

Project Documentation Gebäude-Dokumentation



Abstract | Zusammenfassung



Wheatfield Barns in Marshfield, South Gloucestershire

Data of building | Gebäudedaten

Year of construction Baujahr	2025	Space heating Heizwärmebedarf	15 kWh/(m ² a)
U-value external wall U-Wert Außenwand	0,138 W/(m ² K)		
U-value basement U-Wert Kellerdecke	0,135 W/(m ² K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	61 kWh/(m ² a)
U-value roof U-Wert Dach	0,06 W/(m ² K)	Generation of renewable Energy Erzeugung erneuerb. Energie	28 kWh/(m ² a)
U-value window U-Wert Fenster	0,88 W/(m ² K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	74 kWh/(m ² a)
Heat recovery Wärmerückgewinnung	87 %	Pressurization test n ₅₀ Drucktest n ₅₀	0,4 h ⁻¹
Special features Besonderheiten			

Brief Description

Passive House Wheatfield Barns

Wheatfield Barns consists of 15 certified Passivhaus homes with associated parking, shared open green space, trees and wildflower planting. The scheme was led by the Marshfield Community Land Trust, a not-for-profit organisation established to address the shortage of local affordable housing, in cooperation with the Ball family who provided the land and Brighter Places housing association by whom the properties are leased and managed. The homes are also the first in South Gloucestershire to be delivered through the Rural Exception Site Policy.

Inception and concept design began on the desks of London-based firm, Reed Watts Architects. Inspired by the surrounding character of the Cotswolds National Landscape, farmyard typology was envisioned. Modest barn-like structures sitting low in the landscape look inwards to a central open space, and are finished with a mix of warm, textured brickwork and contrasting dark grey cladding to gable ends.

gcp Chartered Architects was approached by contractor Winsley White to provide Passivhaus expertise and technical design for RIBA stages 4-7. The layouts were developed to meet occupants' changing needs over time in line with Part M. In keeping with the project's fabric-first approach and by including energy efficient building services such as heat-pumps, MVHR and solar panels, gcp completed the Passive House Planning Package (PHPP) and detailed design to ensure the homes achieve Passivhaus certification. All homes also successfully achieved the Secured by Design Developers Silver Award.

Responsible project participants

Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	gcp Chartered Architects www.gcparch.co.uk
Implementation planning Ausführungsplanung	Reed Watts Architects https://www.reedwatts.com/
Building systems Haustechnik	Zehnder https://www.zehnder.co.uk/en
Structural engineering Baustatik	-
Building physics Bauphysik	gcp Chartered Architects www.gcparch.co.uk
Passive House project planning Passivhaus-Projektierung	gcp Chartered Architects www.gcparch.co.uk
Construction management Bauleitung	Winsley-White Building Contractors & Developers https://winsleywhite.co.uk/

Certifying body

Zertifizierungsstelle

Passivhaus Institut Darmstadt www.passiv.de	Etude https://etude.co.uk/
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Certification ID

Zertifizierungs ID

51922-51923_ETUDE_PH_20251215_NG	Project-ID https://passivehouse-database.org/#d_8133
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Author of project documentation

Verfasser der Gebäude-Dokumentation

Passivhaus Institut Darmstadt www.passiv.de	
Date Datum	Signature Unterschrift
30.01.2026	

1. Ansichtsfotos



2. Innenfoto exemplarisch

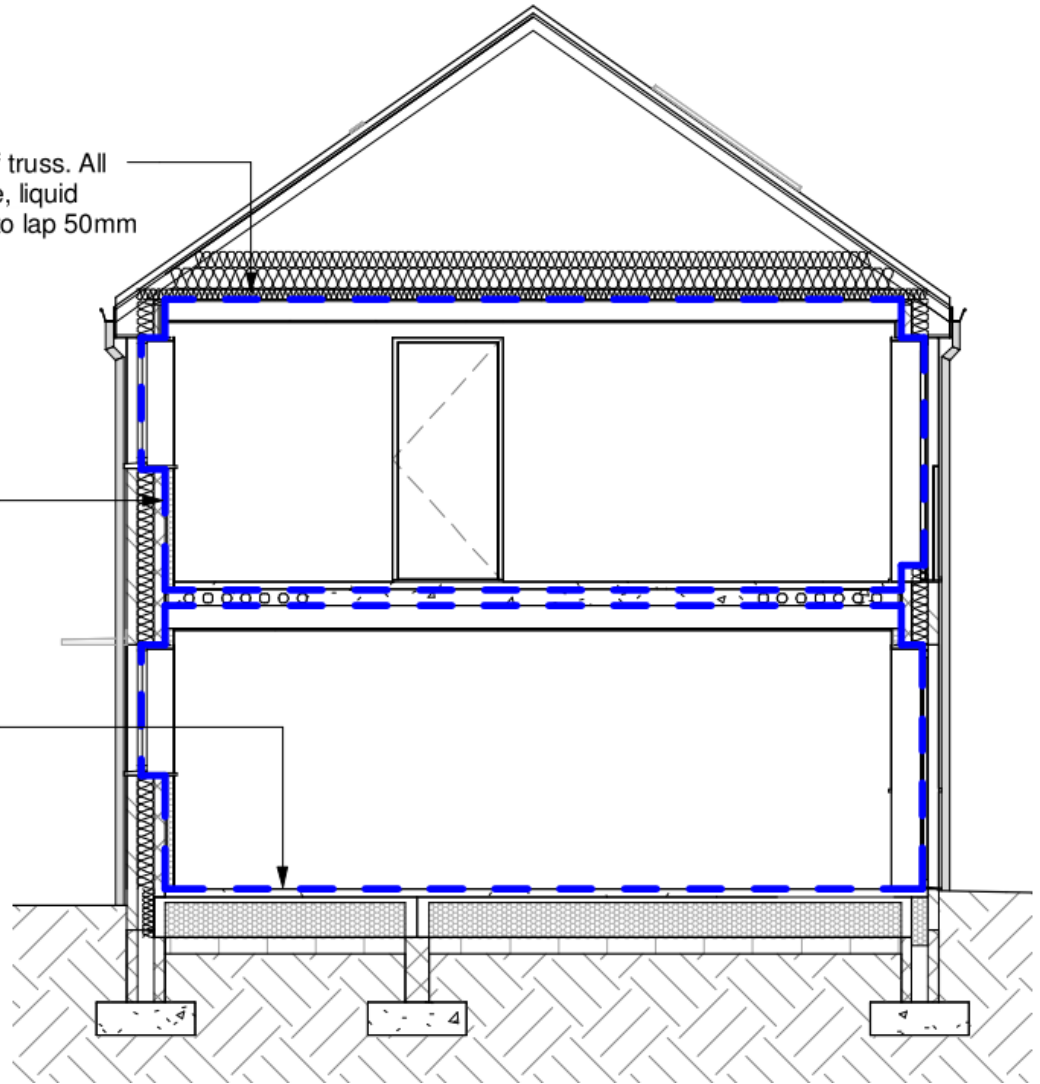


3. Schnittzeichnung

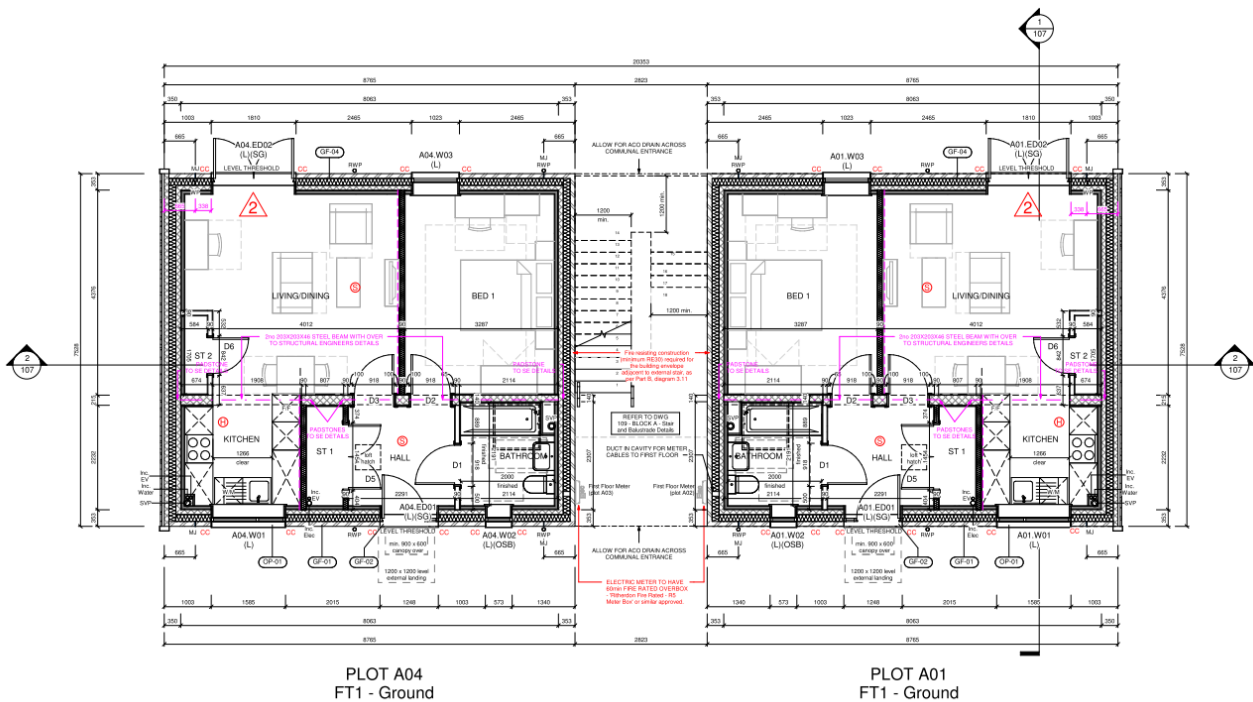
Airtight board to underside of truss. All joints sealed with airtight tape, liquid applied membrane returned to lap 50mm with airtight board.

Liquid applied membrane to face of external wall blockwork and applied around joist hangers.

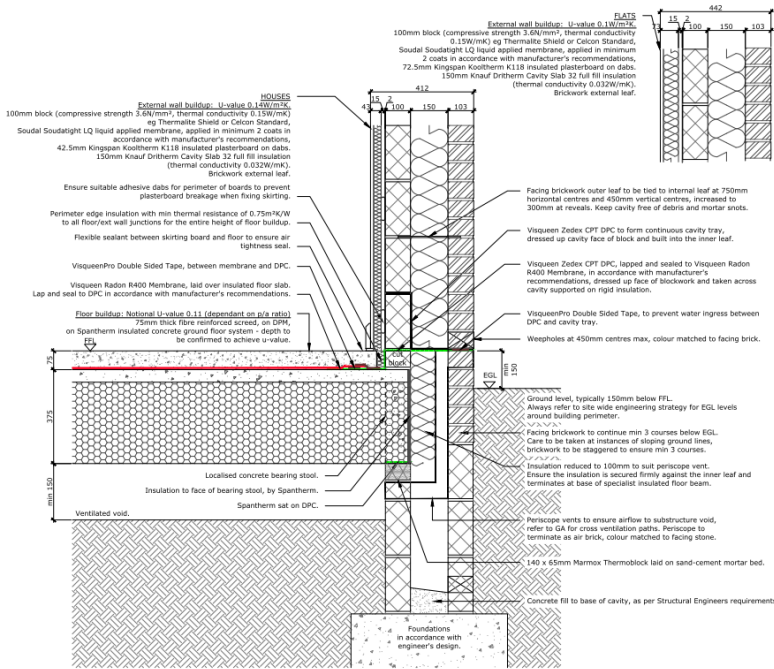
DPM below screed, lapped with DPC dressed up face of block. Liquid applied membrane to lap with DPC membrane.



4. Grundrisse

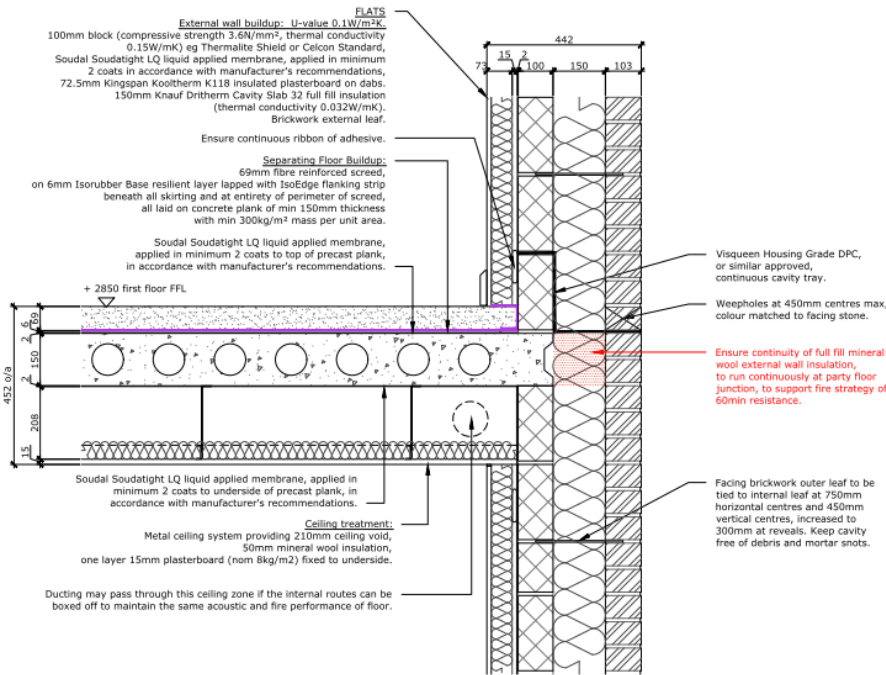


5. Konstruktion der Bodenplatte



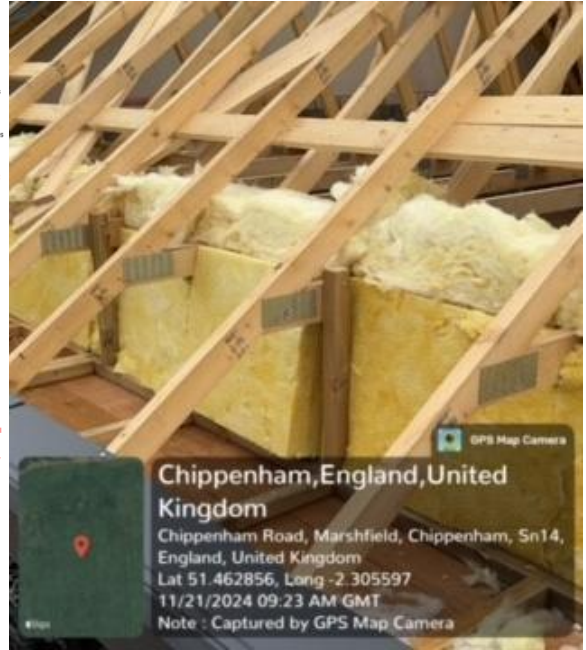
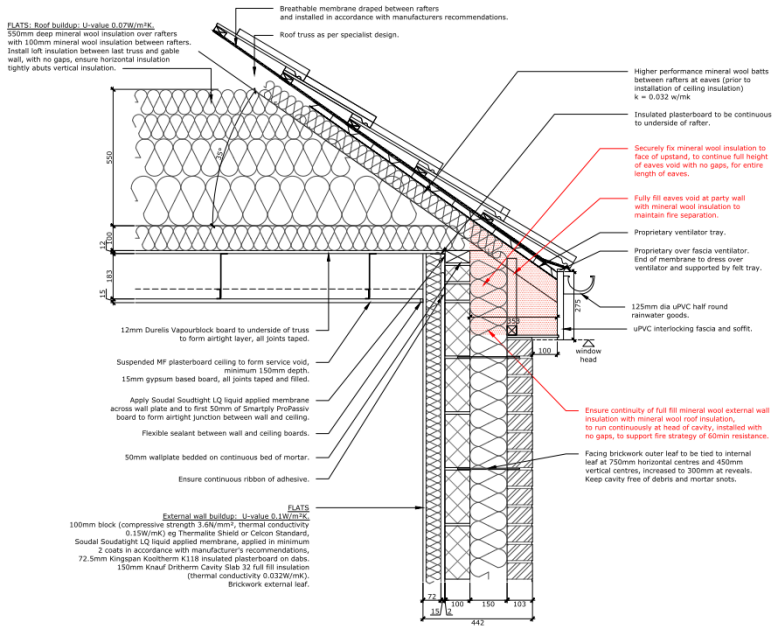
Description of building assembly		Assembly no.				
ground floor insulated slab		01ud				
Orientation of building assembly (or R _{si}) 3-Floor		Interior insulation?				
Adjacent to (or R _{se}) 3-Ventilated		U-value supplement [W/(m²K)] -0.121				
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Screed	1.400					75
Plank	2.000			EPS	0.031	50
EPS	0.031	Plank	2.000			250
EPS	0.031					75
Percentage of sec. 1: 81%		Percentage of sec. 2: 16.4%		Percentage of sec. 3: 2.3%		
Heat transmission resistance coefficients				Total thickness [cm]: 45.0		
Interior R _{si} : 0.17 m²K/W						
Exterior R _{se} : 0.17 m²K/W		U-value [W/(m²K)]: 0.135				

6. Konstruktion der Außenwände



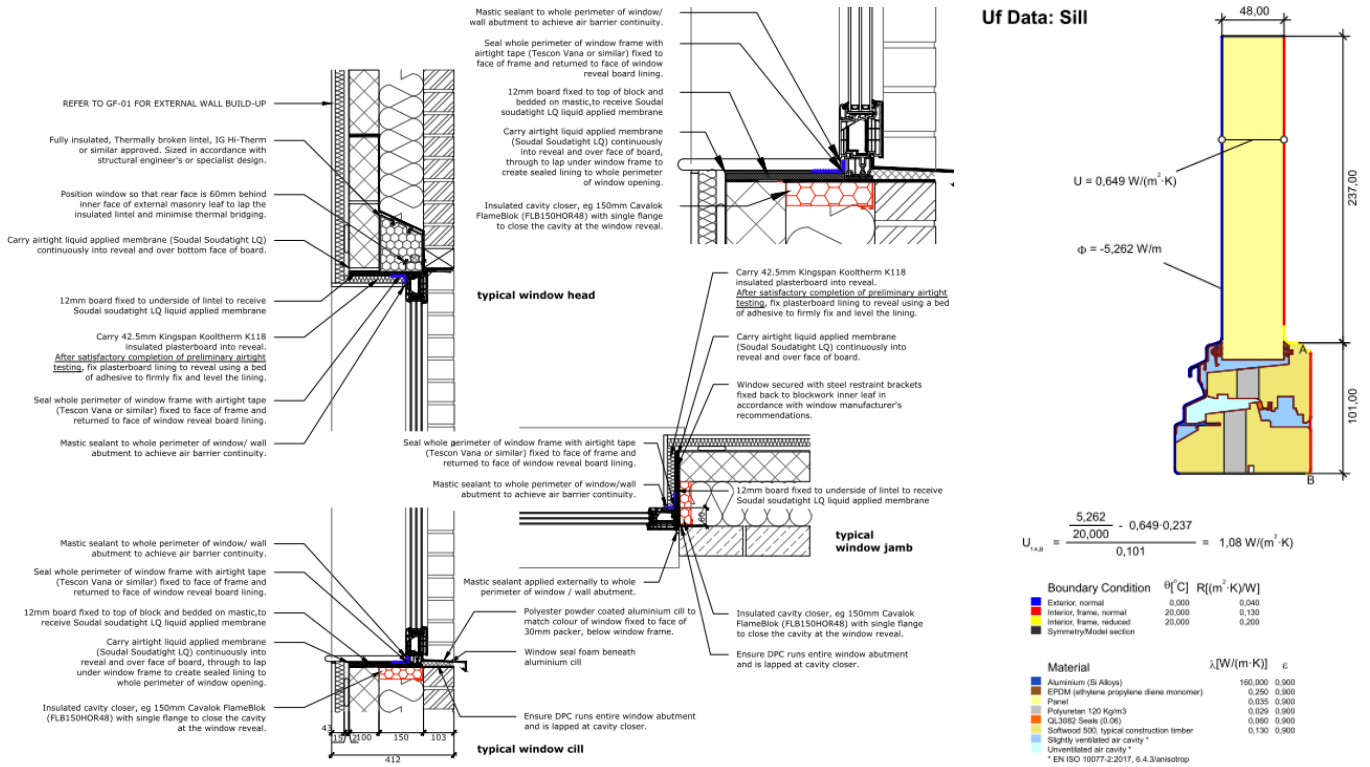
Description of building assembly							Assembly no.		
external wall							02ud		
Orientation of building assembly (or R_{si})			2-Wall		Interior insulation?				
Adjacent to (or R_{se})			1-Outdoor air		U-value supplement [W/(m²K)]				
Area section 1		λ [W/(mK)]	Area section 2 (optional)		λ [W/(mK)]	Area section 3 (optional)		λ [W/(mK)]	Thickness [mm]
Plasterboard		0.190							13
Insulation		0.019							60
Cavity		0.088							15
Aerated Conc. Block		0.150	Mortar		0.880				100
Mineral Wool		0.032							150
Brick		0.770				Mortar		0.940	103
Percentage of sec. 1:		76%	Percentage of sec. 2:		7.0%	Percentage of sec. 3:		17.0%	
Heat transmission resistance coefficients							Total thickness [cm]:		
Interior R_{si} :		0.13	m²K/W					44.0	
Exterior R_{se} :		0.04	m²K/W		U-value [W/(m²K)]:			0.138	

7. Konstruktion des Daches



Description of building assembly		Assembly no.				
insulated ceiling		03ud				
Orientation of building assembly (or R _{si}) 1-Roof		Interior insulation?				
Adjacent to (or R _{se}) 3-Ventilated		U-value supplement [W/(m ² K)]				
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Plasterboard	0.190					15
Cavity	1.277					183
OSB	0.144					12
Mineral Wool	0.044	Timber	0.125			100
Mineral Wool	0.044					650
Percentage of sec. 1:		93%	Percentage of sec. 2:	7.0%	Percentage of sec. 3:	
Heat transmission resistance coefficients				Total thickness [cm]: 96.0		
Interior R _{si} :		0.10	m ² K/W		U-value [W/(m ² K)]: 0.058	
Exterior R _{se} :		0.10	m ² K/W			

8. Fenster und Fenster-Einbau



Beschreibung der Fenster (rahmen)-Konstruktion, Hersteller	Nordan
Fabrikat Fenster (rahmen; Produktname)	Ntech One Double
Rahmen-U-Wert Uf	0,75 W/(m ² K)
Bauart der Verglasung	Argon ausgefüllt; 4 18 4 18 4
Glas-U-Wert Ug	0,53 W/(m ² K)
g-Wert der Verglasung	0,53

Reference Detail:

Boundary Conditions in model:

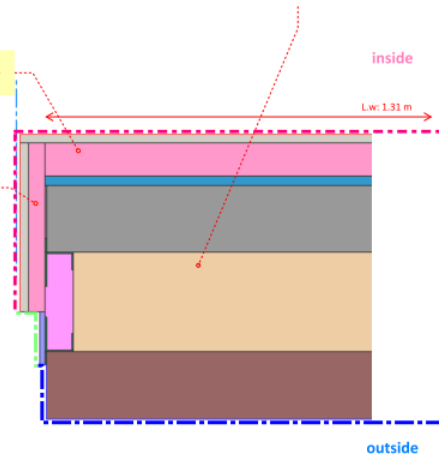
- - - Internal - horizontal heat flow 20 °C 0.13 m²/W
- - - Internal - upwards heat flow 20 °C 0.10 m²/W
- - - External exposed 0 °C 0.04 m²/W
- - - Adiabatic boundary

external wall spec:

- 12.5 mm plasterboard : k = 0.19 W/mk
- 60 mm backing insulation : k = 0.019 W/mk
- 15 mm cavity (dabs) : k = 0.088 W/mk
- 100 mm aerated conc. block : k = 0.15 W/mk
- 150 mm full-fill mineral wool : k = 0.032 W/mk
- 102.5 mm brick external leaf : k = 0.77 W/mk

NOTE: 60mm insulation backing - applies to flats only

NOTE: 25mm insulation to reveals assumed k = 0.019 w/mk



Detail Ref: ggp_dwg_22022-0903
Therm Model View (not to scale)

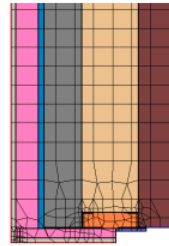
Installation Linear Thermal Transmittance (Psi) $\Psi_i = 0.024 \text{ W/m.k}$ (SAP & PHPP)

Temperature Factor: $T_e = 0^\circ\text{C}$ | $T_i = 20^\circ\text{C}$ | $T_{si} = 19.1^\circ\text{C}$
 $\text{frsi} = (T_{si} - T_e) / (T_i - T_e) = 19.0/20$ **frsi = 0.950**

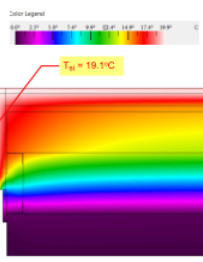
Model Thermal Views:

Finite Element Mesh

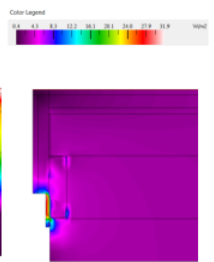
Total number nodes in simulation: 566



Isotherms
(lines of constant temperature)



Heatflux
(heatflow through materials)



Calculation Summary:

Option	Selection
Junction Group	Junction_with_an_external_wall
Junction Detail	Jamb
SAP ref	E4
Description	Std. window/door jamb/flats
2D or 3D	2D
Heat loss value	Thermal coupling, L2D (W/(mK))
L2D (W/(mK))	0.1690
U_{jamb} (Wm ⁻² K ⁻¹)	0.1105
l_{jamb} (m)	1.3100
T_{si} (°C)	0.000
ψ -value (Wm ⁻² K ⁻¹)	0.0243

Total 2D heat loss in simulation (L2D) = 0.1690 W/mK

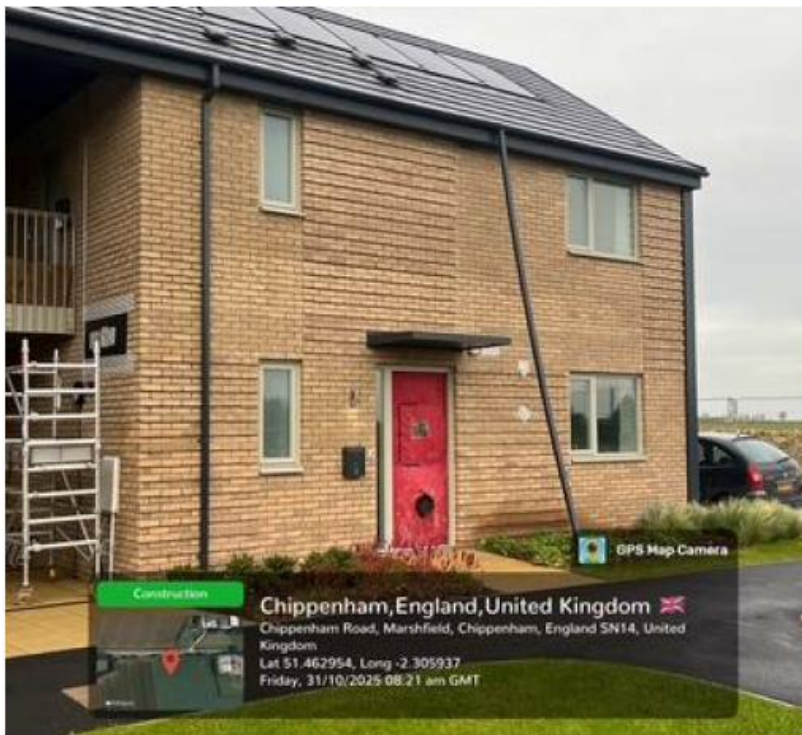
Mono dimensional heat loss Wall (fe1) = 1.31m x 0.1105 W/m²K = 0.14475 W/mK

$\Psi_i = \text{L2D} - \text{L1D}$

$\Psi_i = 0.1690 - 0.14807 = 0.024 \text{ W/mK}$



9. Beschreibung der luftdichten Hülle

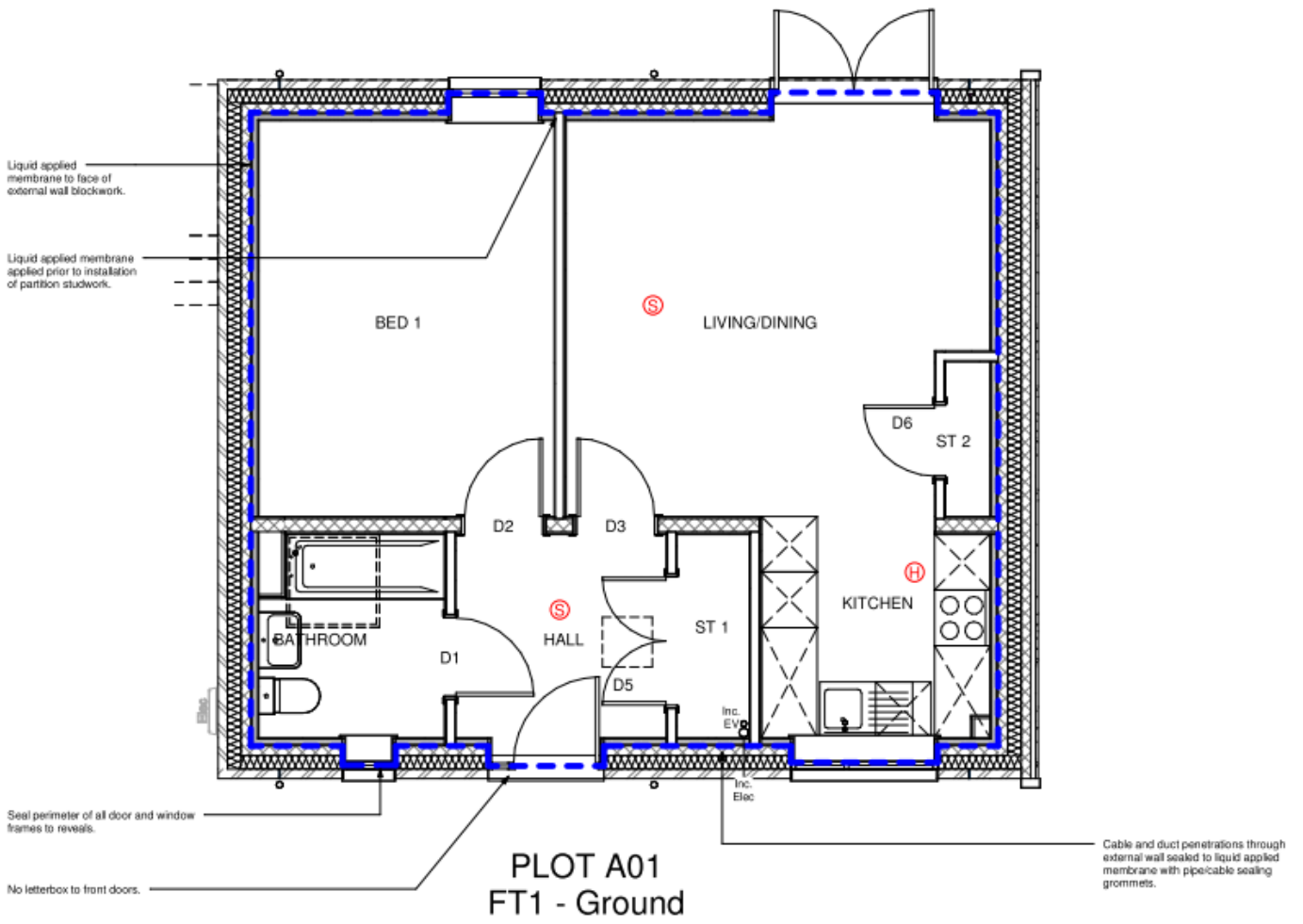


eco-futures		Unique Certificate Number: 10460440		elmhurst energy		
Passivhaus and Low Energy Building Airtightness Test Certificate	Building Name/Plot Number: Plot A01	Average Air Permeability (AP)	0.26 m ³ (h.m ²) @ 50 Pa	Average Air Changes per Hour (n)	0.379 h ⁻¹ @ 50 Pa	
	Building Address: Chippenham Road, Marshfield, Chippenham, Wiltshire, SN14	Property Type: Flat - Ground floor	Pressurised	Depressurised		
	Coefficient of Determination (r²)	0.9991	0.9998			
	Flow Exponent (n)	0.673	0.756			
	Air Changes per Hour (n)	0.374	0.384			
	Air Permeability (AP)	0.25	0.26			
	Test Information					
	Test Method: Blower Door	Test Standard: ATTMA TSL4				
	Test Date: 31 st October 2025	Retest: No				
	Building Envelope Area (m²): 176.50	Building Volume (m³): 119.30				
Type of Building: New Build Domestic	Building Status: Stage 3 - completion					
Building Preparations: Drainage traps filled/sealed, Internal doors opened, Windows & external doors closed, Mechanical Ventilation grilles sealed						
Deviations/Notes: None						
Tester Information						
Company: Eco-Futures	Name: Paul Short					
Level of Competence: Level 2	EAS Tester Number: 0432					
Contact: 07792541247 paul@eco-futures.co.uk	Testers Report Reference: None					
Related Party Disclosure: No related party						
Should you have any enquires about this certificate or require the full test report please contact the testing company.						
Elmhurst Airtightness Scheme - Registered Competent Persons Scheme						
16 St Johns Business Park, Lutterworth, Leicestershire, LE17 4HB e: airtest-support@elmhurstenergy.co.uk, t: 01455 555 217 w: elmhurstairtightness-scheme.co.uk						

Building:	Plot A01 Chippenham Road Marshfield Chippenham, Wiltshire England SN14
Date of Construction:	2025
Test Engineer:	Paul Short
EAS Registration:	0432
Level of competence:	Level 2
Test Standard:	ATTMA TSL4 / CIBSE TM23

Test Date:	31/10/2025
Test Time:	08:15:54
Net Floor Area, A_F:	50.9
Envelope Area, A_E:	176.5
Volume, V:	119.3
Building Preparation:	Method A
Volume Calc Prepared By:	Passivhaus Assessor
From:	PHPP Software
Signed:	

The air-tightness strategy comprised an Aerobarrier sprayed liquid membrane which was applied during building pressurisation to ensure all gaps are suitably filled.



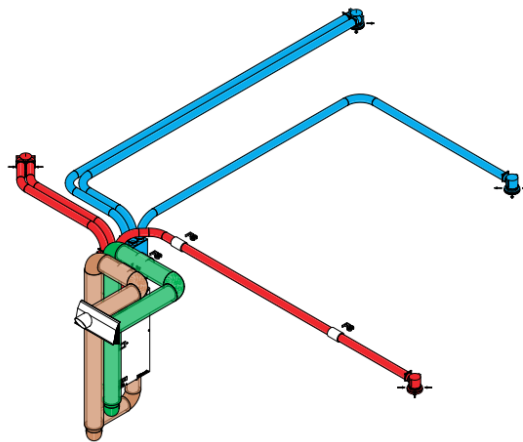
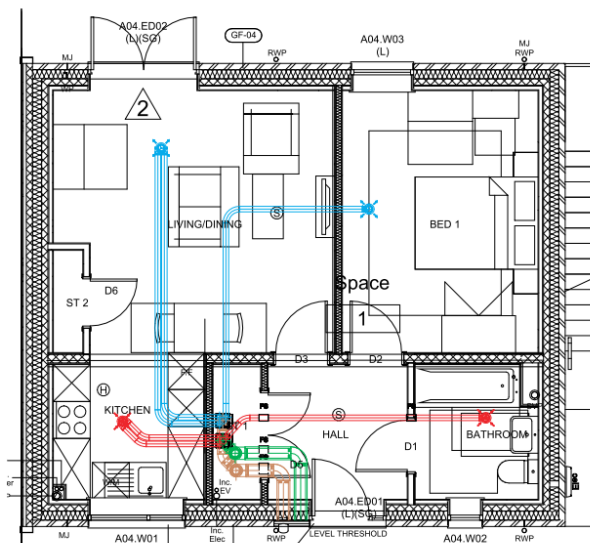
10. Lüftungsgerät



Fabrikat Lüftungsanlage	Zehnder ComfoAir 200
effektiver Wärmebereitstellungsgrad	87 %
Elektroeffizienz	0,42 Wh/m ³

The ventilation system consisted of one MVHR unit per flat fitted with suitable attenuators, insulated ductwork, and filters.

11. Lüftungsplanung Kanalnetz



1 Flat 1
1 : 75

2 Flat 1 3D Layout

Nr Room	Design - Base		Design - Normal		Design - Peak	
	V supply m ³ /hr	V extract m ³ /hr	V supply m ³ /hr	V extract m ³ /hr	V supply m ³ /hr	V extract m ³ /hr
1 Kitchen		30		43		54
2 Bathroom		18		26		34
3 Hallway						
4 Living room	27		39		50	
5 Bedroom 1	21		30		38	
Sum:	48.00m ³ /h	48.00m ³ /h	69.00m ³ /h	69.00m ³ /h	88.00m ³ /h	88.00m ³ /h

- CA200 located in store cupboard
- Ø160mm insulated steel ducting to Combined grille
- Ø90mm ComfoTube to internal valves
- Fire sleeves to be provided where ducting passes through fire barriers
- Steel ducting fire protection provided by others

Supply and extract ductwork was kept to a minimum to reduce thermal bridges. 90mm Comfo Tube ducting allowed for a small service void below the ceiling.

12. Wärmeversorgung

Heating is provided by an Edel air to water heat pump for domestic hot water, and localised electric panel heaters for any additional space heating required.



13. Baukosten

14. Literatur

15. PHPP-Ergebnisse

Passive House-Verification

10.6 EN

Building:	Block A1
Street:	2 & 4 Wheatfield Bams
Postcode/City:	SN14 8FL Marshfield
Province/Country:	South Gloucestershire GB-United Kingdom/Britain
Building type:	5-Multi-family house / Apartment building
Climate data set:	GB0006b-Lyneham, Altitude corrected
Climate zone:	3: Cool-temperate
Altitude of location:	177.2 m
Home owner / Client:	Brighter Places
Street:	Eden House, 10 Eastgate Office Park
Postcode/City:	BS5 6XX Bristol
Province/Country:	Bristol GB-Vereinigtes Königreich
Mechanical engineer:	Zehnder Group UK
Street:	Unit 4 & Concept House
Postcode/City:	GU15 3AD Camberley
Province/Country:	Surrey GB-Vereinigtes Königreich
Certification:	Etude
Street:	5 Baldwin Terrace
Postcode/City:	N1 7RU London
Province/Country:	London GB-Vereinigtes Königreich

Architecture:	gcp Chartered Architects	
Street:	Suite 10 Conum 2, Crown Way	
Postcode/City:	BS30 8FJ	Bristol
Province/Country:	Somerset	GB-United Kingdom/Britain
Energy consultancy:	gcp Consulting	
Street:	Suite 10 Conum 2, Crown Way	
Postcode/City:	BS30 8FJ	Bristol
Province/Country:	Somerset	GB-United Kingdom/Britain
Year of construction:	2024	
No. of dwelling units:	2	
No. of occupants:	2.9	
Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]: 25.0
Internal heat gains (IHG) winter [W/m²]:	3.1	IHG summer [W/m²]: 3.1
Specific heat capacity [Wh/K per m² TFA]:	116	Mechanical cooling:

Specific building characteristics with reference to the treated floor area

	Treated floor area m²			Alternative criteria		Fulfilled? ²
				Criteria	Alternative criteria	
Space heating	Heating demand kWh/(m²a)	17	≤	15	-	Yes
	Heating load W/m²	10	≤	-	10	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-	-	-
	Frequency of overheating (> 25 °C) %	2	≤	10	-	Yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20	-	Yes
Airtightness	Pressurisation test result n ₅₀ 1/h	0.4	≤	0.6	-	Yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	79	≤	-	-	-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	64	≤	65	65	Yes
	Renew. energy generation (in rel. to projected building footprint area) kWh/(m²a)	28	≥	-	-	

² Empty field: data missing; '-': No requirement

I confirm that the values given here have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Task: 2-Certification

Certificate-ID: 51922-51923_ETUDE_PH_20251215_NG

First name: Naomi

Issued on: 15/12/25

Surname: Grint

City: London

Passive House Classic? **Yes**

Signature: