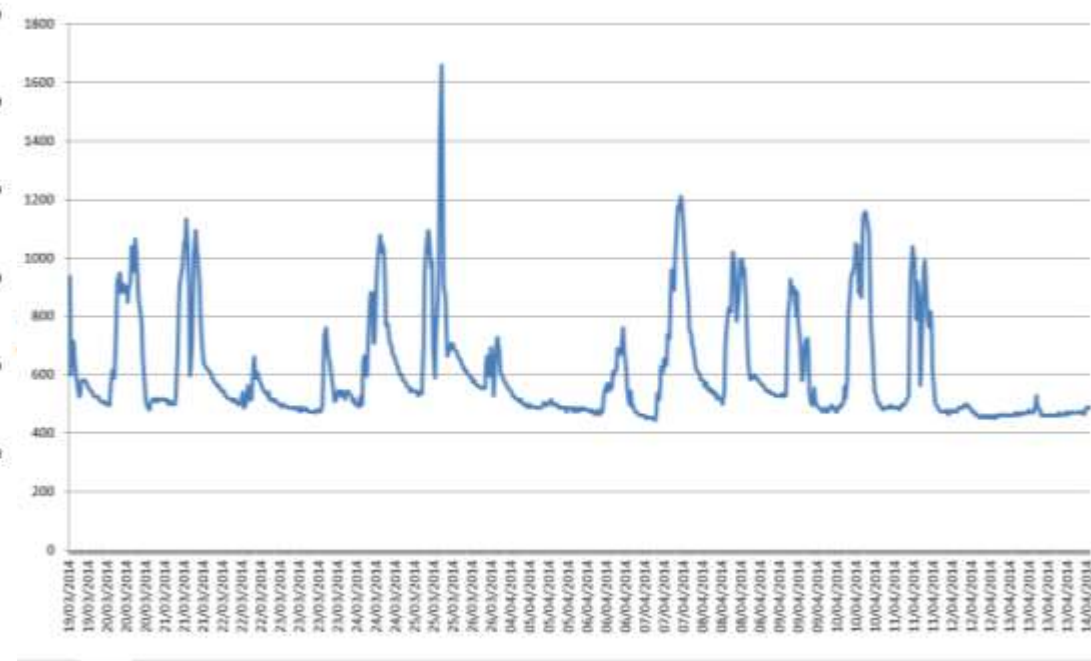
Overall the project has been a fantastic success – a year on there is no doubt that the quality of the space has really improved our output. I wasn't sure before but now strongly believe Passivhaus is a fantastic standard for offices, not because of the low heat input but the air quality, thermal stability throughout the year and the real surprise: how little external noise there is. Sally Godber, WARM.

INTERNAL ENVIRONMENT DATA:

Admiral's Hard



4-20 NH CO2



CONSTRUCTION APPROACH

Hallway Floor

The pre-existing concrete slab was overlaid with phenolic foam insulation



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The WARM team undertook all the design work and all of us spent time on site working closely with the builders – very skilled carpenters – to ensure they understood everything necessary to achieve the target. The builders were paid on a day-rate.



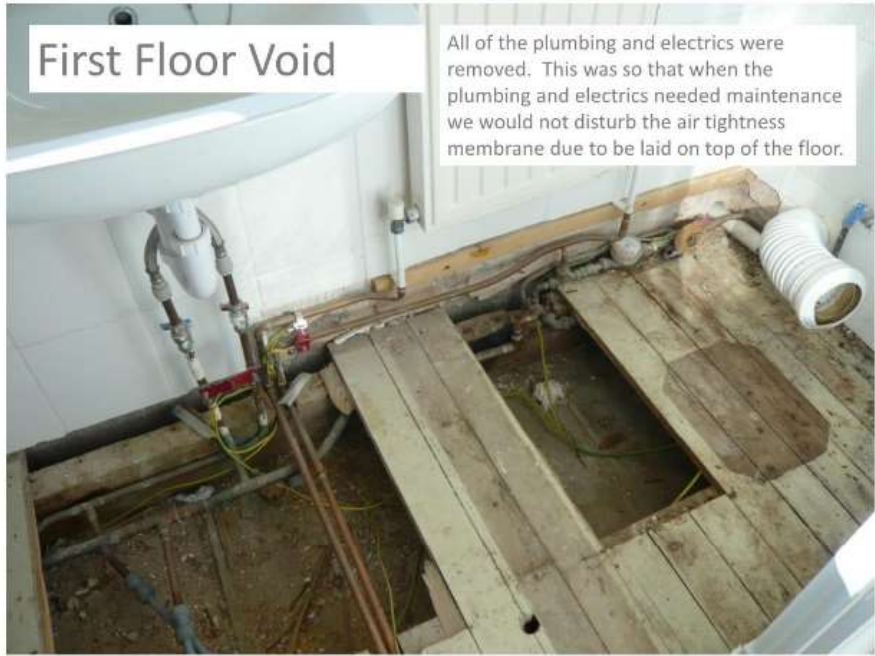


The building is semi-detached, with the neighbouring property offset slightly which lead to some complicated detailing around the party wall. We added a layer of internal insulation on the whole of the party wall, which was thicker where it was adjacent to the neighbours unheated attic space.

CONSTRUCTION APPROACH

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First Floor Void

All of the plumbing and electrics were removed. This was so that when the plumbing and electrics needed maintenance we would not disturb the air tightness membrane due to be laid on top of the floor.



First Floor Void

The void was filled with cellulose insulation. This is made from recycled newspaper.



First Floor Covering

The original boards were re-laid and on top of these we laid:

- (1) Hardboard
- (2) Protective foam
- (3) Air tightness membrane (delicate)
- (4) Protective foam
- (5) Floating floor

Then we laid the carpet as usual



Additional Roof Structure



The original roof was stripped back to the rafters. Then we installed:
OSB sarking boards
Air-tightness membrane (blue, in this photo)
Timber I-beams (later filled with insulation)
(4) Windproof roofing membrane
(5) Tile battens
(6) Original tiles

Additional Roof Structure

Allows for continuous insulation and removes awkward eaves detailing.



The timber I-beams filled with mineral wool insulation

Additional Roof Structure

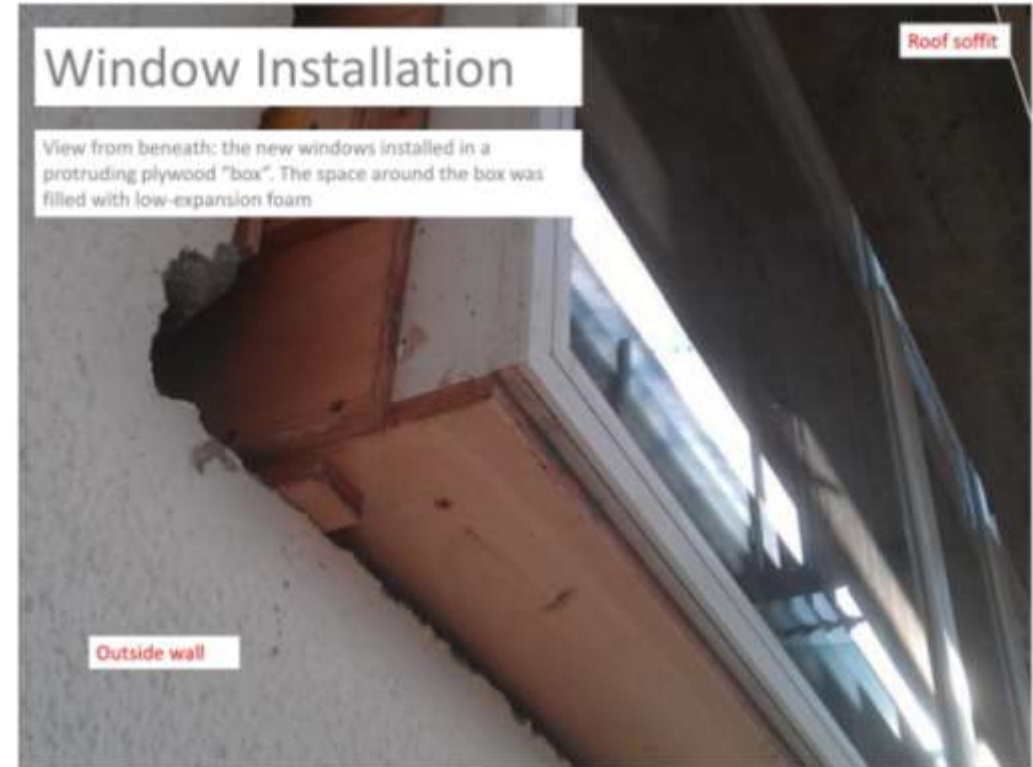
The roof soffit showing the blue air-tightness membrane from the roof glued to the wall with a special airtight paste. The pre-existing wall render visible here forms the air-tight layer for the entire wall.



Roof soffit

Pre-existing render

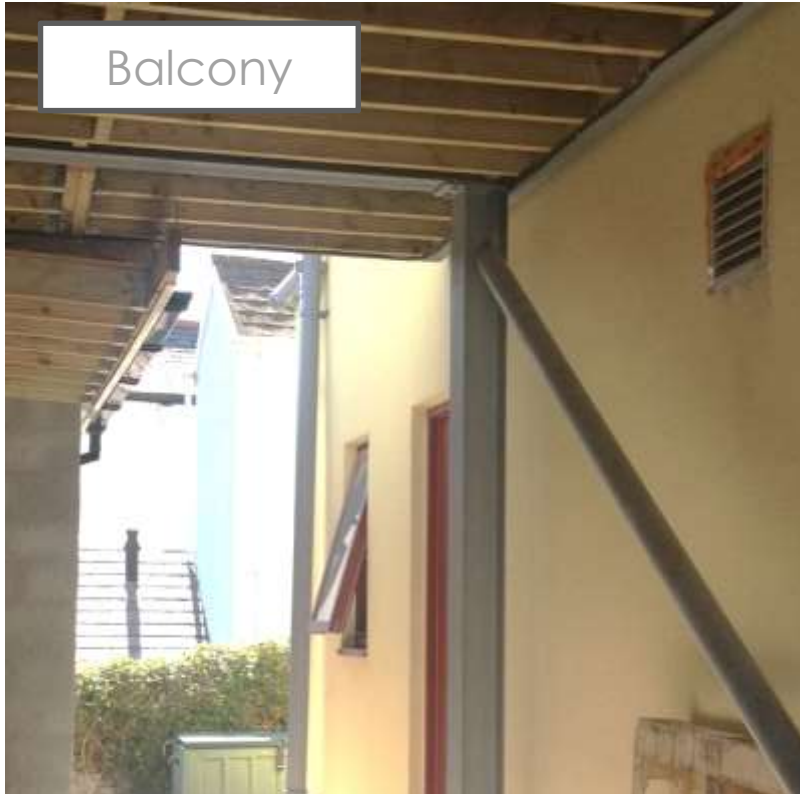
The new window frames sealed against air leakage with air-tight paste and tape



We improved the heating balance by simplifying the window design & slight reductions in the extent of glazing; this was possible because the MVHR meant we didn't need as many openings.



Balcony



We added a balcony to the south side, adding amenity and providing an escape route. The balcony is a separate structure to the building, that required significant negotiation with the structural engineer and builder to develop a suitable solution

Air-Tightness Testing

We kept the airtesting equipment on site, with tests carried out each week. This way we were able to closely monitor progress and identify leaks as we went along.

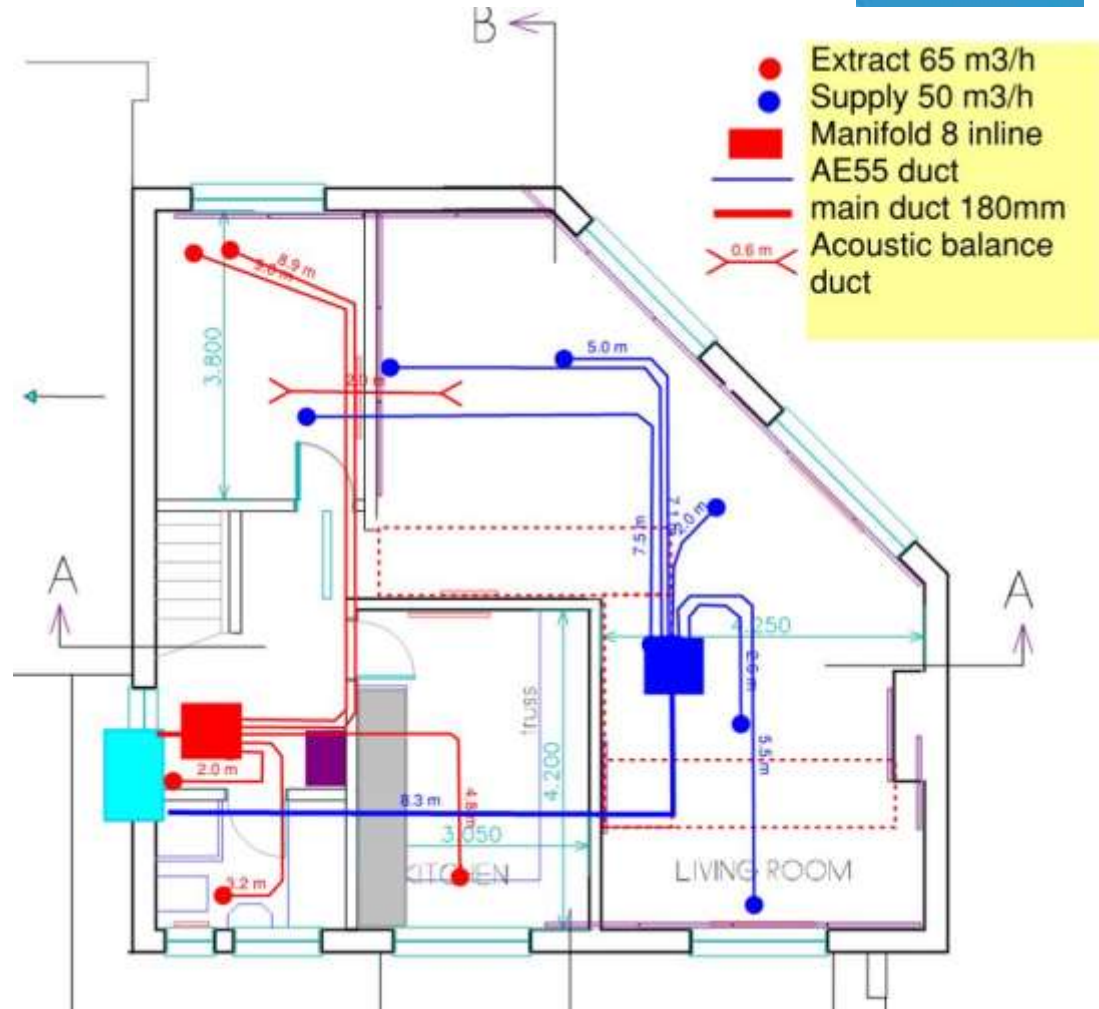




MVHR (Ventilation) System

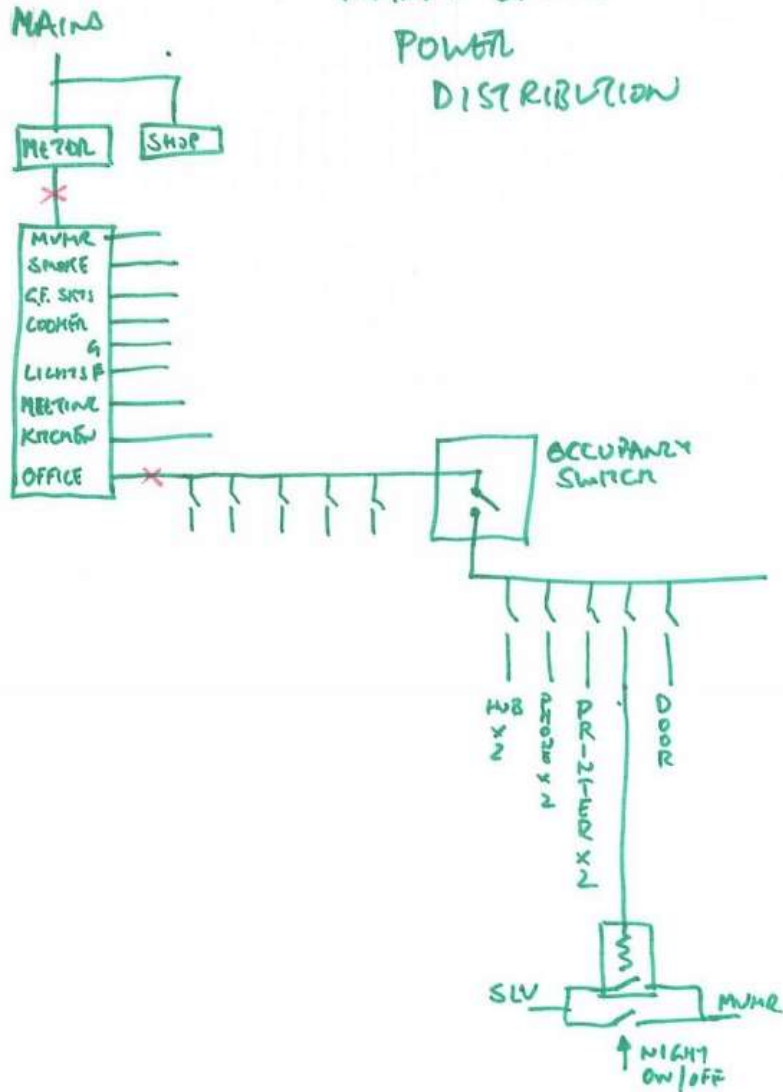


We used a specially designed radial ventilation system with orifice plates and a self-balancing ventilation unit (Brink), that provides fresh air at very low noise levels. This means that the flowrate to each terminal is to an extent pre-set, and the supply and extract are always the same.





WARM OFFICE POWER DISTRIBUTION

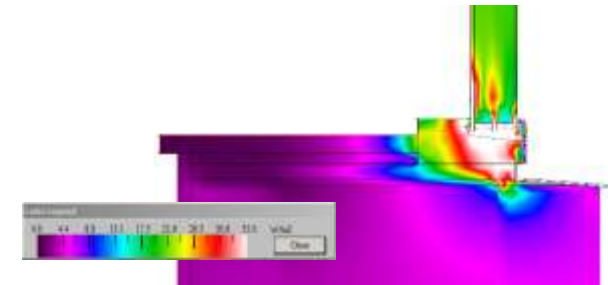


By Energy Saving:

We designed our own electrical distribution system dividing office plug loads into three types: those on each desk, served by an illuminated switch for each desk; those that were common but did not need to be on when the office was not occupied – printers, Ethernet, ventilation, door entry etc etc, served by a heavy duty switch by the exit; and finally those that needed to be on all the time – the server, the fibre router, their UPS.

We chose components such as a fan less server allowing us to reduce this continuous load to 40 W.

We also made significant savings by optimising key junctions using THERM, in particular the window-wall junction where the reveals were splayed to maximise daylight in a way that didn't compromise the 'wrapping' of insulation.





Visit our website to read our special blog about
our adventures transforming this 1960s dwelling into our EnerPHit office:

www.peterwarm.co.uk/introducing-our-new-enerphit-office

