

PROJECT DESCRIPTION

Project name: THE GREEN BASE



Simmonds.Mills Architects Annual Project Review

New-build non-domestic:

The building houses the headquarters / office for the Green Base service, Which manages all of the landscaped areas within Helena partnerships' rented housing estates. The building is also a community resource, with large multi-purpose room, for use by various community groups focused on learning and enjoyment of horticultural activities.



The building opening ceremony in August 2011



Project Team Biographies

Project team:

- Simmonds.Mills Architects
- Alan Clarke – Energy, PHPP & Services,
- Bob Johnson, BJSE - Structural engineering
- Main Contractor – Paragon Construction



SIMMONDS.MILLS ARCHITECTS The Practice designs low-energy domestic and non-domestic projects to the AECB Silver, Passivhaus and EnerPHit energy standards.

Andrew Simmonds is a partner in Simmonds.Mills Architects and part-time Chief Executive of AECB, The Sustainable Building Association. His architectural and building experience covers historic buildings, innovative and traditional materials. Andrew led the development of the AECB energy standards and initiated and worked on the AECB CarbonLite programme. He also led the AECB team supporting the Technology Strategy Board's 'Retrofit for the Future' competition, including developing the AECB/TSB low energy buildings database, and was closely involved in setting up the Passivhaus Trust to bring to the mainstream the work of AECB CarbonLite.

Adele Mills is a partner in Simmonds.Mills Architects. Her architectural and building experience covers social housing, community and historic buildings. She is an ARB registered architect, qualified in 1989.

Tim Crosskey has worked in USA and in the UK. He has particular experience of working with practices with expertise in community consultation, self-build projects and sustainable design. These include Constructive Individuals, London; Plan Shop, Yorkshire; Architype, London and E-Arc. He is an ARB registered architect, qualified in 1994.

Alan Clarke – Energy, PHPP & Services Alan Clarke is an energy consultant and building services engineer specialising in Passivhaus design, building on long experience of low energy and ecological construction. His approach to Passivhaus is one of leaving the building fabric in charge of comfort, and keeping building services as simple as possible. Alan has worked on over 15 certified Passivhaus projects, including houses, schools and small office and community buildings. He teaches Passivhaus design and has published technical papers on a range of topics.

Bob Johnson I.Eng.A.M.I.Struct.E - **structural engineering** has over twenty five years experience in Structural Engineering working for several Consultancy's in Shropshire before setting up as a sole practitioner in 1996. Educated at Wolverhampton Polytechnic and Birmingham University. Particular interest in conservation of buildings.

Passivhaus Certificate & PHPP Verification Sheet

● WARM: Low Energy Building Practice

No.7 The Crescent, PLYMOUTH, PL1 3AB UK +44 (0) 1752 542 546 www.peterwarm.co.uk

Authorised by:
Passivhaus Institut
Dr. Wolfgang Feist
Rheinstr. 44/46
D-64283 Darmstadt



Certificate

● WARM: Low Energy Building Practice hereby certifies the following building as a

Quality Approved Passive House

The Green Base, Queensland Place, Thatto Heath, St Helens, Merseyside WA9 5SH UK

Client: **Helena Homes, The Green Base**
Queensland Place, Thatto Heath, St Helens, Merseyside WA9 5SH UK

Architect: **Simmonds Mills Architects**
57 Portfield St, Hereford HR1 2SE UK

Building **Alan Clarke**
Services: The Woodlands, Woodlands Close, Lydney GL15 4PL UK

This building was designed to meet Passive House criteria as defined by the Passive House Institute. With appropriate on-site implementation, this building will have the following characteristics:

- Excellent thermal insulation and optimised connection details with respect to building physics. High thermal comfort during the summer has been considered and the heating demand or heating load will be limited to
15 kWh per m² of treated floor area and year or 10 W/m², respectively
- A highly airtight building envelope, which eliminates draughts and reduces the heating energy demand: The air change rate through the envelope at a 50 Pascal pressure difference, as verified in accordance with ISO 9972, is less than
0.6 air changes per hour with respect to the building's volume
- A controlled ventilation system with high quality filters, highly efficient heat recovery and low electricity consumption, ensuring excellent indoor air quality with low energy consumption
- A total primary energy demand for heating, domestic hot water, ventilation and all other electric appliances during normal use of less than
120 kWh per m² of treated floor area and year

This certificate is to be used only in combination with the associated certification documents, which describe the exact characteristics of the building.

Passive Houses offer high comfort throughout the year and can be heated with little effort, for example, by heating the supply air. The building envelope of a Passive House is evenly warm on the inside and the internal surface temperatures hardly differ from indoor air temperatures. Due to the highly airtight envelope, draughts are eliminated during normal use. The ventilation system constantly provides fresh air of excellent quality. Heating costs in a Passive House are very low. Thanks to their low energy consumption, Passive Houses offer security against energy scarcity and future rises in energy prices. Moreover, the climate impact of Passive Houses is low as they reduce energy use, thereby resulting in the emission of comparatively low levels of carbon dioxide (CO₂) and other pollutants.

issued:
PLYMOUTH December 2011

Peter Warm

Certificate-ID: 4067_WARM_PH_20111219_PW

Passive House Verification



Building:	The Green Base	
Location and Climate:	West Pennines	Region 8 BRE Weather Data
Street:	Queensland Place, Thatto Heath, St Helens	
Postcode/City:	WA9 5SH	Merseyside
Country:	UK	
Building Type:	Community Centre	
Home Owner(s) / Client(s):	Helena Homes, The Green Base	
Street:	Queensland Place, Thatto Heath, St Helens	
Postcode/City:	WA9 5SH	Merseyside
Architect:	Simmonds Mills Architects	
Street:	57 Portfield St	
Postcode/City:	HR1 2SE	Hereford
Mechanical System:	Alan Clarke	
Street:	The Woodlands, Woodlands Close	
Postcode/City:	GL15 4PL	Lydney
Year of Construction:	2010	
Number of Dwelling Units:	0	Interior Temperature: 20.0 °C
Enclosed Volume V _e :	1023.3 m ³	Internal Heat Gains: 3.5 W/m ²
Number of Occupants:	5.9	

Specific Demands with Reference to the Treated Floor Area			
	Treated Floor Area:		
	207.1 m ²		
	Applied:	Monthly Method	PH Certificate:
Specific Space Heat Demand:	13 kWh/(m ² a)		15 kWh/(m ² a)
Pressurization Test Result:	0.5 h ⁻¹		0.6 h ⁻¹
Specific Primary Energy Demand (DHW, Heating, Cooling, Auxiliary and Household Electricity):	107 kWh/(m ² a)		120 kWh/(m ² a)
Specific Primary Energy Demand (DHW, Heating and Auxiliary Electricity):	47 kWh/(m ² a)		
Specific Primary Energy Demand Energy Conservation by Solar Electricity:	kWh/(m ² a)		
Heating Load:	11 W/m ²		
Frequency of Overheating:	8 %	over 25 °C	

We confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The calculations with PHPP are attached to this application.

Issued on:

signed:

C O S T D A T A

OVERALL PROJECT COSTS

£521,861.49

Building TFA is 224m² giving:

£2,329.74 / m²



Greenbase energy monitoring

Energy monitoring has been recorded via manual meter readings on each working day since the building was handed over.

Totals for 2012 are as follows:

	kWh	kWh/m2.a	PE kWh/m2.a
Electric use kWh	6864	32.4	87.4
PV generation kWh	4964	23.4	63.2
Electric import kWh	5426	25.6	69.1
DHW gas (estimate)	1650	7.8	8.6
heat gas	4241	20.0	22.0
DHW kWh	1485	7.0	
heat kWh	3817	18.0	
Total			118.0

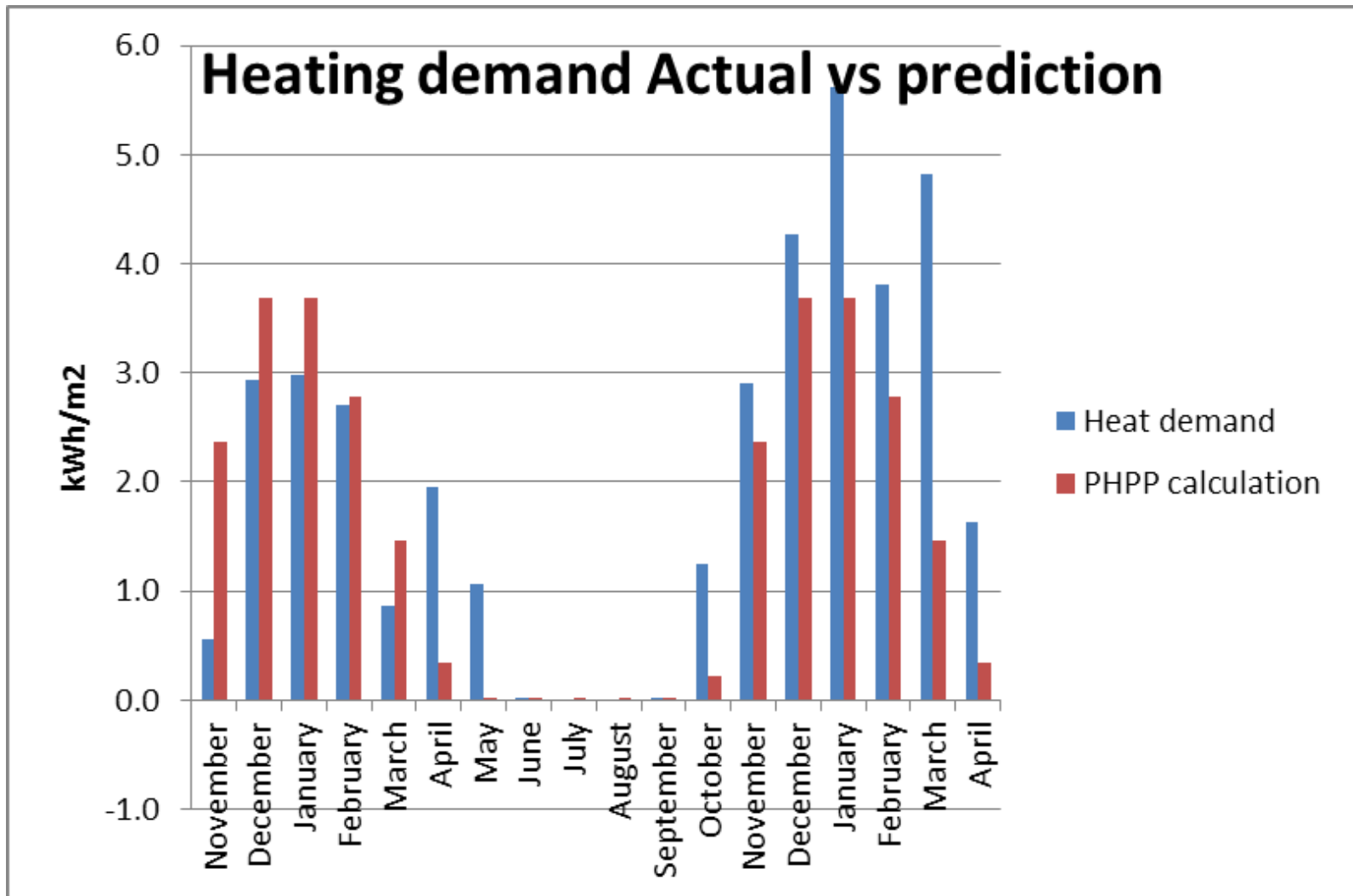


Domestic hot water is estimated according to the summer base load.

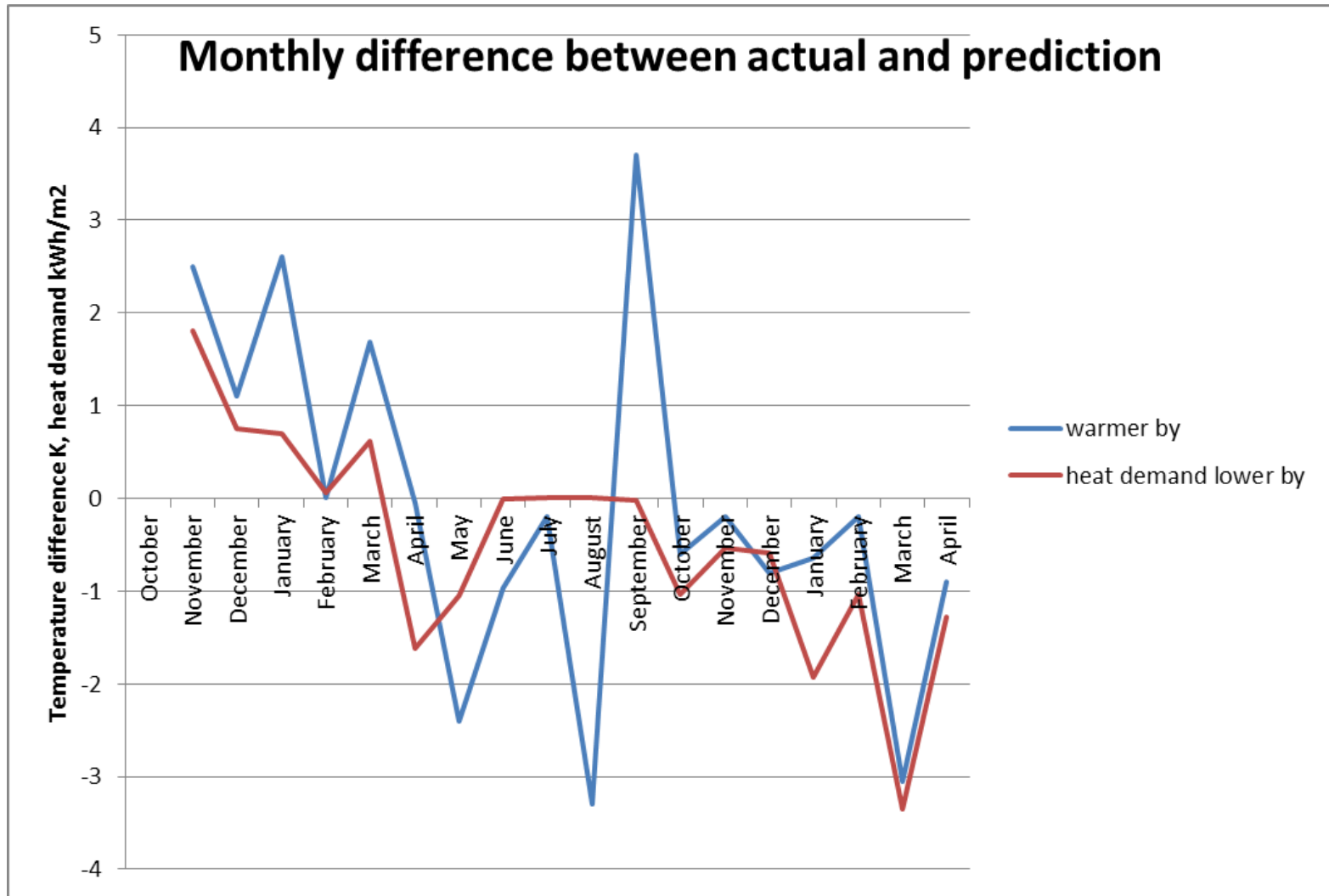
Overall the heat demand was approximately 18kWh/m2.a

Total Primary Energy was 118kWh/m2.a

Month by month the heating demand was as follows:



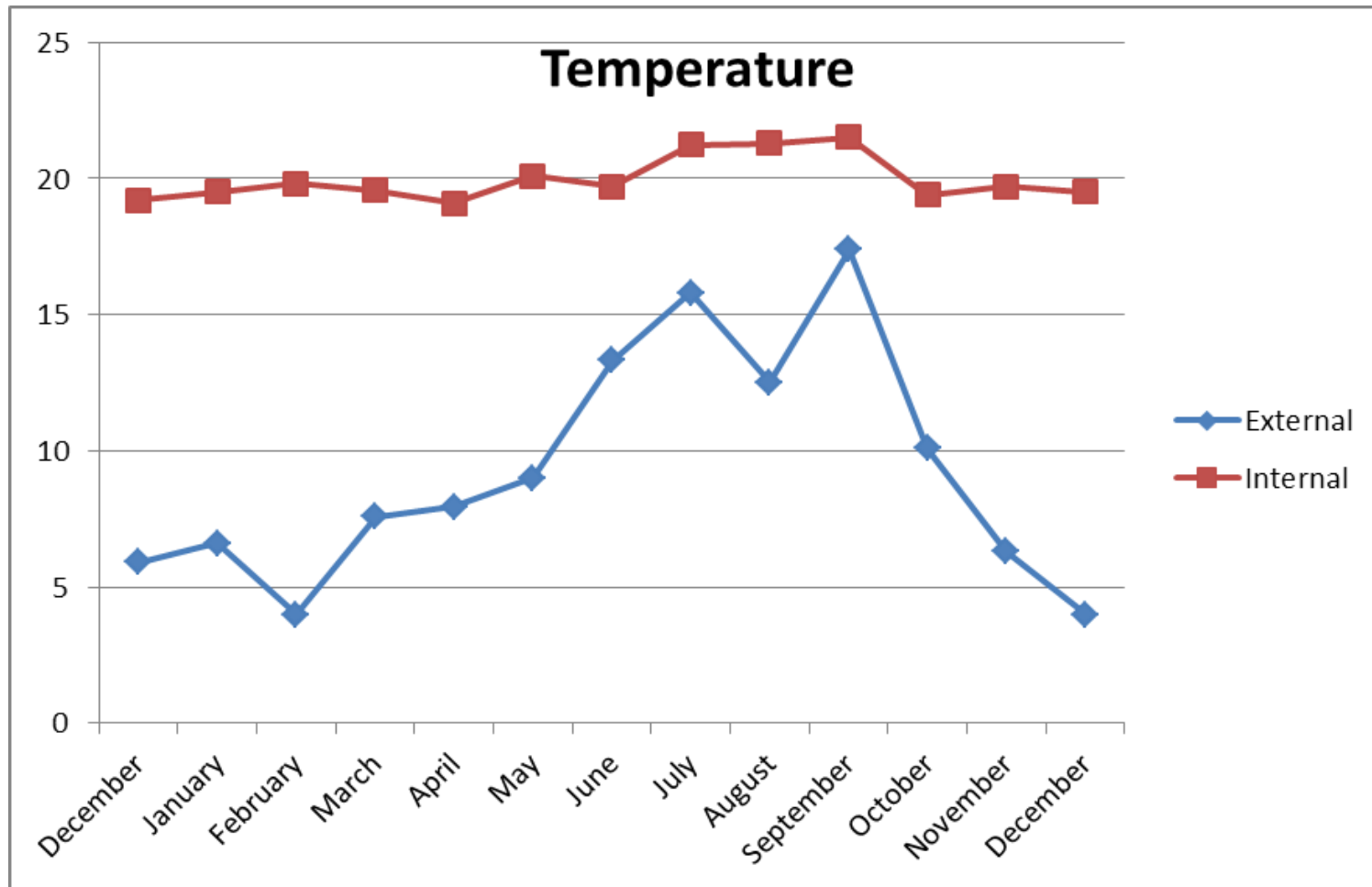
The deviation in heating demand from the monthly PHPP figures appears consistent with the difference between recorded external temperature and the PHPP climate data:



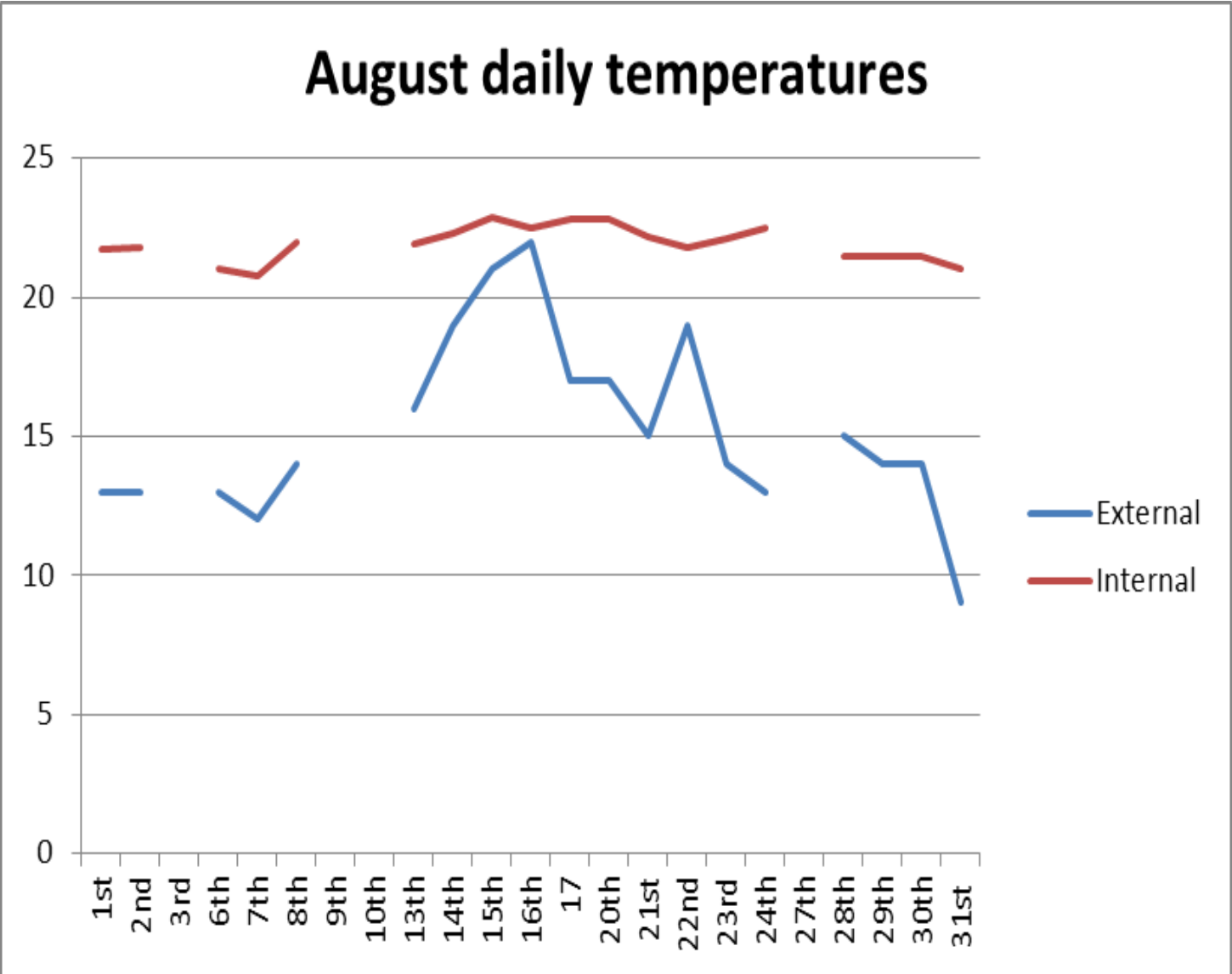
So the winter 2011-2012 was relatively mild and heating demand lower than PHPP predicted, whereas 2012-2013 was colder and heating demand higher than predicted.

ENERGY CONSUMPTION DATA

Average monthly temperatures internal and external:



Admittedly 2012 wasn't a hot year, but overheating did not occur. August had the highest internal temperatures and the maximum daily temperature recorded was 22.9C:



THE CLIENT; HELENA PARTNERSHIPS

“The Helena Partnerships Green Base project was an ambitious embodiment of our fundamental principles which are to provide our tenants, and the communities they live, in with the best possible housing and environment for their rent in an environmentally responsible way. This led us to combining a working environment and a community centre in a sustainable building. We also set ourselves the target of achieving the highest possible level of building efficiency within our budget. We were delighted when it proved to be possible to achieve a PassivHaus standard building which fits perfectly in its residential environment and provides an efficient working environment at a reasonable price. We couldn't have achieved this without the passion, commitment and expertise of our architects Simmonds Mills. Our tenants, the local community, the workforce and the Board of Helena Partnerships are delighted with the outcome.

Professor Robert Barr OBE,
Independent Board Member and Sustainability Champion
Helena Partnerships

During the design development / consultation, and construction, a film was made interviewing all involved in the process ; the link to this film is

<http://www.youtube.com/watch?v=SFftPQXCoc8>

THE CONTRACTOR

“Working with Helena Partnerships on the Green Base project was a wonderful experience. We worked seamlessly together to deliver this award-winning, ground-breaking facility. The partnering arrangement was truly adopted by all parties involved, the success of which is a testament to the principles set out by Sir John Egan.

We were very pleased to be part of the team and worthy recipients of the Gold Award for Sustainable Construction at the Green Apple awards in 2011.”

Paul Barrow, MD of Paragon Construction

OCCUPANCY FEEDBACK

Post-Occupancy Evaluation, issued by Simmonds.Mills on behalf of the design team.

GREEN BASE QUESTIONNAIRE: Operational review stage

CLIENT: USER/FACILITIES

GREEN BASE, St. Helens..... COMPLETED BY:
 DATE..... APRIL 2012. **Andy Houghton**
 NEW-BUILD PROJECT..... SIGNATURE.....

Please complete the following questions in respect of the above mentioned project. Return your completed questionnaire to Simmonds.Mills.

Please add additional sheets if required for comments.
 Please circle the appropriate figures

For Office Use only

SECTION 1 - CLIENT SATISFACTION - PRODUCT

1.1 How satisfied were you with the quality of the finished building?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

1.2 How satisfied were you that the design of the scheme met your requirements?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

1.3 Has the scheme improved your work area?
 Worse 1 2 3 4 5 6 7 8 9 10 Better

SECTION 2 - CLIENT SATISFACTION - SERVICE

2.1 How satisfied were you with the service provided by the design team ?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

2.2 How helpful were the design team during initial planning of the scheme?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

2.3 How flexible were the design team in delivering your needs?
 Inflexible 1 2 3 4 5 6 7 8 9 10 Very flexible

2.4 How approachable were the design team during the works?
 Not approachable 1 2 3 4 5 6 7 8 9 10 Very approachable

2.5 Were any problems resolved to your satisfaction?
 No 1 2 3 4 5 6 7 8 9 10 Yes

2.6 How satisfied were you with the partnering process between Helena, the design team and the main contractor ?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

2.7 How satisfied were you with the service provided by the main contractor during the work?
 Dissatisfied 1 2 3 4 5 6 7 8 9 10 Satisfied

SECTION 3:- DEFECTS

What was the condition of the facility with respect to defects at the time of handover?

Totally defective	Major defects major impact on client	Some defects with some impact on client	Some defects with no significant impact on client	Defect free
1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>

For Office Use only

ENGINEER'S SERVICES CRITIQUE

In construction the heating and hot water was completely straightforward, and the only hiccups with the ventilation were fitting the two MVHR units neatly into the limited space available. Post construction tuning has been minimal - the users have no problem adjusting the heating programmable thermostat, and once commissioned the MVHR units have been run successfully by the building users. The only complication with the lighting has been setting the office daylight dimming system, to ensure lights actually go off instead of dim to very low levels when daylight is sufficient - maybe this control was unnecessarily complicated.



DESIGN PHILOSOPHY

a challenging environment

The Design Solution : The brief was for an office / educational centre for Helena Partnerships, (the biggest social housing landlord in St. Helens) to house the Green Base, their horticultural arm. The team had a visionary approach to the service they wanted to provide, and a building to match this vision was paramount. Aside from maintenance and enhancement of public landscape, the Green Base team will engage the community in a variety of activities all focused on horticulture and sustainability. The design team won the contract with their aspiration to build a Passivhaus exemplar. The team already had proven experience with the recently completed Disability Essex PH certified building.

Aesthetic design: The design approach was to design a contemporary building, of modest scale that would sit well in its domestic 1970's housing estate setting, whilst also signalling a centre of public activity. Although simple in plan and form, the elegant building occupies a prominent corner site and has a contemporary feel and shows a high quality of design. It is already becoming a landmark and creating a real focus on the estate as an inspiring community resource. The design was intended to suggest a domestic scale, and domestic low energy replicability - whilst also expressing honestly the non-domestic functions of the building.

Neighbourhood: The building very clearly states the client's intention that this community facility should be accessible to the neighbourhood, and encourage participation. The housing estate is one of high crime incidence, and this open approach by Helena is a brave stance to show that this facility is FOR the community. The designers worked closely with the client team to ensure that the building form, its security detailing would create a secure and safe environment for staff and residents without creating an overly 'defensive' design.

Monitoring: The staff are actively engaged with the monitoring of the building's performance. They are sharing the results and experience of working in such a building with the community and Helena's other staff, business and community partners. That the building is performing as designed adds huge weight to this message – and is likely to encourage genuine change.



DESIGN PHILOSOPHY

subtle innovations

Achieving PH with 'conventional' methods

The design team decided to adopt the construction techniques & the palette of materials previously used successfully at PH certified Grove Cottage & Disability Essex. The intention was to refine simple, robust basic techniques that offered conventional solutions to achieving the demanding standards set by the PH standard. Also it was hoped to demonstrate to the local business & residential communities that PH can be achieved without 'radical' changes to the materials & methods currently used in the UK. The focus of the regular community site visits and presentations was therefore build quality and the importance of attention to insulation continuity, window technology, airtightness & ventilation.

The methods used included externally insulated high density loadbearing concrete block walls, using a high performance vapour open graphitised EPS & direct render system, alongside a timber clad 'Larsen truss' EWI system that accepts a variety of types of insulation materials placed between site built lightweight wall trusses. This mixed approach allows a wider choice of materials, wall finishes and fixings etc. The roof uses timber 'I' beams, in this case finished with profiled aluminium.

Working with unfamiliar contractors, who have not built to Passivhaus standards previously, always presents a challenge for the design team and client – the strategy to use and refine tried and tested construction techniques was successful, despite a last minute unplanned change of roof and wall insulation product. Demonstrating that 'mainstream builders' can achieve PH – by talking their (construction) language – was a key aim of the construction strategy.



AESTHETICS

EWI - finishes



DESIGN PHILOSOPHY

simple is best



Services



Heating uses a domestic gas combi boiler, with radiators, control of boiler flow temperature according to room temperature using the boiler controls. This operates as a single zone, with TRVs on radiators. No weather compensation is used, being less suited to Passivhaus buildings where gains form a large proportion of total heat loss.

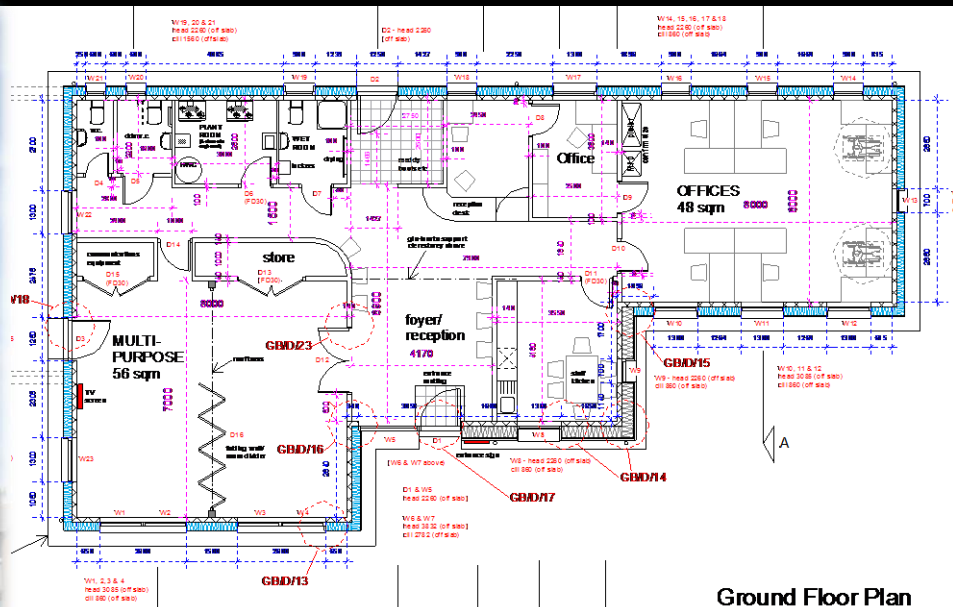
Hot water is distributed from the combi boiler via small bore pipework to minimise deadleg losses. Usage is low, so the additional losses from a solar thermal system could easily have resulted in a higher annual gas consumption than the simpler and cheaper system used here.

Ventilation is zoned by the use of two separate domestic MVHR units. One serves the general offices and the other serves the large meeting rooms. The MVHR manufacturer's room control units provide a 7-day programme of ventilation rates with simple manual over-ride for unplanned use. The MVHR control unit also operates electric frost protection and summer bypass.

Lighting uses high frequency fluorescent throughout for low energy use at reasonable cost. Lighting was carefully modelled to minimise installed loads, to avoid reliance on excessive automatic controls for energy efficiency. There are simple daylight/PIR sensors in circulation area and WCs, and daylight dimming in the main office.

AESTHETICS

form

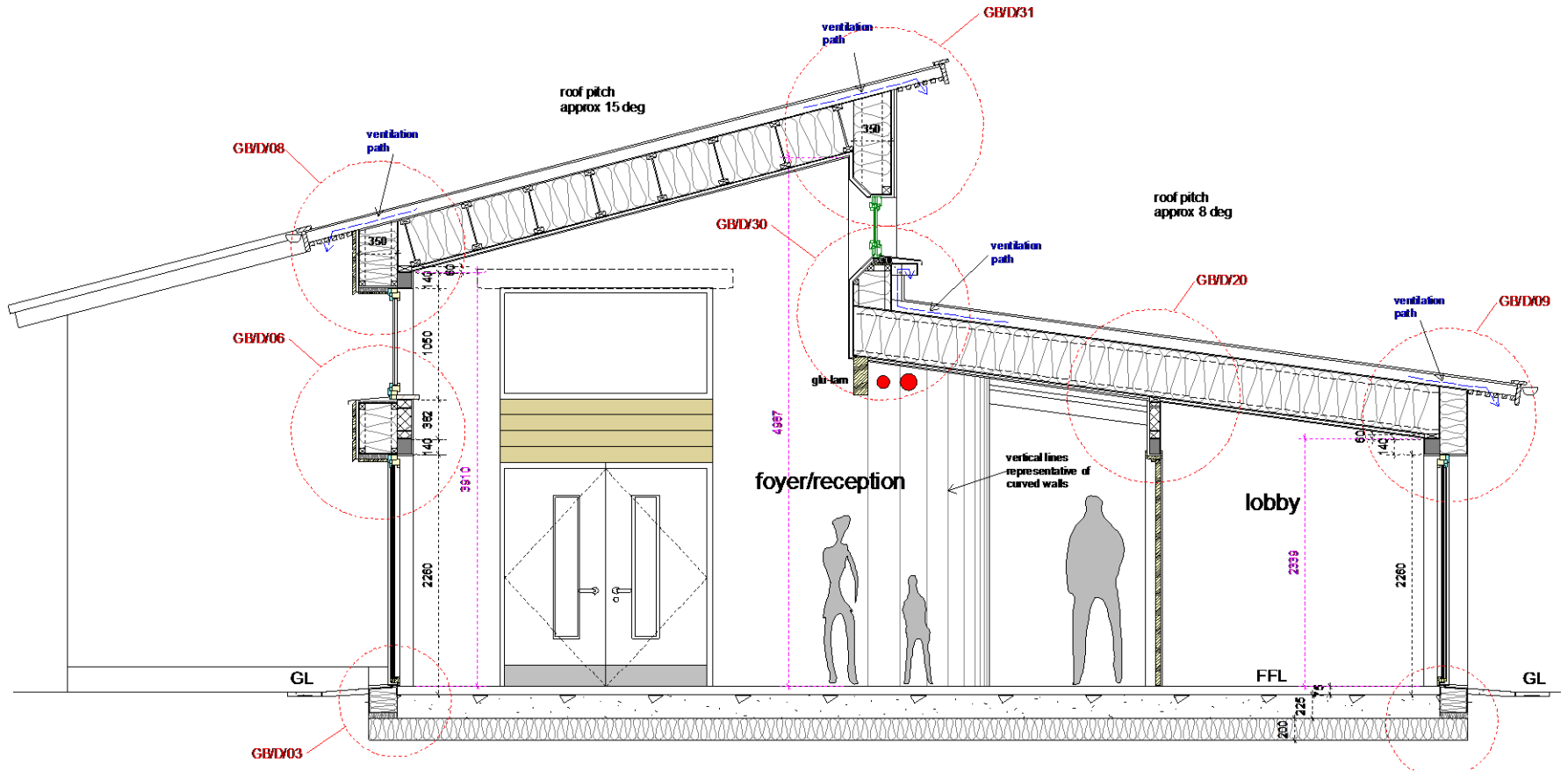


The plan has a straightforward logic:

- Central entrance to south for the public, north from staff car park
- Clear circulation
- Service zone to north
- Multi-purpose room to SW with sun / view to garden
- Staff office to East for good supervision of site, single room width for good daylight, security away from public area.

AESTHETICS

volumes



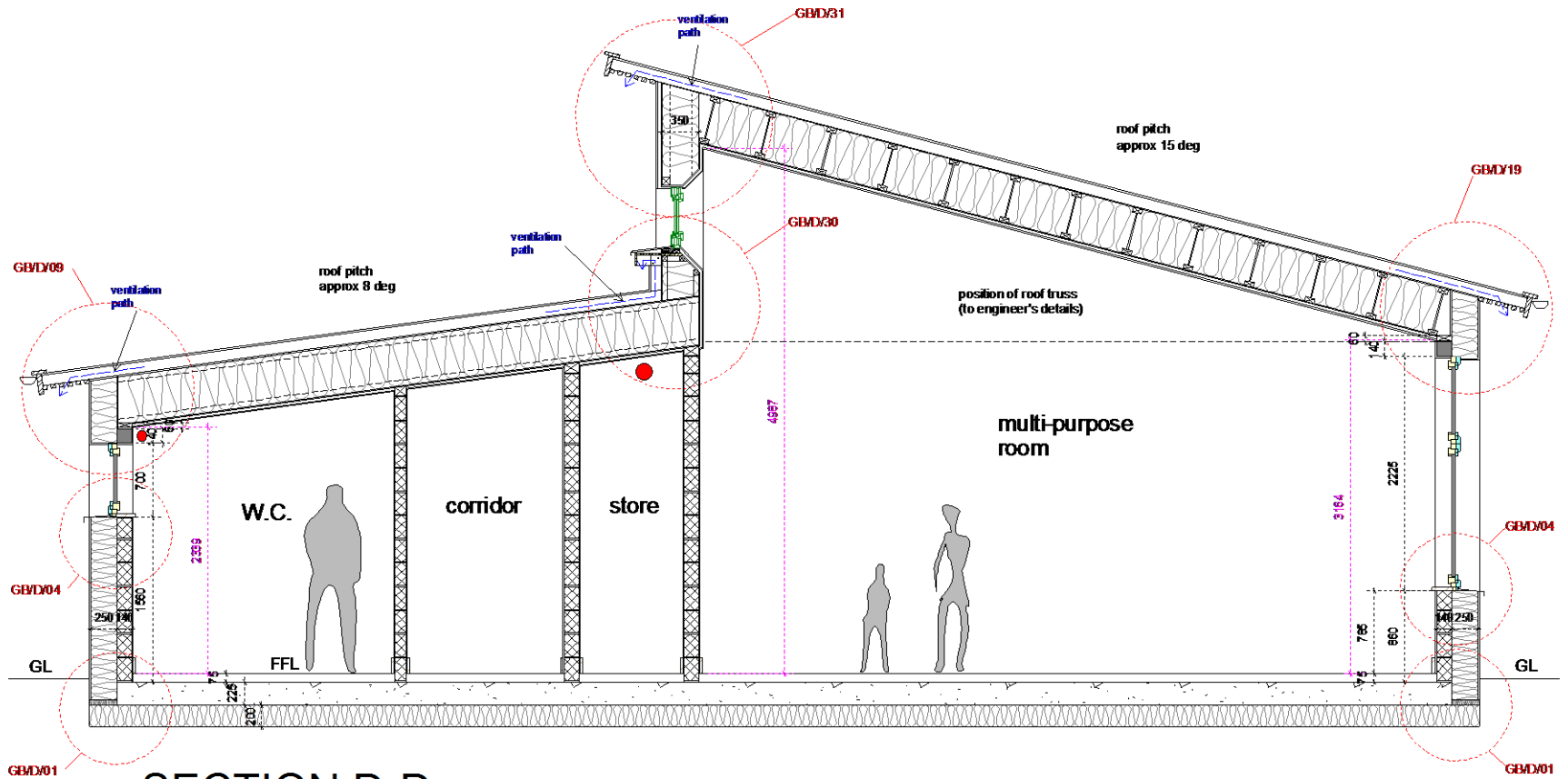
AESTHETICS

entrance foyer



AESTHETICS

volumes



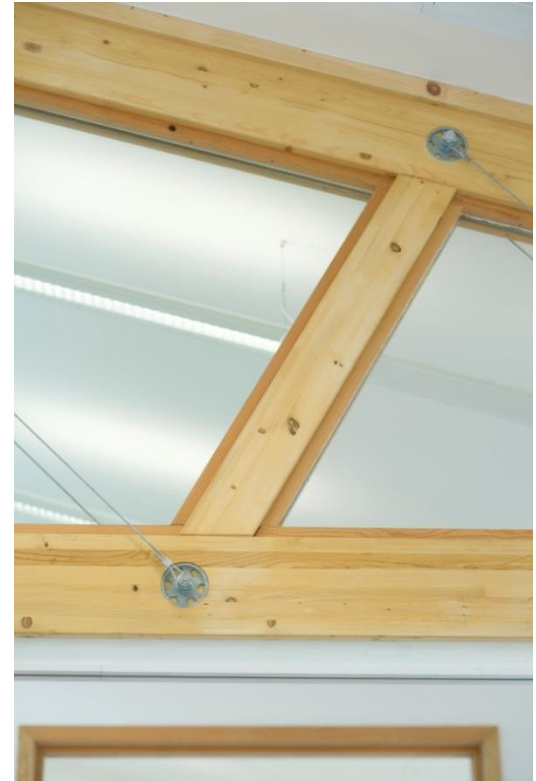
AESTHETICS

Multipurpose hall

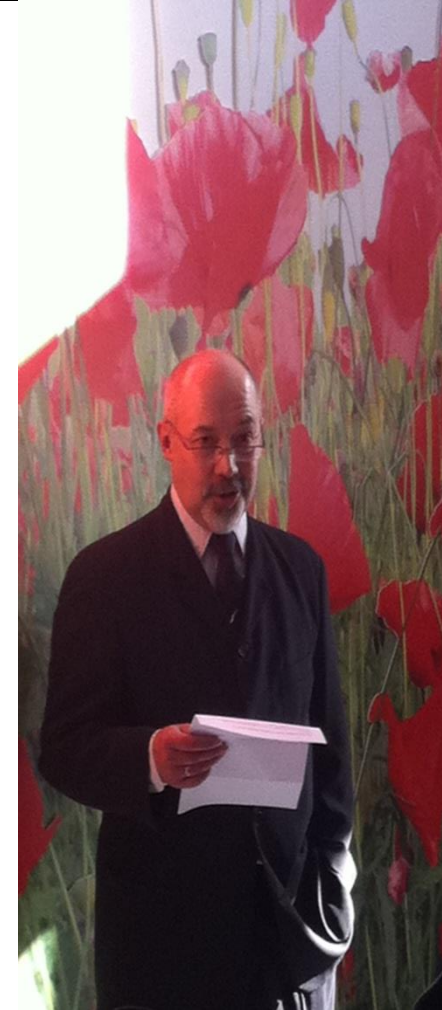
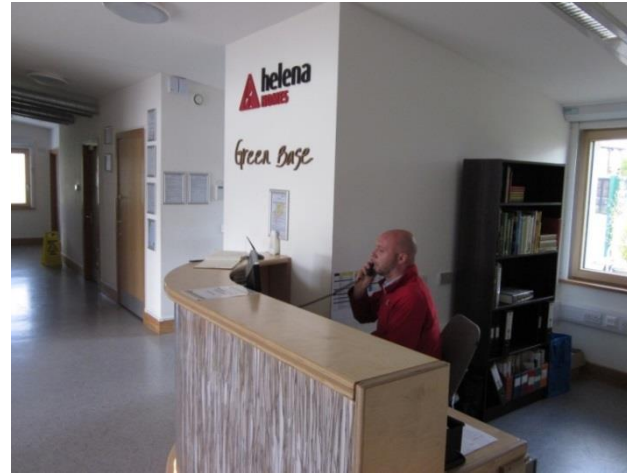


AESTHETICS

Multipurpose hall – partitioned with folding screen



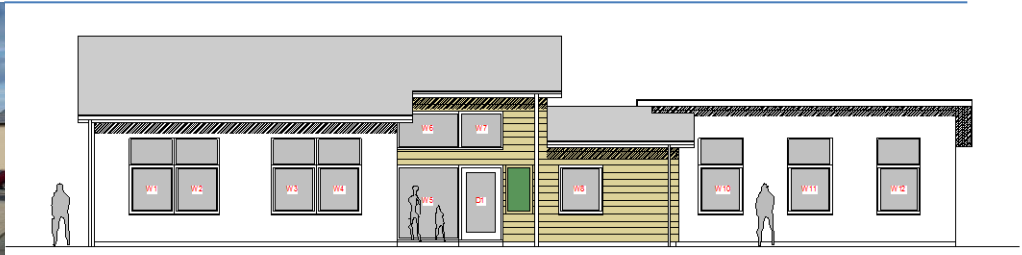
AESTHETICS with people!



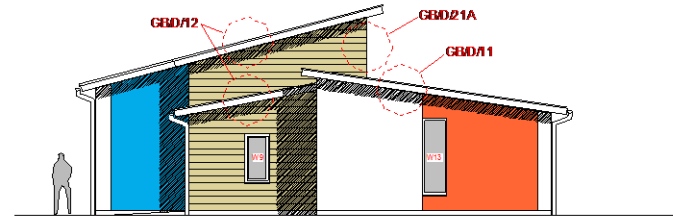
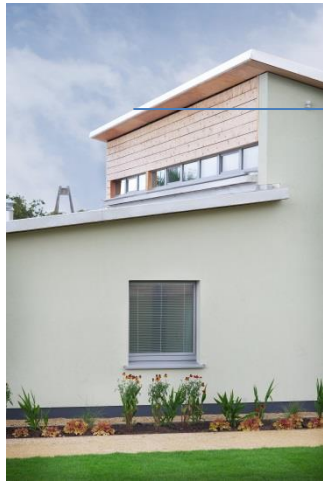
Internally, the spaces are functional, well lit and visually comfortable. Light wall colours were chosen to maximise daylight via reflectance to further minimise need for electrical light. A few walls were decorated more dramatically. This approach is in keeping with the energy efficiency of the building, but also provides a calm backdrop to the wide variety of activities the building is used for.

AESTHETICS

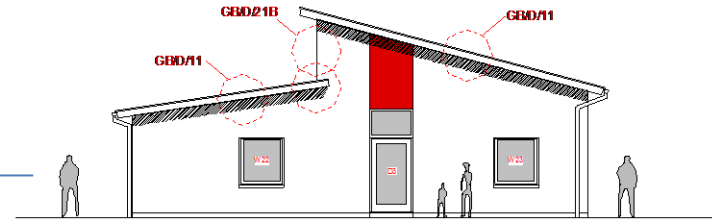
elevations



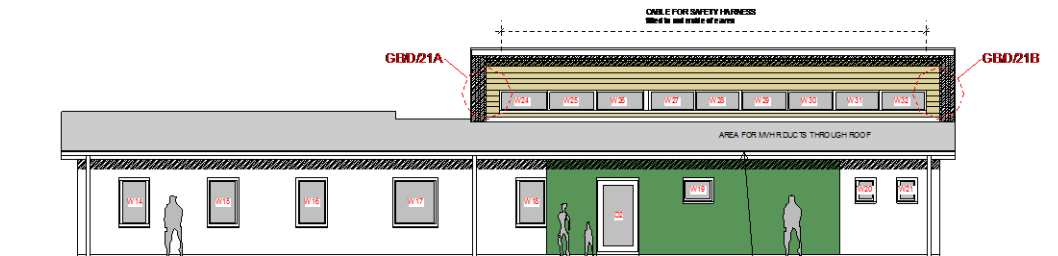
SOUTH ELEVATION



EAST ELEVATION



WEST ELEVATION

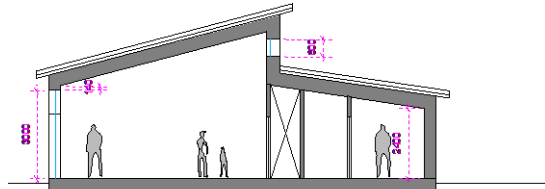


NORTH ELEVATION

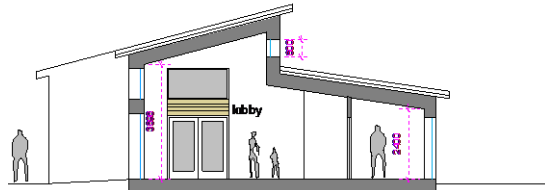
NOTE: FOR SAFETY PURPOSES
DO NOT USE STAIRS

SECURE UNDER FLOOR
DOOR TO STAIRS AND WALKWAY

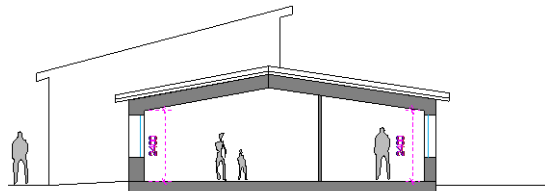
AESTHETICS construction



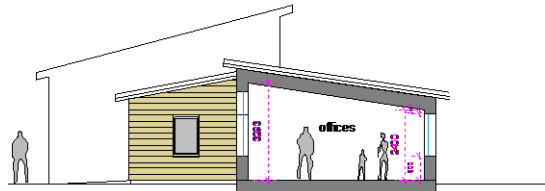
SECTION D-D



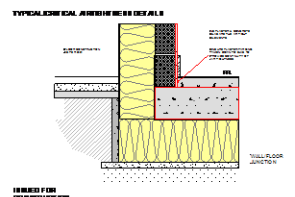
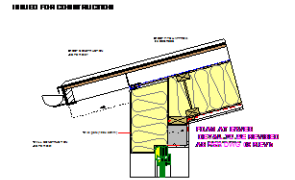
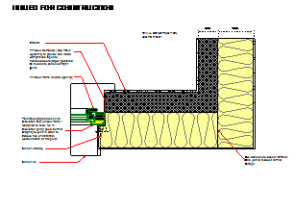
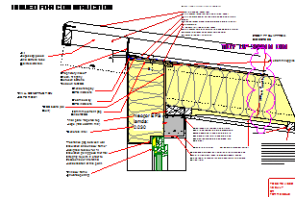
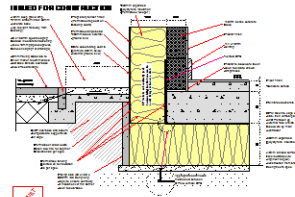
SECTION C-C



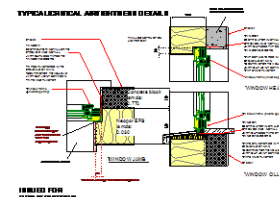
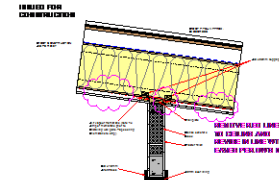
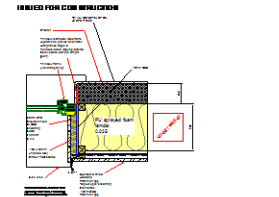
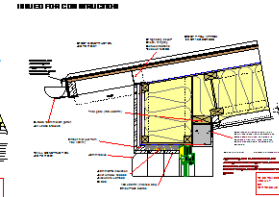
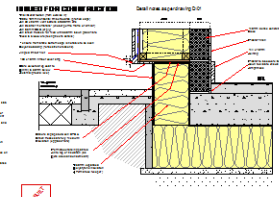
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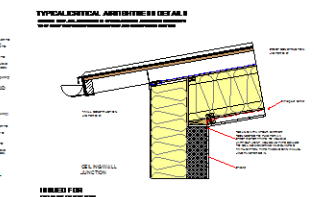
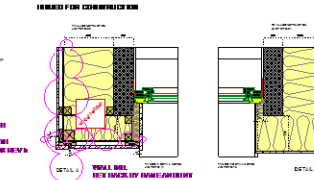
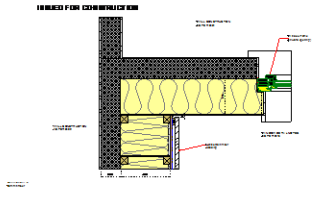
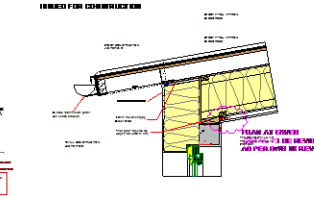
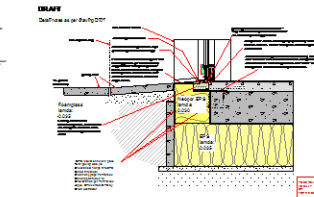
SECTION A-A



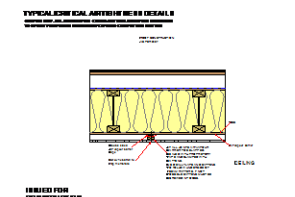
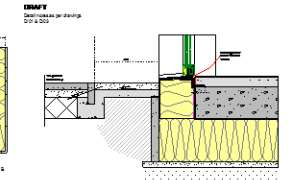
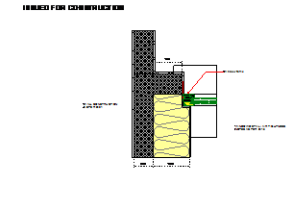
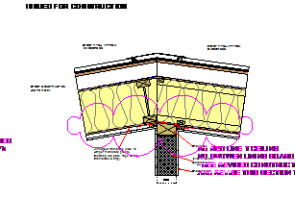
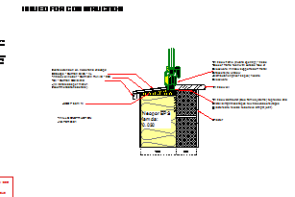
FINISH FOR CONSTRUCTION



FINISH FOR CONSTRUCTION



FINISH FOR CONSTRUCTION



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OTHER SUSTAINABILITY CREDENTIALS

- 'Green' products used / reused materials

- Low VOC OS wood paint and stains
- Reception desk using recycled & natural materials
- Low water usage sanitary ware
- Rainwater collection butts from downpipes.

- Certified 'sustainable' timber

- FSC accredited timber generally and
- Cladding timber sourced from UK woodland

- Biodiversity

- Landscape of key importance to the use of the building, incorporating porous hard surfaces, wide variety of planting for increased biodiversity, wildlife value, sensory aspects, and aesthetic appeal
- The site will develop vegetable-growing plots over the near future, working with the community to re-invigorate knowledge of food growing skills

The Green base

