

Project Documentation Gebäude-Dokumentation

Abstract | Zusammenfassung



Terrace of 3 houses at Elm Grove, Nailsea, Bristol, UK

Data of building | Gebäudedaten

Year of construction Baujahr	2024	Space heating Heizwärmebedarf	13 kWh/(m²a)
U-value external wall U-Wert Außenwand	0,105 W/(m ² K)		
U-value floor U-Wert Kellerdecke	0,106 W/(m ² K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	57 kWh/(m ² a)
U-value roof U-Wert Dach	0,096 W/(m ² K)	Generation of renewable Energy Erzeugung erneuerb. Energie	166 kWh/(m ² a)
U-value window U-Wert Fenster	0,80 W/(m ² K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	70 kWh/(m ² a)
Heat recovery Wärmerückgewinnung	Unit - 91 % Effective - 82/89 %	Pressurization test n ₅₀ Drucktest n ₅₀	0,45 h ⁻¹
Special features Besonderheiten	10.32 kWp of Solar PV, ASHP hot water cylinder		

Brief Description

Elm Grove, Nailsea, Bristol, UK

This is a terrace of 3 houses (Block Q) which is part of the Elm Grove development in Nailsea, Bristol, UK. The development comprises of 52 dwellings over 20 blocks. 4 of these blocks (8 dwellings) are bungalows which are targeting PHI Low energy Standard, the remaining 16 blocks are targeting the Passivhaus Standard. Currently two blocks (M and Q), each of 3 houses, have been certified.

Block Q has a total treated floor area of 230 m², with each house having a similar layout, with a living/dining room, kitchen and two double bedrooms, over 2 storeys.

The dwellings are built with a Passivhaus-certified timber frame system.

Responsible project participants

Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	APG Architecture https://www.apg-architecture.co.uk/
Implementation planning Ausführungsplanung	APG Architecture https://www.apg-architecture.co.uk/
Building systems Haustechnik	Greengauge Building Energy Consultants https://ggbec.co.uk/
Structural engineering Baustatik	JDL Consultants https://jdlconsultants.co.uk/
Building physics Bauphysik	Greengauge Building Energy Consultants https://ggbec.co.uk/
Passive House project planning Passivhaus-Projektierung	Greengauge Building Energy Consultants https://ggbec.co.uk/
Construction management Bauleitung	Stonewood Homes http://www.stonewoodhomes.co.uk/

Certifying body

Zertifizierungsstelle

Etude Consulting	https://etude.co.uk/
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Certification ID

Zertifizierungs ID

7760	Project-ID (www.passivehouse-database.org) Projekt-ID (www.passivhausprojekte.de)
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Author of project documentation

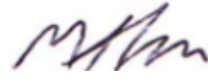
Verfasser der Gebäude-Dokumentation

Mitchell Finn
ggbec.o.uk

Date
Datum

06.02.2025

Signature
Unterschrift



1. View Photos

Ansichtsfotos



East



West



South



North

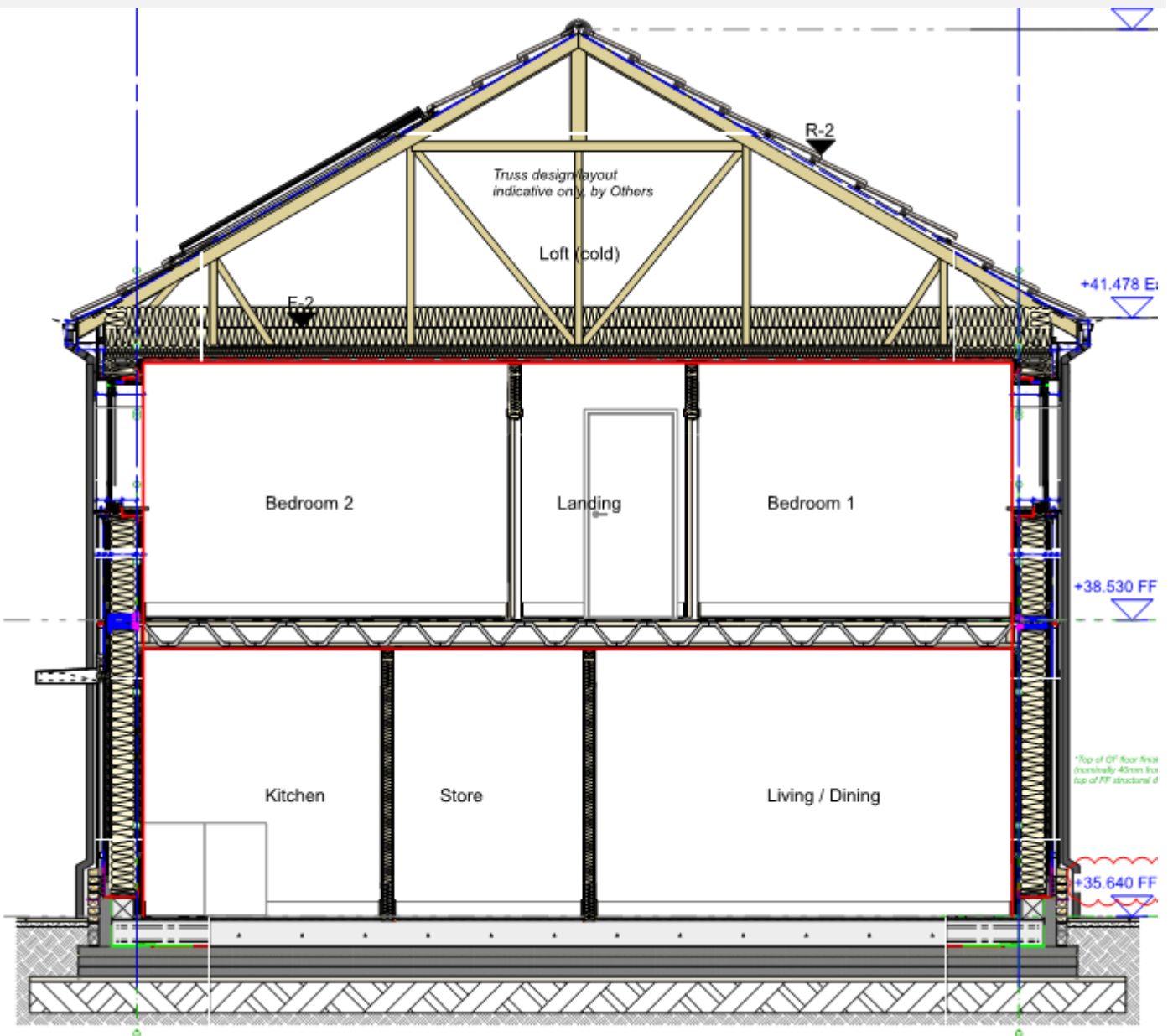
2. Interior Photo

Innenfoto exemplarisch



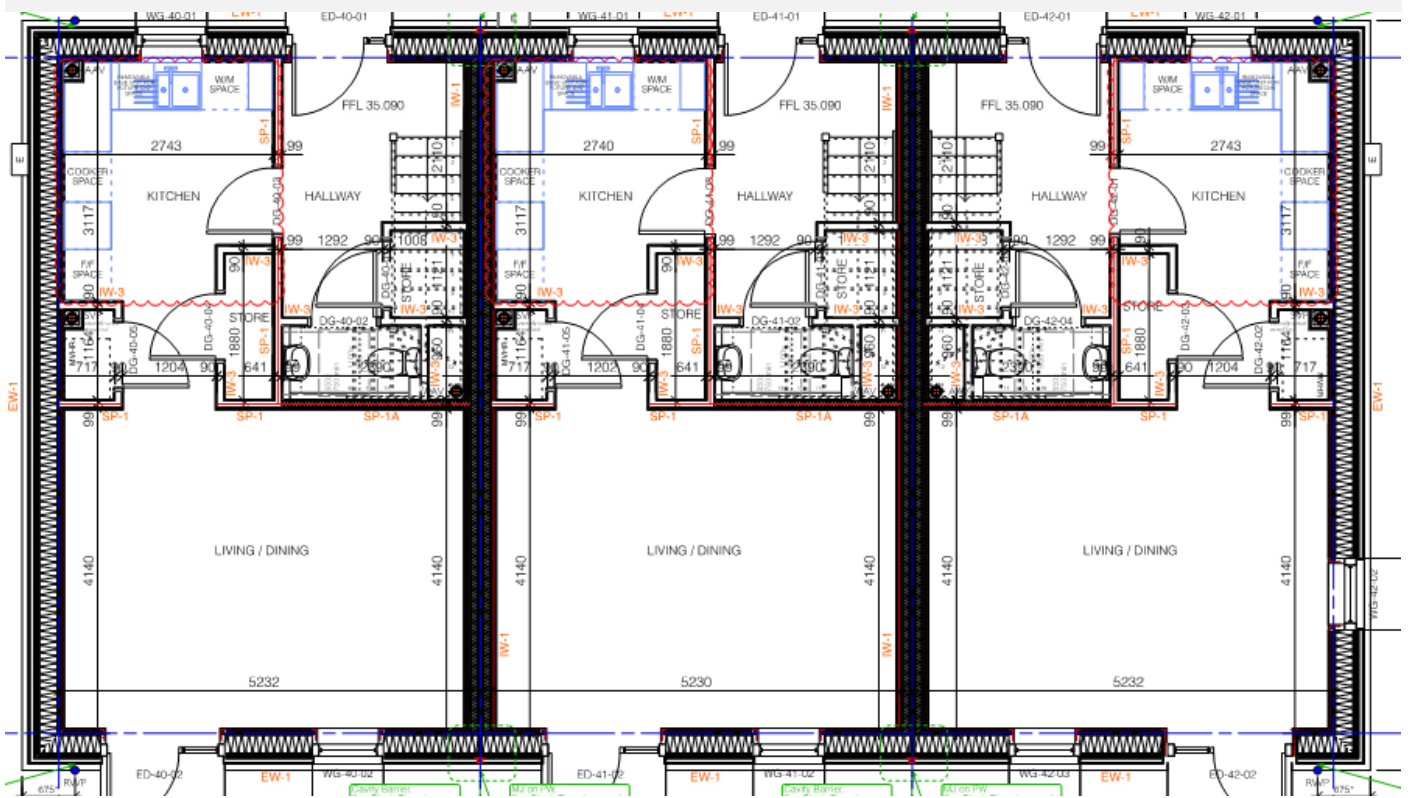
3. Cross Section Drawing

Schnittzeichnung

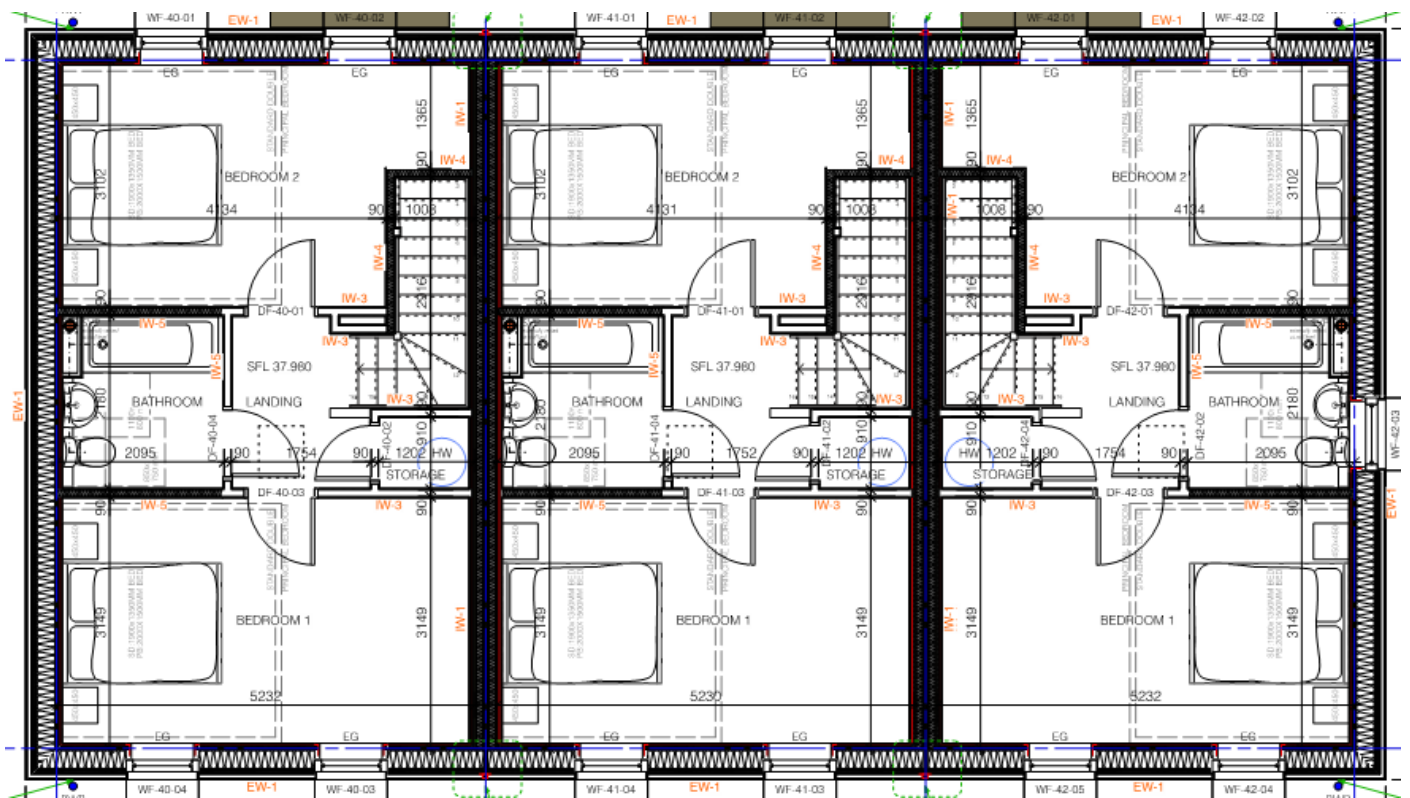


4. Floor Plans

Grundrisse



Ground floor

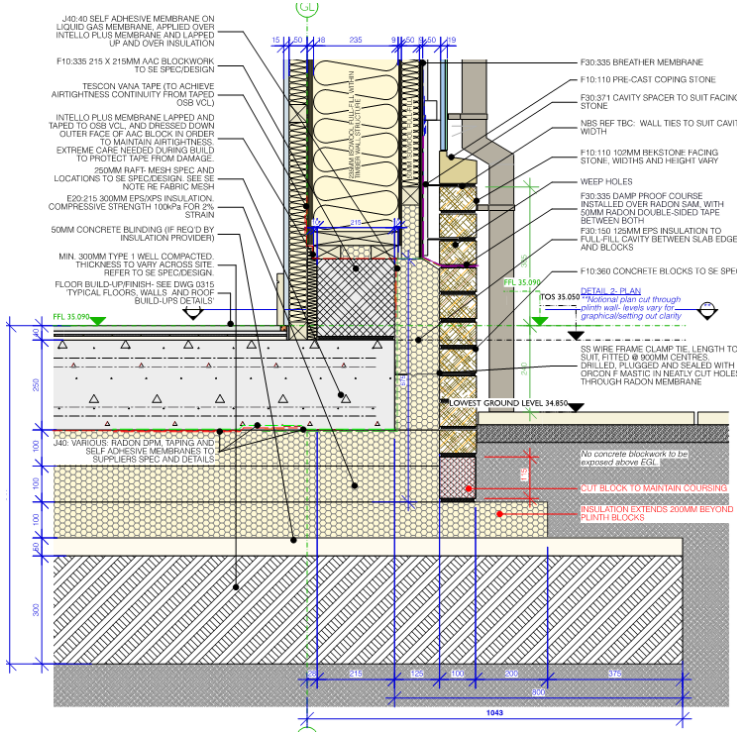


1st floor

5. Floor Construction

Konstruktion der Bodenplatte

Floor insulation is 300 mm XPS. Thermal bridging at the floor edge is mitigated with an aerated concrete block and cavity insulation between the slab edge and brick/blockwork.



Description of building assembly

Assembly no.

Ground floor	01ud
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Orientation of building assembly (or R_{si})	3-Floor	Interior insulation?	<input type="checkbox"/>			
Adjacent to (or R_{se})	2-Ground	U-value supplement [W/(m ² K)]	<input type="checkbox"/>			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Screed / floor finish	1.400					40
Concrete	2.100					250
Polyfoam Floorboard Extra	0.033					300
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:		

Heat transmission resistance coefficients

Interior R_{si} :	0.17	m ² K/W
Exterior R_{se} :	0.00	m ² K/W

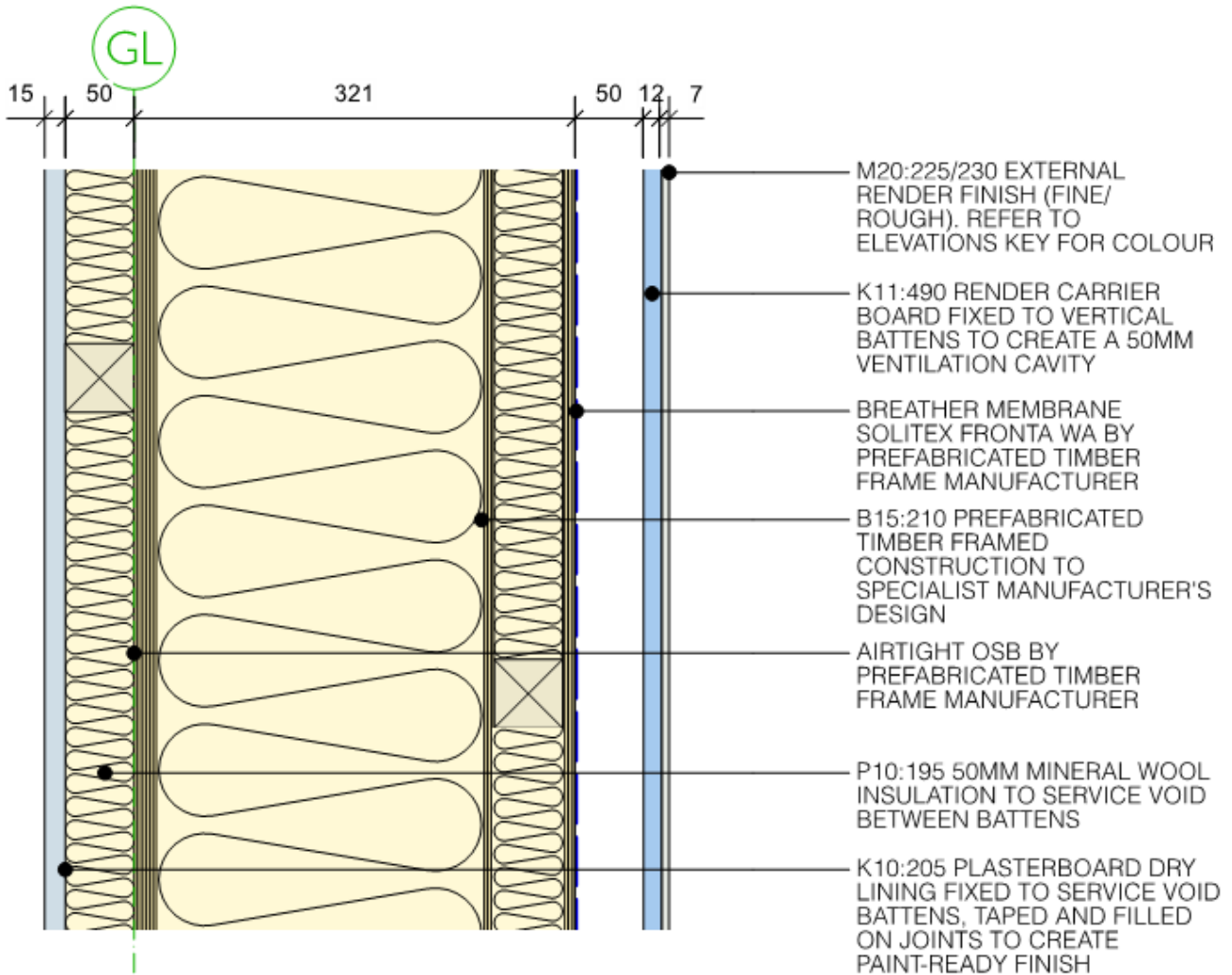
Total thickness [cm]: **59.0**

U-value [W/(m²K)]: **0.106**

6. Wall Construction

Konstruktion der Außenwände

The wall construction is a Passivhaus Certified component from Frame Homes UK. The product name is Frame Ultra which consists of 235 mm mineral wool with the timber frame panel, with 50 mm mineral wool internally (services void) and 50 mm mineral wool externally.



GL

6
Z316

EXTERNAL WALL TYPE EW-2 BUILD-UP

1:5

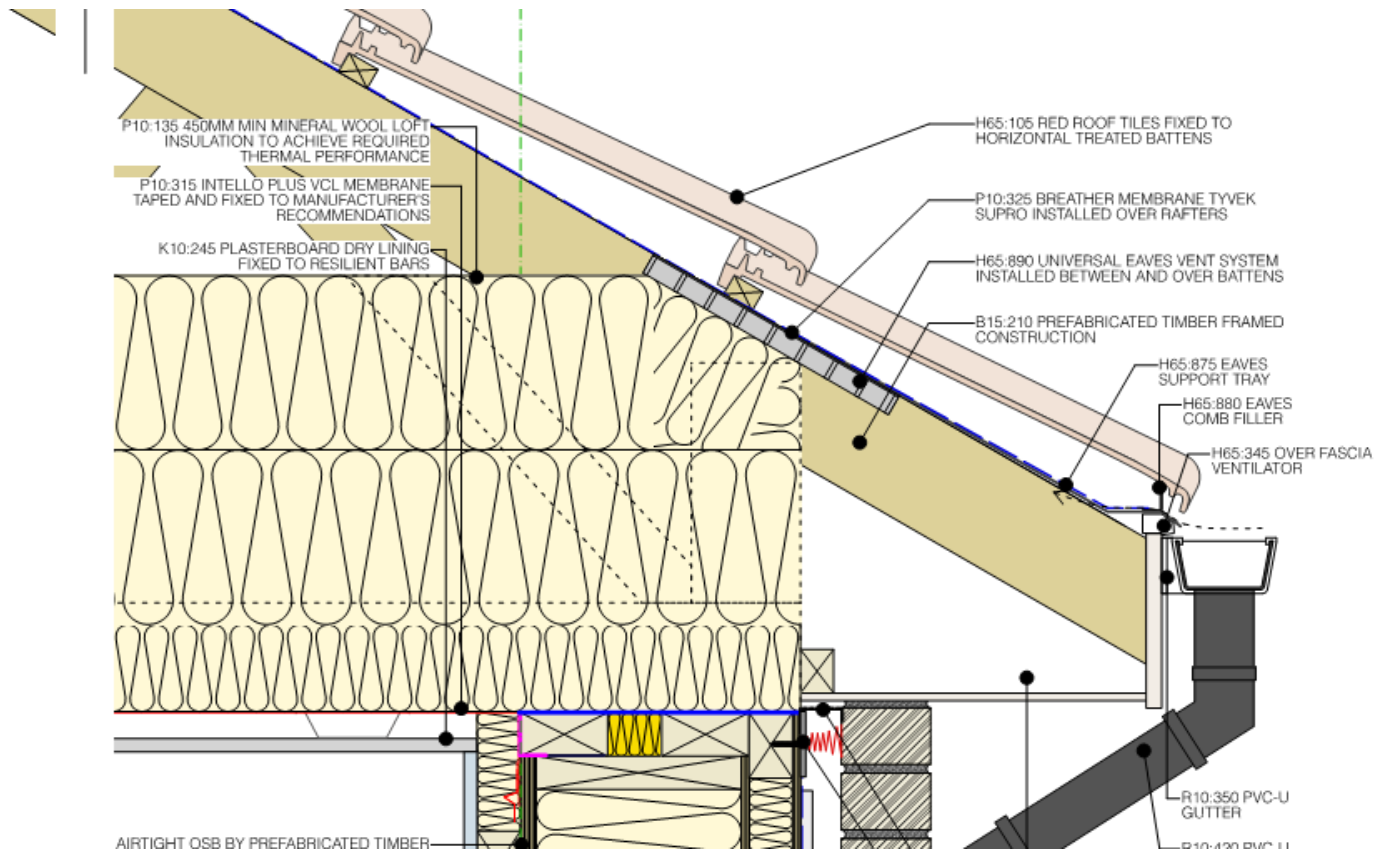


Acronym	Building assembly description		Interior insulation?
EW01	External wall		<input type="checkbox"/>
Orientation of building element	Adjacent to	Heat transmission resistance [m ² K/W]	
2-Wall	3-Ventilated	interior R _{si}	exterior R _{se}
		0.13	0.13
Equivalent conductivity of inhomogeneous layers: Service void			
Material	λ [W/(mK)]	Description	length [m]
Timber	0.130	According to EN ISO 10456	0.038
Mineral wool	0.032	Generic	0.562
Equivalent conductivity [W/(mK)]			0.0382
U-value determined by thermal simulation (see appendix 2)			
length of model [m]	Δθ [K]	thermal flux [W/m]	U-value [W/(m²K)]
0.600	30	1.8911	0.1051
U-value determined according to PHPP			
Material of Layer	λ [W/(mK)]	Description	Thickness [mm]
Plasterboard	0.250	According to EN ISO 10456	12.5
Service void	0.0382	Equivalent conductivity of inhomogeneous layers	50
OSB-board	0.130	According to EN ISO 10456	18
Eq: Timber/mineral wool	0.03725	Iterative determined to match thermal sim.	235
OSB-board	0.130	According to EN ISO 10456	9
Outside timber/m. wool layer	0.0382	Equivalent conductivity of inhomogeneous layers	50
OSB-board	0.130	According to EN ISO 10456	9
			38.4 cm
Total			
U-value:			0.1051 W/(m ² K)

7. Roof Construction

Konstruktion des Daches

The roof is insulated at joist level with 150 mm mineral wool between joists, and 300 mm above.



Description of building assembly	Assembly no.
Pitched roof (insulated joists)	03ud

Orientation of building assembly (or R_{si})	1-Roof	Interior insulation?				
Adjacent to (or R_{se})	3-Ventilated	U-value supplement [$W/(m^2K)$]				
Area section 1	λ [$W/(mK)$]	Area section 2 (optional)	λ [$W/(mK)$]	Area section 3 (optional)	λ [$W/(mK)$]	Thickness [mm]
Plaster						
Plasterboard	0.210					13
Services cavity	0.306	Timber	0.130			50
OSB	0.130					18
Mineral wool	0.044	Timber	0.130			150
Mineral wool	0.044					300
Percentage of sec. 1:	90%	Percentage of sec. 2:	9.8%	Percentage of sec. 3:		

Heat transmission resistance coefficients

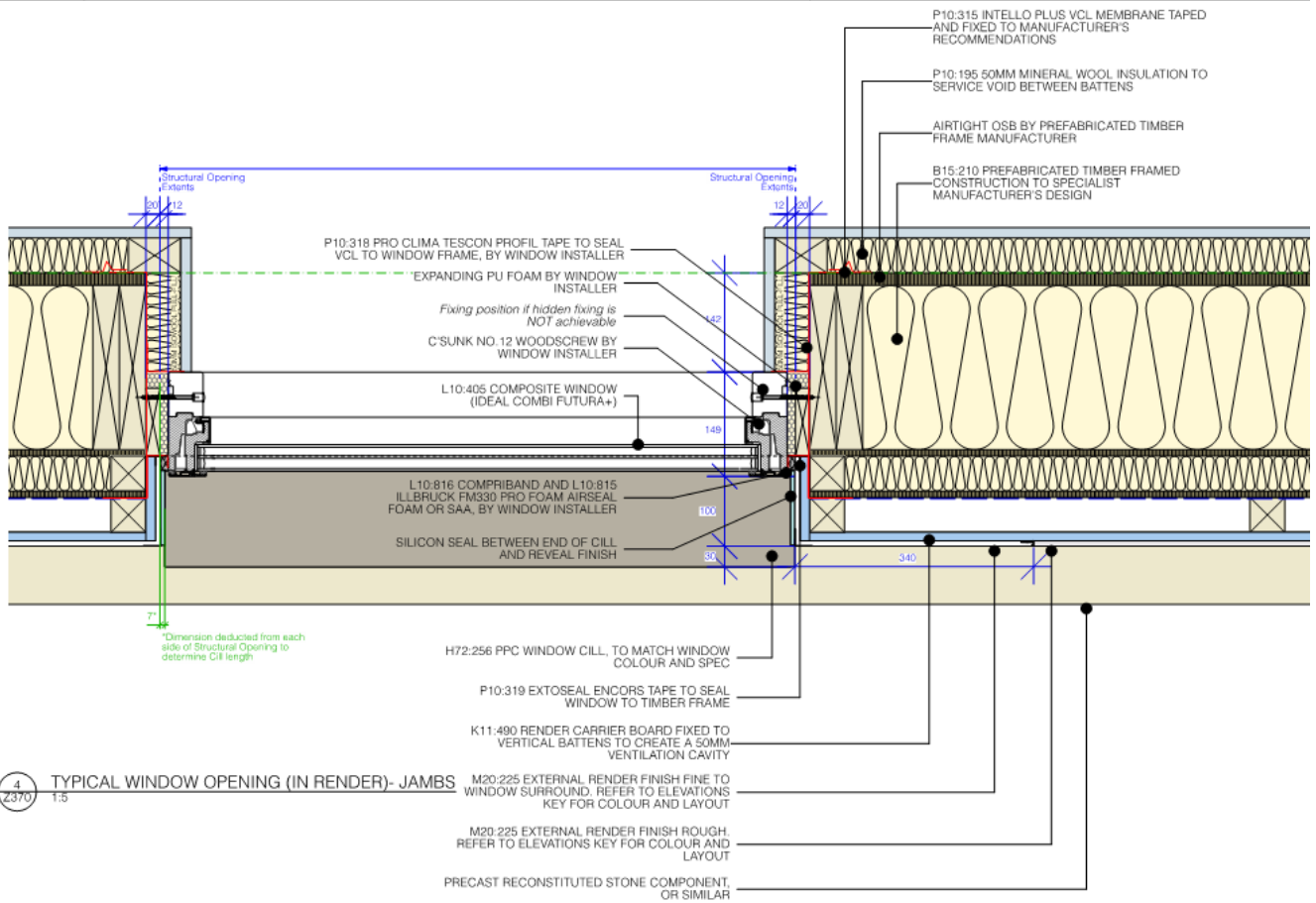
Interior R_{si} :	0.10	m^2K/W
Exterior R_{se} :	0.10	m^2K/W

Total thickness [cm]: **53.1**

U-value [$W/(m^2K)$]: **0.096**

8. Windows and Windows Installation

Fenster und Fenster-Einbau



Description of the window (frame) construction, manufacturer	Ideal Combi
Window make (frame; product name)	Futura+
Frame-U-Value U_f	0,98 W/(m ² K)
Glazing type	Argon filled; 4 14 4 16 4 and 4 16 4 18 7
Glass-U-Value U_g	0,60 / 0.54 W/(m ² K)
g-value of glazing	0,51 / 0.52

9. Airtightness

Beschreibung der luftdichten Hülle

The air pressure tests were carried out by Eco-Futures, with the overall result for Block Q being 0.45 ach.

Dwelling	50 Pa-Pressure test $n_{50} \text{ h}^{-1}$
Plot 40	0,361
Plot 41	0,438
Plot 42	0,542
Weighted average (PHPP entry)	0,45

Airtightness measures

Floor – Concrete slab

Wall – 18 mm OSB

Warm roof – 18 mm OSB

Cold roof – Intello Plus VCL

Windows – Compriband foam tape and Illbrick Pro Foam Airseal

Junctions – Connected with airtight tape. Airtightness membrane between ground floor slab and external wall.

General – AeroBarrier air sealing system used to further improve airtightness.

10. Ventilation

Lüftungsgerät

The mechanical ventilation units are Zehnder ComfoAir Q350. These are Passivhaus Certified units, with high heat recovery and summer bypass. The ducts are insulation with 50 mm Armaflex insulation.



Ventilation Unit	Zehnder ComfoAir Q350
Unit Heat Recovery Efficiency	91 %
Effective Heat Recovery Efficiency	89% (end terrace) / 82% (mid terrace)
Electrical Efficiency	0,24 Wh/m ³

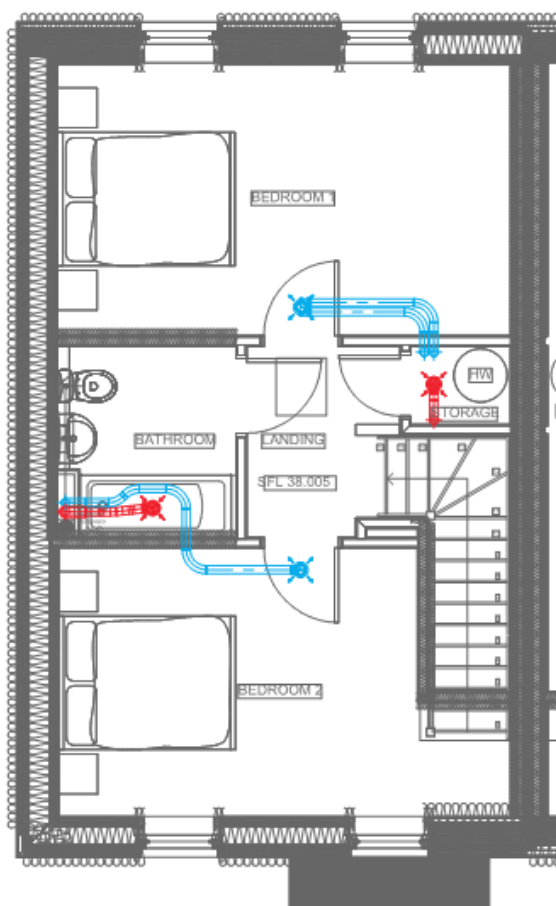
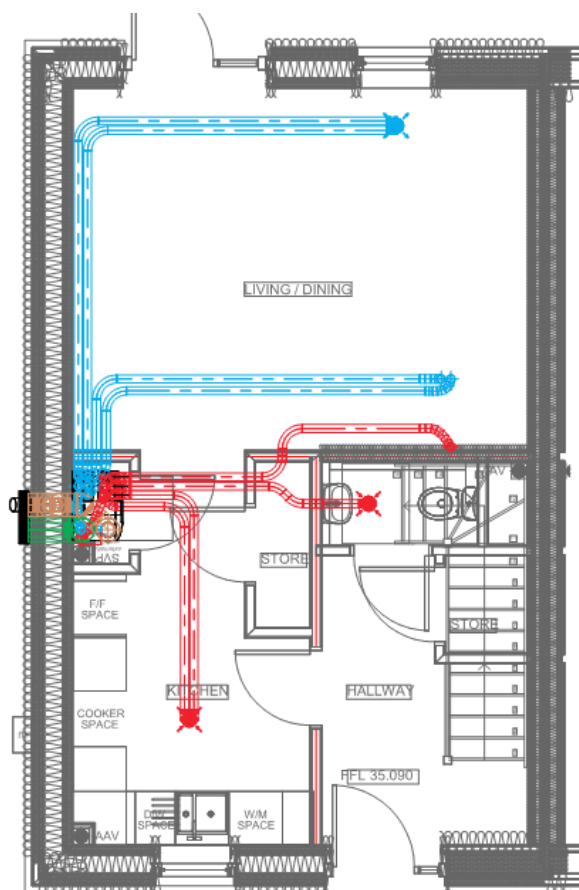
11. Ventilation Ductwork

Lüftungsplanung Kanalnetz

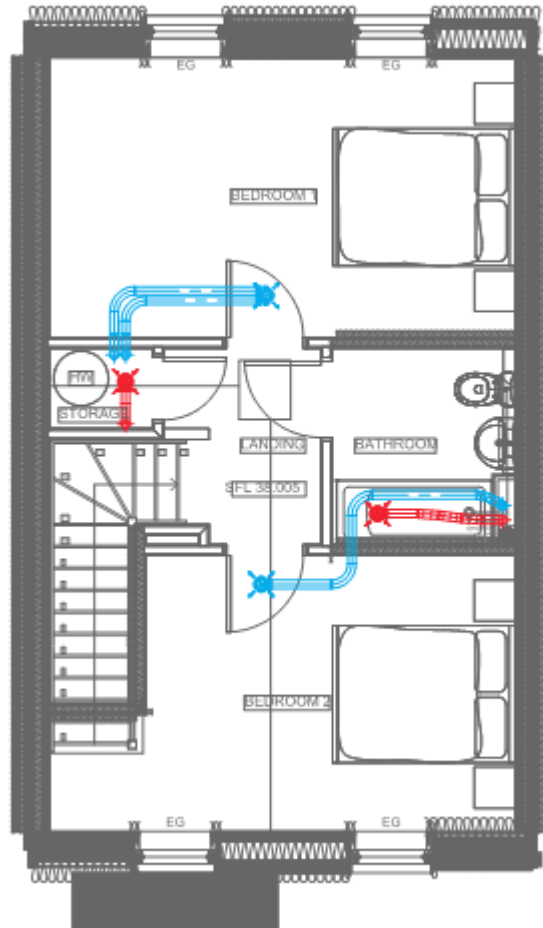
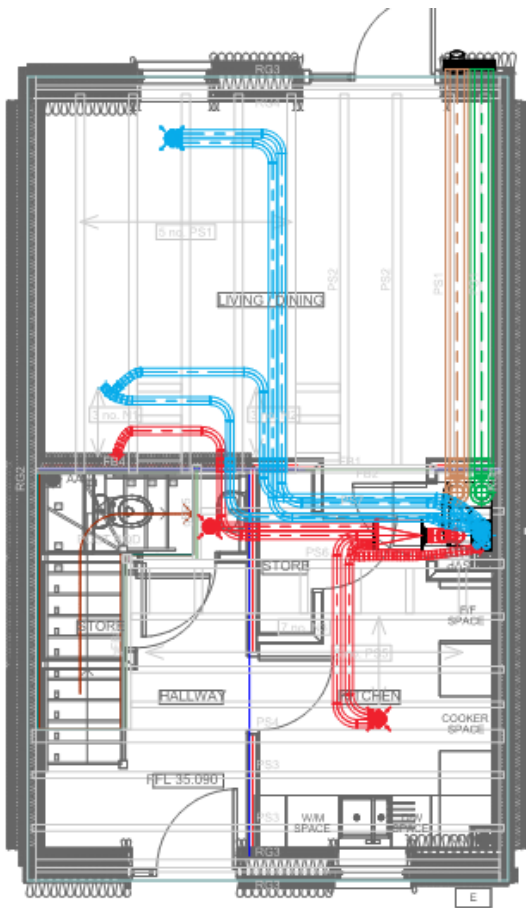
Below are the ventilation layout drawings. Supply ducts are shown in blue (living rooms and bedrooms) and extract ducts are shown in red (kitchens, bathrooms/WCs and some storage areas). Circulation areas are ventilated by air transfer with door undercuts. Ventilation units are located on the ground floor in an MVHR cupboard.

Intake and exhaust ducts are shown in green and orange. For end terrace houses the units are against external walls so duct lengths are kept short. For the mid-terrace dwelling the ducts are longer so they can reach the rear wall. Heat loss from ducts is kept low with 50 mm insulation.

Ventilation layout – Plots 40/42, ground floor and 1st floor



Ventilation layout – Plots 40/42, ground floor and 1st floor



12. Heating

Wärmeversorgung

Heating is provided by direct electric radiators.



Hot water is provided by an Edel Hot Water Heat Pump in each dwelling.



Each house has 8no. 430 W solar PV panels, giving a total of 10.32 kWp for the block. PHPP estimates this to provide 10.3 MWh/a, equivalent to 95% of the predicted energy demand of the block (10.8 MWh/a)



13. Construction Costs

Baukosten


Not available

15. PHPP-Results

Ergebnisse

Passive House-Verification

10.6 EN



Building:	Block Q, Plots 40, 41, 42 Elm Grove	
Street:	1, 2 and 3 Bridleway Crescent	
Postcode/City:	BS48 4BG	Nailsea
Province/Country:	Bristol	GB-United Kingdom/ Britain
Building type:	Residential	
Climate data set:	GB0006b-Lyneham, Altitude corrected	
Climate zone:	4: Warm-temperate	Altitude of location: 35 m
Home owner / Client:	North Somerset Council	
Street:	Wallscote Grove Road	
Postcode/City:	BS23 1UJ	Weston-super-Mare
Province/Country:	North Somerset	GB-United Kingdom/ Britain
Mechanical engineer:	Greengauge Building Energy Consultants Ltd	
Street:	The Old Brewery, Newtown	
Postcode/City:	BA15 1NF	Bradford-on-Avon
Province/Country:	Wiltshire	GB-United Kingdom/ Britain
Certification:	Etude	
Street:	3 Dufferin Avenue	
Postcode/City:	EC1Y 6PQ	
Province/Country:	London	

Architecture:	APG Architecture	
Street:	5 York Court, Wilder Street	
Postcode/City:	W1T 1PD	Bristol
Province/Country:	Bristol	GB-United Kingdom/ Britain
Energy consultancy:	Greengauge Building Energy Consultants Ltd	
Street:	The Old Brewery, Newtown	
Postcode/City:	BA15 1NF	Bradford-on-Avon
Province/Country:	Wiltshire	GB-United Kingdom/ Britain
Year of construction:	2024	
No. of dwelling units:	3	
No. of occupants:	5.9	
Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]: 25.0
Internal heat gains (IHG) winter [W/m²]:	2.8	IHG summer [W/m²]: 3.1
Specific heat capacity [Wh/K per m² TFA]:	84	Mechanical cooling:

Specific building characteristics with reference to the treated floor area						
				Criteria	Alternative criteria	Fullfilled? ²
Space heating	Treated floor area m²	229.8				
	Heating demand kWh/(m²a)	13	≤	15	-	Yes
	Heating load W/m²	9	≤	-	10	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-	-	-
	Frequency of overheating (> 25 °C) %	3	≤	10		Yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20		Yes
Airtightness	Pressurisation test result n ₅₀ 1/h	0.5	≤	0.6		Yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	70	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	57	≤	60	60	Yes
	Renew. energy generation (in rel. to projected building footprint area) kWh/(m²a)	66	≥	-	-	

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: 1-Design

Certificate-ID:

First name: Mitchell

Issued on:

Surname: Finn

City:

Passive House Classic? Yes

Signature: _____