Trans-Pennine Passivhaus Design: Design Challenges & Lessons Learned
• Overview of our experience in designing to & towards Passivhaus across the region
• Emerging design-based challenges
• The increasing flexibility of Passivhaus
Design variety
Process
Process
Challenges

• Climate / Location

• Client-led
  – Budget
  – Brief

• Planning
  – Planning & or Conservation Area restrictions.

• Buildability & Materials
  – Available skills
  – Generic, industry- & lobby-led “standards” vs. genuine, viable low-carbon solutions

• Services
### Specific building characteristics with reference to the treated floor area

<table>
<thead>
<tr>
<th>Space heating</th>
<th>Treated floor area m²</th>
<th>Heating demand kWh/(m²a)</th>
<th>Heating load W/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>140.0</td>
<td>15</td>
<td>9</td>
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### EnerPHit targets in the UK

- **Cold Climate Zone**: EnerPHit target 23kWh/m²a/°C
- **Warm Temperate Climate**: EnerPHit target 20kWh/m²a/°C
- **Cool Temperate Climate**: EnerPHit target 25kWh/m²a/°C
- **Cold Climate Zone**: EnerPHit target 30kWh/m²a/°C

Height above climate station affects the requirements. Confirmation from a Passivhaus Doctor is recommended.
- North of Leeds
- Form Factor = 2.9
- Avg. U-value of 0.165 W/m2K
- Heavily influenced by Planning & context
- Experienced contractor, ach: 0.13 ach@60 Pa(!)
- Able to use non PH-certified windows
- Certified to Peak Heat Load
• Roundhay, Leeds
• Form Factor = 3.0
• Avg. U-value of 0.156 W/m2K
• Planning very straightforward
• Two types of window
• Certifying to Space Heat Demand
• Rural N. Yorks.
• Form Factor = 2.9
• Planning – so far, so good
• Client driven desire for specific form
• Development of previous window detail
• Certification (?) PHI Low Energy Building or AECB Standard?
• Stockport, Manchester
• Form Factor of 3.58(!)
• Conservation Area & Site restrictions
• Client brief for Carer provision
• Likely to certify as Passivhaus Low Energy Building
• Lessons
  – “Don’t let certification override common sense.”
    • R. Bunn
  – If comfort & fabric are not compromised why not consider PHI LEB or AECB?
    • Consider how this works with NZEB?
  – Climate influence – even at similar latitude
  – Planning is Passivhaus neutral – so far
    • Not an inherent advantage or problem by default – tho’ is an issue if it would be anyway
  – Practical limits on fabric U-values require special focus on windows.
    • An ongoing technical and architectural challenge / opportunity.
  – The “small Passivhaus” problem (< 100m2)
  – “Traditional” glazing proportions = consider heat load certification or LEB.
  – Smaller widows = tends to lower risk of overheating (provided daylighting is not compromised!)
  – Heating & Hot water: everything on market tends to be oversized; lack of modular sizing systems; fuel source & off-gas properties?
  – Learn to walk before you run...
Project PHPP Outputs for 20 Maisonettes

On Site
UK Passivhaus Open Days 2018

Date: 9-11 November 2018
Time: 3 consecutive days
Location: Nationwide
Cost: Free to attend, booking essential

The International Passivhaus Days offers the public the opportunity to experience Passivhaus buildings. Passivhaus stands as the solid basis for a sustainable energy future, combining superior user comfort and healthy indoor environments with minimal energy use. Offering long-term savings, Passivhaus is the affordable solution for all those looking to build. Visit a scheme near you by clicking on the projects below for further booking details.

2018 Participants

Scotland

BRUADAR

OSTRO PASSIVHAUS

CLACHAN HOUSE

North-East England

North-West England