University of Aberdeen
Built Environment
Passive House Nursery

University of Aberdeen

Institution Profile
- Founded 1495
- Higher Education
- 16,500 students
- Research intensive
- 3000 staff
- Urban

About the project
Summary

The University's pre-school childcare was previously provided in an ageing building that struggled to cope with demand from staff and students. The solution: build a larger, purpose-built facility, reflecting best-practice in modern child-care. The scale and nature of the build provided an opportunity to stretch the institutional commitment to sustainable buildings, with the dual aim of Passivhaus and BREEAM accreditation.

Project partners

Our Design Team was led by Boswell Mitchell Johnson (bmj) Architects and our main contractor was Burns Construction. Key Design Team members included KJ Tait (Mechanical & Electrical and BREAM), Talbots (Quantity Surveyors), George Watt and Stewart (CDM), Cameron + Ross (Structural Engineers) and Future Komfort (specialist Passivhaus consultants). The internal Project Board also consulted widely with Nursery staff, parents, the Aberdeen University Students Association and academic colleagues in the School of Education. The Care Inspectorate was also engaged at every stage in the process.

The results
The challenge

The brief: an energy efficient, fit-for-purpose, early-years facility.
The proposal: an innovative Passivhaus design.
The main hurdle: a lack of local expertise in delivering such buildings.

Although none of the project partners had experience of Passivhaus construction, all were familiar with energy efficient design and all bought in to the requirement to learn 'on the job'. Our specialist Passivhaus consultants (Future Komfort) provided expertise and assessed the design and compliance of components and installation, while the site team undertook professional development courses and adopted a site mentality

that emphasized the high level of attention to detail and finish required to satisfy Passivhaus accreditation.

The approach

- A fabric first approach from the outset.
- Meticulous attention to detail in all aspects of the build.
- Specialist advice to supplement and oversee local trades.
- A collaborative, open-book approach to tackling on-site issues.
- Wider consultation with key partners e.g. Care Inspectorate, educationalists, Nursery staff etc.

Our goals

- To stretch the institutional commitment to energy efficient construction.
- To minimize energy consumption and associated costs in the building.
- To provide excellent environmental conditions for the staff and children in the Nursery.
- To increase capacity and satisfy institutional demand for pre-school childcare.
- To support the institutional commitment to family friendly policies.

Obstacles and solutions

Obstacles	Solutions
• Adverse ground conditions (marshy sub-soil).	• Sinking of 43 piles (average of 24m deep).
• Need to ensure an air tight building envelope and to avoid heat loss.	• The identification of a named 'taping champion' on site (and the use of specialist materials inc. 5km of tape).
• No direct experience of Passivhaus construction.	• Appointment of specialist consultant and a detailed CPD programme.
• Limited (or no) local suppliers of Passivhaus quality components.	• Identification of European suppliers of windows, skylights and MVHR.
• Complexity of installation detailing e.g. to avoid cold bridging and to ensure certification compliance.	• Well managed site; buy-in from all contractors; commitment to 'quality' throughout.

Performance and results

The building performed exceptionally in commissioning tests. Its air-tightness scores (critical to Passivhaus performance) were very good and the Mechanical Ventilation and Heat Recovery (MVHR) system was installed and tested at 87% efficiency. After a first year of performance in which users were adapting to the building and seeking to optimise its performance, it's energy performance is significantly better than the ageing building it replaced (c. 96kWh per m2 compared to 179kWh) and has reduced carbon by 60% (from 22t to 9t) in a building that is 50% larger. We expect these figures to improve as controls are further optimized.

Sustainability features include LED lighting throughout, grey-water harvesting and solar hot-water systems, high-levels of insulation, and locally sourced timber and cladding. The Passivhaus design uses solar gain, as well as radiated heat from users and equipment. Air Source Heat Pumps linked in via the MVHR ensure a steady building temperature, with no recourse to additional heating anticipated unless in extreme cold.

The future

Lessons learned

Although undoubtedly challenging, Passivhaus is viable where there is comprehensive buy-in from all parties. This requires a willingness from client, architect and contractor to adopt a mindset that varies significantly from that on other builds. The capacity to work differently, adopt new techniques, and adhere strictly to a regime that requires components and installation compliant with Passivhaus design underpins the methodology.

Having set out as Passivhaus novices, this 'team' approach has been rewarded with a building that has become the first fully accredited Passivhaus in the Scottish sector and should become the first in Scotland to achieve both Passivhaus and BREEAM 'Excellent' accreditation.

Project sharing

We have made extensive efforts to share knowledge of the project. These include: EAUC channels (e.g. news bulletins, case studies and a short video); public open days (including at our May Festival and the International Passive House Day); inclusion in our public engagement team's 'Pecha Kucha' series (showcasing innovative research and ideas to the public); public talks including the visit of Professor Wolfgang Feist (founder of the Passive House concept) to give a keynote at our May Festival as part of Scotland's year of Architecture, Innovation and Design; and press releases and internal e-zine stories at each major milestone. The project has also been used as a case study in the University's Strategic Plan and as a feature in our global alumni magazine marking its opening by the Duchess of Rothesay. It has also featured in the 'trade' press with articles in Nursery World magazine.

We continue to work with partner organisations, notably the Education, Sustainability and Housing departments of the local authority, and are committed to making the building available for specialist and technical audiences interested in both the methodology and the setting e.g. architects, Nursery managers, planners.

What has it meant to your institution to be a Green Gown Award finalist?

Being chosen as a finalist in the Built Environment category provides recognition for the dedication of our design and project team in tackling the challenges of a complex, low-energy methodology new to us all.

Although common across Europe, Passive House buildings remain rare in the UK. We hope that our positive experience in seeing this project through to its successful completion – and its inclusion as a finalist in the prestigious Green Gown Awards - will help to showcase the concept within the sector and beyond.

Further Information

Fraser Lovie (Policy Adviser), University of Aberdeen, King's College, Aberdeen, AB24 3FX
E: f.lovie@abdn.ac.uk T: 01224 273165 W: www.abdn.ac.uk/sustainability Tw: @SustainableAbdn