

Affordable Passivhauses for Exeter

KNIGHTS PLACE ROWAN HOUSE

Planning Constraints

Knights Place



- Former garage site within established 60ies housing estate
- Sloping site
- Height restrictions due to overlooking/privacy issues
- Need to maximise units on site
- Overshading from adjacent 3 storey buildings and the blocks themselves

Rowan House



- Conservation area between two listed buildings
- Small brownfield site within established residential area with limited access
- Height restrictions due to overlooking/privacy issues
- Overshading from adjacent buildings
- Overshading of south elevation from listed 3.5m high garden wall

Passivhaus – Design Strategy

Fabric design

Walls

250mm EIFS $U < 0.12 \text{ W/m}^2\text{K}$

Roof

400mm insulation $U < 0.11 \text{ W/m}^2$

Floor

250mm insulation $U < 0.10 \text{ W/m}^2$

Air Barrier

Internal plaster, structural screed, vapour check in roof

Thermal Bridge Free

Windows and Doors

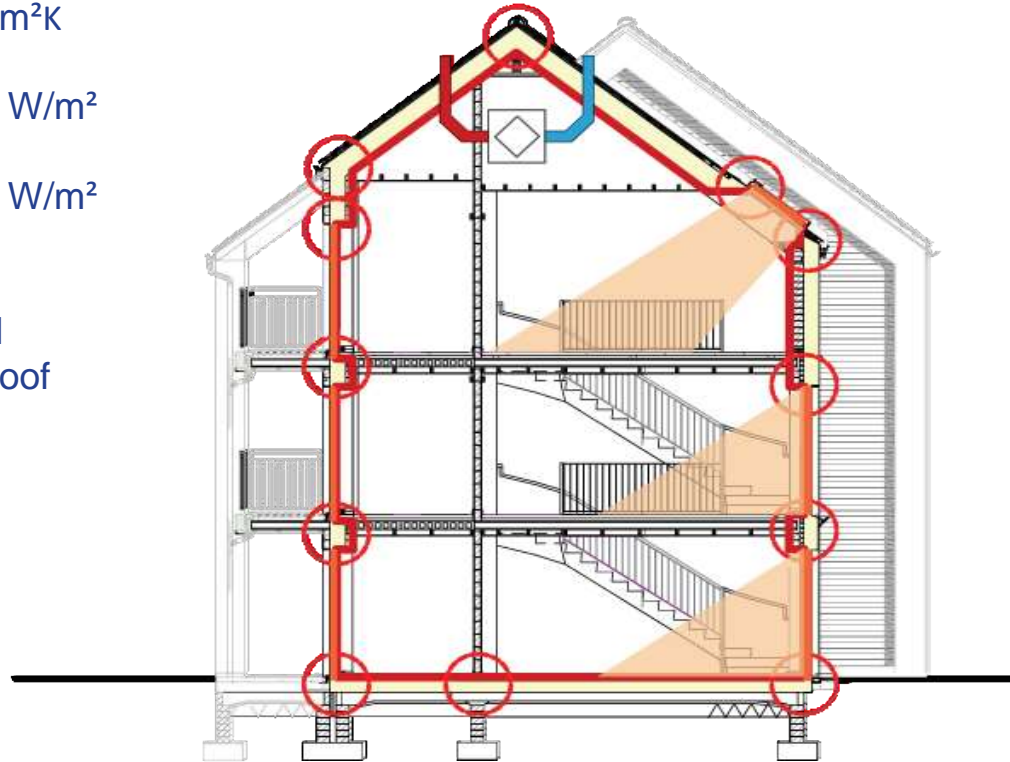
$U_w (\text{instl}) < 0.85 \text{ W/m}^2\text{K}$

MVHR

>92% efficient MVHR

Optimized Solar Orientation

Compact Building Form



PHPP

Both blocks at Knights Place and Rowan House have been certified to meet Passivhaus Standard

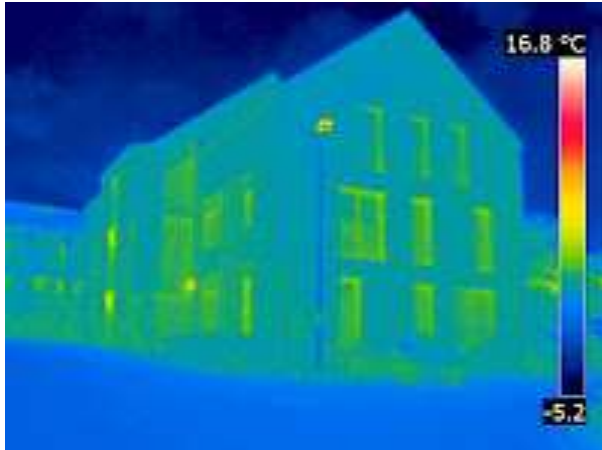
The direct electric heating and hot water strategy lead to a relatively high primary energy demand.



Specific building demands with reference to the treated floor area

Space heating	Treated floor area	492.1 m ²
	Annual heating demand	11.90 kWh/(m ² a)
	Heating load	10.0 W/m ²
Space cooling	Overall specific space cooling demand	kWh/(m ² a)
	Cooling load	W/m ²
	Frequency of overheating (> 25 °C)	0.6 %
Primary Energy	DHW, space heating and auxiliary electricity	111.5 kWh/(m ² a)
	Specific primary energy reduction through solar electricity	64 kWh/(m ² a)
		0 kWh/(m ² a)
Airtightness	Pressurization test result n ₅₀	0.6 1/h

Key Achievements



- Passivhaus certified
- Designed to meet **Code 4** of the CSH
- Fully compliant with **Lifetime Homes Standards**
- All occupants gain private gardens, designed using **Permaculture** principles
- **Solar Panels** serving each individual unit will further reduce the energy demand for domestic hot water
- Designed to meet **best practice daylight** levels in accordance with the requirements of the Code for sustainable homes.
- **100% energy efficient** light fittings throughout
- Compliant with *Secured by Design*
- Independently assessed under the *Building for Life standard* with a final score of 18.5 out of 20
- *Considerate Constructors Scheme* rating of 37.5 out of 40
- Use of low water use fittings reduces the water consumption to less than **80 litres/person/day**

Healthy by Design Building Biology Principles

- Non-toxic and non VOC materials
- High levels of air quality (CO2 <600ppm)
- High levels of natural daylight
- Thermal comfort
- Avoidance of dust and dust mite habitats
- User control
- Radial wiring to reduce low frequency Electro-Magnetic Fields (EMFs)
- PVC free throughout



Site / Landscaping Permaculture Principles

Landscape Architect and Species expert as part of Gale & Snowden in-house design team.

Emphasis on integrated design using Permaculture principles

Working with natural system not against

Create sense of ownership



Involving Future Residents

Pre-occupancy

Community liaising at pre planning stage

Passivhaus building design and operation workshops held with prospective tenants

Pre-occupancy training for selected tenants

Community garden design workshops with neighbours

Post-occupancy

Training

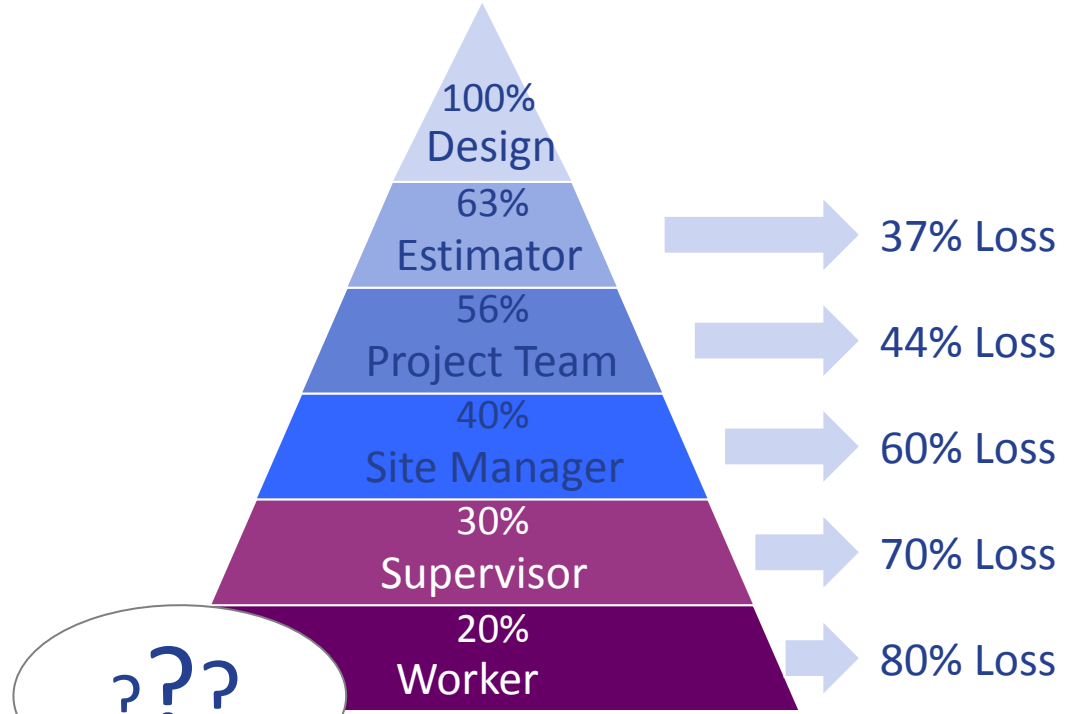
User manual

Exeter City tenant Support



The biggest challenge Communication

'Industry Standard':
Downward Communication

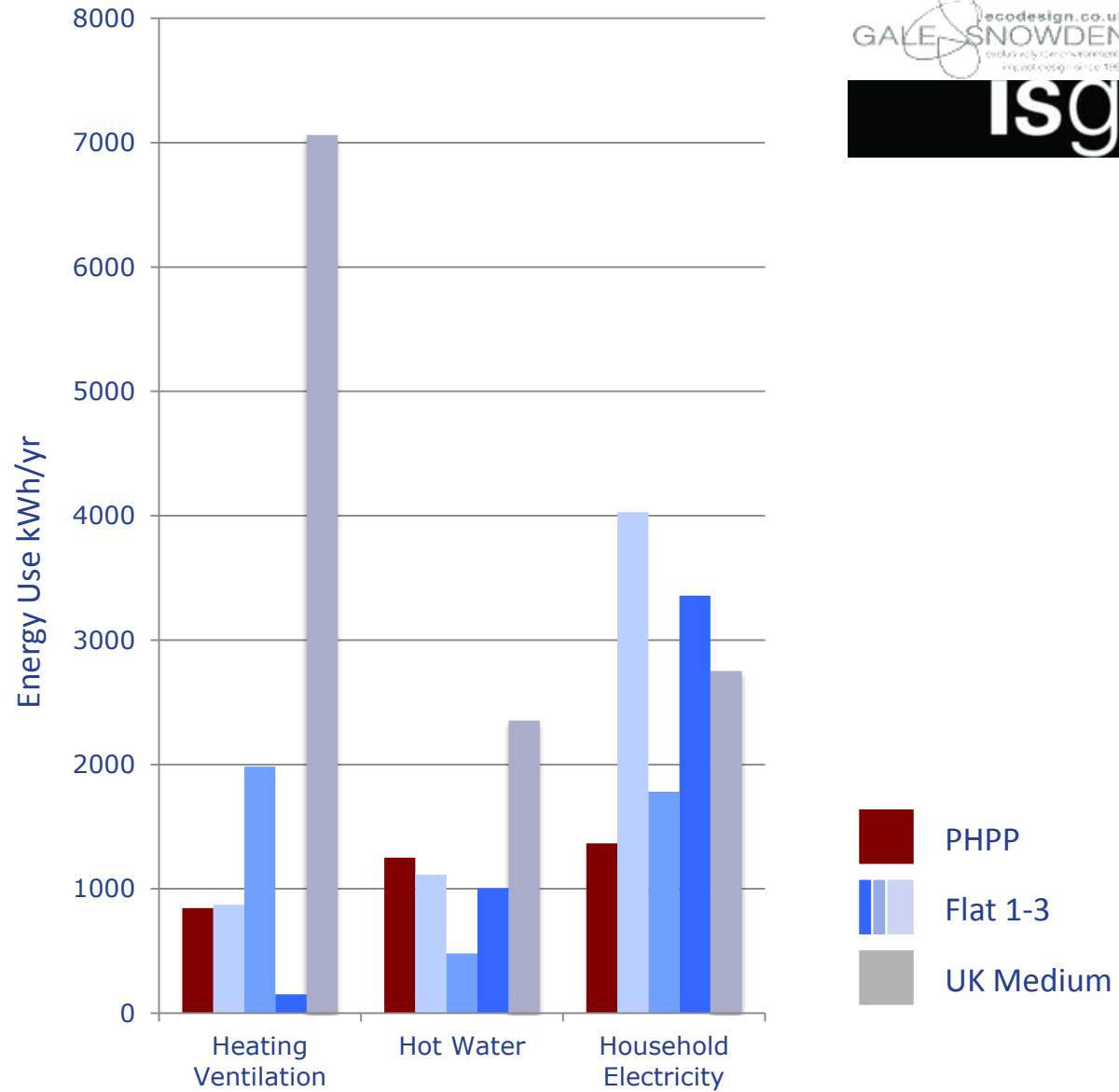


Cut out the middle men?



Does it Work?

Energy & Comfort Monitoring



Does it Work?

Energy & Comfort Monitoring

CO2 Monitoring

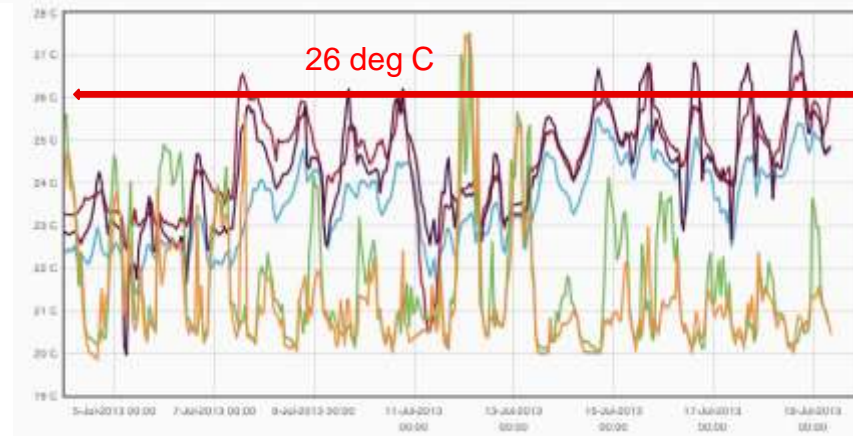
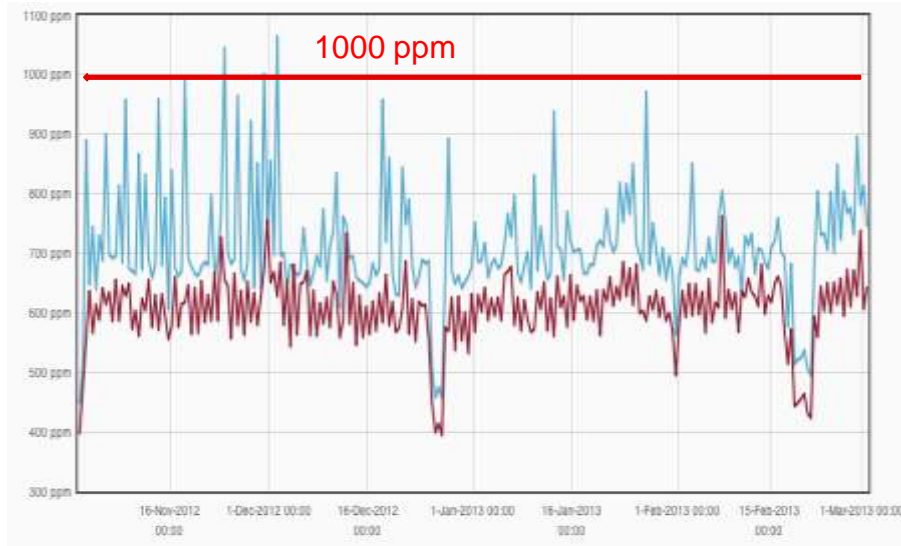
Winter period November ñ March

Mean average 600-710ppm

Temperature Monitoring

2013 Heat wave

0.45% above 26 degree C



What we have learnt



- Need for greater contractor-designer collaboration
- Greater consideration of work sequencing
- Simplify the design to make it more robust
- Greater lead in time
- Repairs and maintenance team early involvement
- Future users involvement and training
- A committed client

Feedback

What tenants said

*'I love the fact that the flat is warm all the time and
whenever I come in from outside it is always nice and
warm unlike any other building I have been in'*

(tenant Knights Place)

*'It gets hot sometimes but is controllable via
a window or boosting the vent.'*

• *(tenant Rowan House)*

*'I have never felt uncomfortably hot or cold a single day
since moving in'*

(tenant Rowan House)

Thank you

KNIGHTS PLACE AND ROWAN HOUSE

Client's Perspective



ukpassivhaus
conference 2014



Contents

- Why develop?
- Why passivhaus?
- How was the journey?
- What have we learnt?
- Where are we heading?

Why Develop?

- Housing need
- Political drive
- NAHP 2008 -2011 finance available
- Land availability
- Anticipated HRA reform
ñ test case

Why Passivhaus?



How was the journey?



What have we learnt?

- Fund it yourself
- Give yourself plenty of lead-in time
- Don't make a 'big thing' about its low-energy credentials
- Think hard about tenant training to get it right
- Don't simplify controls
- Get other in-house teams involved earlier for buy-in
- Monitoring helps!
- It works!

Where are we heading?



ii More Housing

ii Extra-care



ii New Leisure Centre and
Swimming Pool

ii Enerphit Refurbishment



ii Estate Rationalisation

Any questions?

