

# Project Documentation Gebäude-Dokumentation



Abstract | Zusammenfassung



## The Vanguard Building, Meole Brace School, Shropshire, UK

### Data of building | Gebäudedaten

Year of construction Baujahr	2021	<b>Space heating</b> <b>Heizwärmebedarf</b>	<b>13</b> <b>kWh/(m<sup>2</sup>a)</b>
U-value external wall U-Wert Außenwand	0,124 – 0,128 W/(m <sup>2</sup> K)		
U-value floor U-Wert Kellerdecke	0,143 W/(m <sup>2</sup> K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	67 kWh/(m <sup>2</sup> a)
U-value roof U-Wert Dach	0,074 W/(m <sup>2</sup> K)	Generation of renewable Energy Erzeugung erneuerb. Energie	29 kWh/(m <sup>2</sup> a)
U-value window U-Wert Fenster	0,78 W/(m <sup>2</sup> K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	155 kWh/(m <sup>2</sup> a)
Heat recovery Wärmerückgewinnung	84 %	Pressurization test n <sub>50</sub> Drucktest n <sub>50</sub>	0,58 h <sup>-1</sup>
Special features Besonderheiten	Masonry cavity wall construction, Roof mounted PV		

## Brief Description

### The Vanguard Building, Meole Brace School, Shropshire, UK

This new education building provides a new teaching hub located on the Meole Brace Secondary School campus in Shrewsbury, Shropshire, UK. It contains 5 new classrooms, group room, staff room, toilets and storage over 2 storeys with a floor area of 600sqm. The project was delivered under a JCT D&B 2016 contract over a construction period of 35 weeks.

The building is been designed to be 'zero-carbon' in operation and has also achieved a BREEAM Excellent rating for sustainability in the wider sense. The end result is a highly energy efficient building that delivers very high levels of comfort for all users of the building.

The project won the Net Zero Category in both the West Midlands Region and National Constructing Excellence Awards in 2022, the first year the category has been awarded. The expert judging panel recognised the commitment of the integrated team of designers, client, school stakeholders, contractor and supply partners, and their ambition to put climate change solutions at the heart of the project.

This is believed to be the UK's first ever Passivhaus educational project constructed in masonry.

## Kurzbeschreibung

### The Vanguard Building, Meole Brace School, Shropshire, UK

Dieses neue Bildungsgebäude bietet ein neues Lehrzentrum auf dem Campus der Meole Brace Secondary School in Shrewsbury, Shropshire, Großbritannien. Es umfasst 5 neue Klassenzimmer, einen Gruppenraum, einen Lehrerraum, Toiletten und Lagerräume auf 2 Etagen mit einer Grundfläche von 600 m<sup>2</sup>. Das Projekt wurde im Rahmen eines JCT D&B 2016-Vertrags über eine Bauzeit von 35 Wochen geliefert.

Das Gebäude ist so konzipiert, dass es im Betrieb „kohlenstofffrei“ ist, und hat außerdem die BREEAM-Ausgezeichnet-Bewertung für Nachhaltigkeit im weiteren Sinne erhalten. Das Endergebnis ist ein äußerst energieeffizientes Gebäude, das allen Nutzern des Gebäudes ein Höchstmaß an Komfort bietet.

Das Projekt gewann 2022, dem ersten Jahr, in dem diese Kategorie verliehen wurde, die Kategorie „Net Zero“ sowohl bei den West Midlands Region als auch bei den National Constructing Excellence Awards. Die Expertenjury würdigte das Engagement des integrierten Teams aus Designern, Kunden, Schulbeteiligten, Auftragnehmern und Lieferpartnern sowie ihren Ehrgeiz, Lösungen für den Klimawandel in den Mittelpunkt des Projekts zu stellen.

Es wird angenommen, dass es sich hierbei um das erste in Mauerwerk errichtete Passivhaus-Bildungsprojekt in Großbritannien handelt.

## Responsible project participants

### Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	TACP <a href="https://tacparchitects.co.uk">https://tacparchitects.co.uk</a>
Implementation planning Ausführungsplanung	-
Building systems Haustechnik	Davies Partnership <a href="https://daviespartnership.co.uk/">https://daviespartnership.co.uk/</a>
Structural engineering Baustatik	JP Structural Design <a href="https://jpstructural.co.uk">https://jpstructural.co.uk</a>
Building physics Bauphysik	HLM Architects <a href="https://hlmarchitects.com">https://hlmarchitects.com</a> Davies Partnership <a href="https://daviespartnership.co.uk/">https://daviespartnership.co.uk/</a>
Passive House project planning Passivhaus-Projektierung	Simon Bell – HLM Architects <a href="https://hlmarchitects.com">https://hlmarchitects.com</a>
Construction management Bauleitung	Read Construction <a href="https://readconstruction.co.uk">https://readconstruction.co.uk</a>

## Certifying body

### Zertifizierungsstelle

WARM <a href="https://peterwarm.co.uk">https://peterwarm.co.uk</a>	
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## Certification ID

### Zertifizierungs ID

**7517**

Project-ID ([www.passivehouse-database.org](http://www.passivehouse-database.org))  
Projekt-ID ([www.passivhausprojekte.de](http://www.passivhausprojekte.de))

## Author of project documentation

### Verfasser der Gebäude-Dokumentation

Simon Bell – HLM Architects <a href="https://hlmarchitects.com">https://hlmarchitects.com</a>	
Date Datum	Signature Unterschrift
16.09.24	

# 1. External Photos / Ansichtsfotos

© Read Construction

North



© Read Construction

South

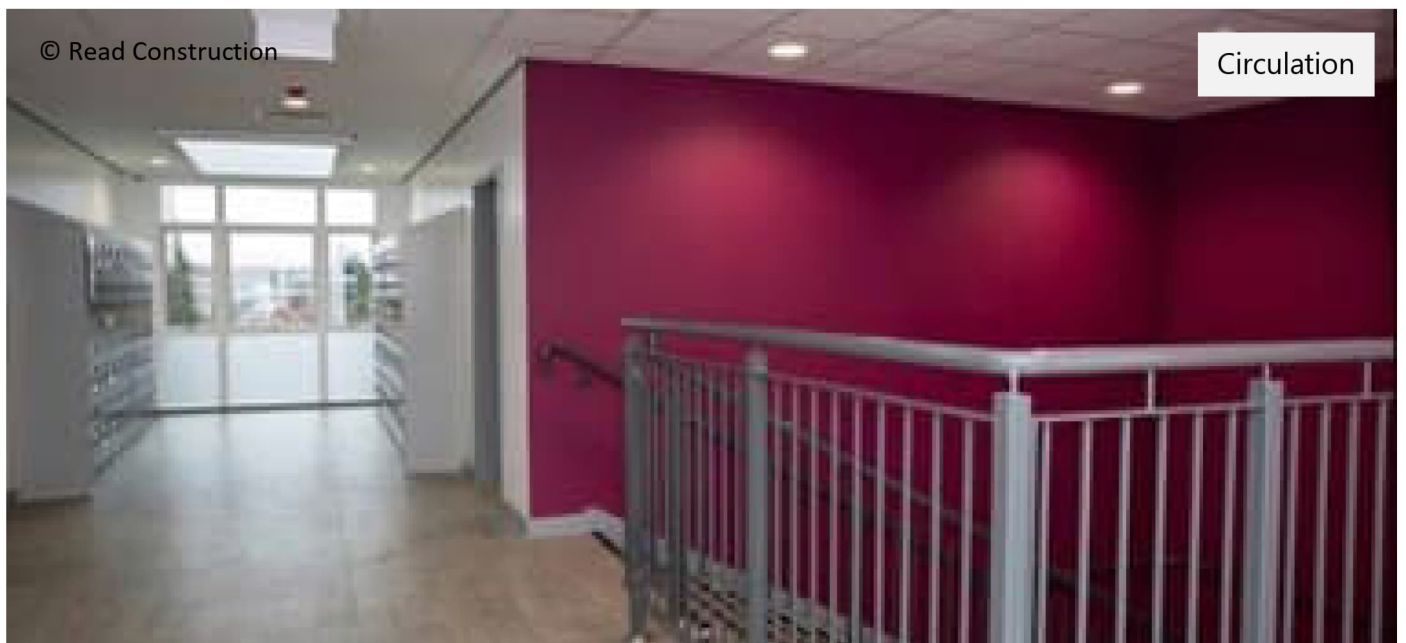


© Read Construction

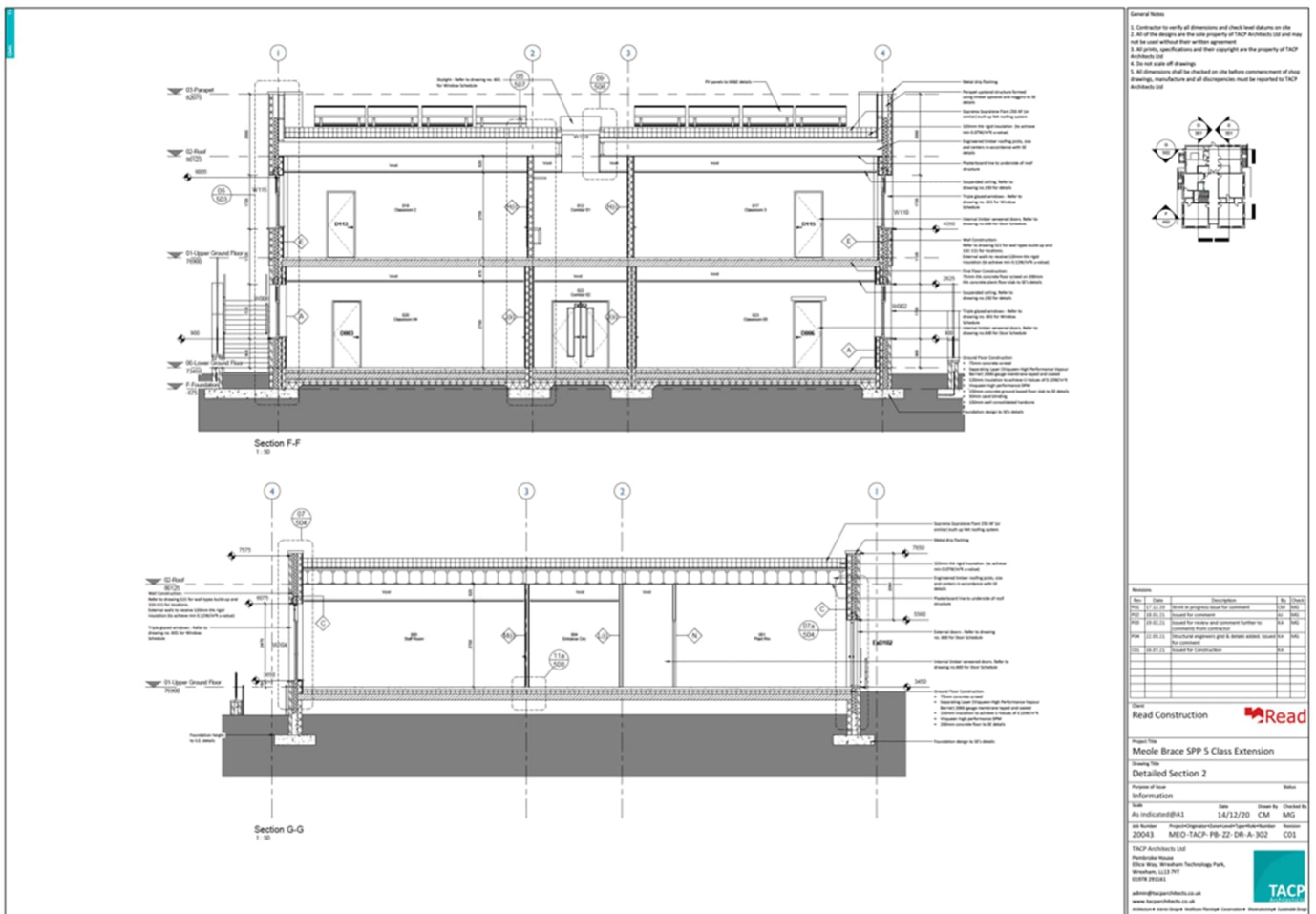
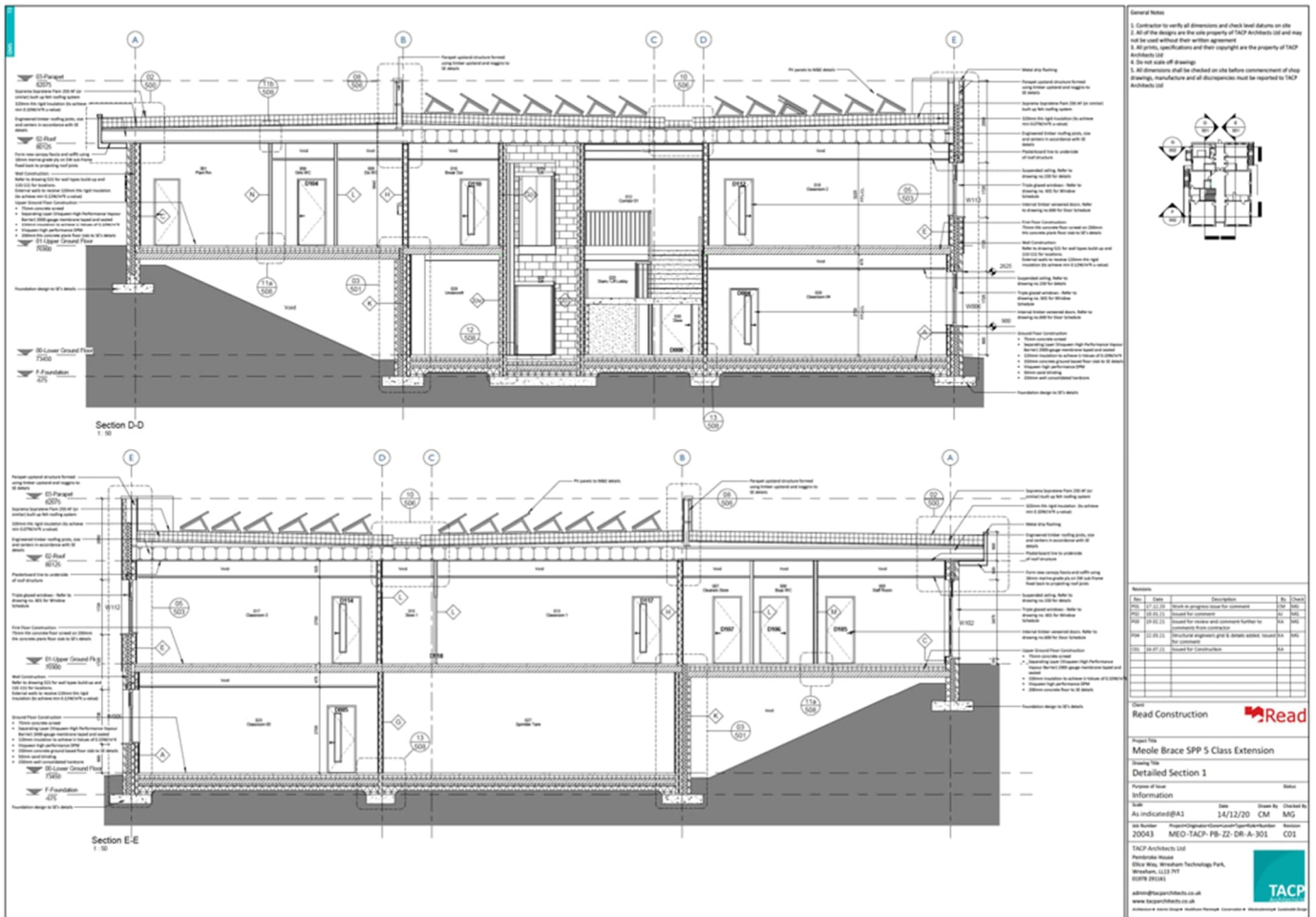
East



## 2. Internal Photos / Innenfoto exemplarisch



# 3. Sectional Drawings / Schnittzeichnung



# 4. Floor Plans / Grundrisse



**00- Lower Ground Floor GA**  
1 : 100



**01- Upper Ground Floor GA**  
1 : 100

- General Notes**
1. Contractor to verify all dimensions and check level datums on site
  2. All of the designs are the sole property of TACP Architects Ltd and may not be used without their written agreement
  3. All prints, specifications and their copyright are the property of TACP Architects Ltd
  4. Do not scale off drawings
  5. All dimensions shall be checked on site before commencement of shop drawings, manufacture and all discrepancies must be reported to TACP Architects Ltd

**Revisions**

Rev	Date	Description	By	Check
001	15.09.20	Issued for review and comment	KA	MAG
002	16.09.20	Issued for Building Control	AJ	MAG
003	17.12.20	Work in progress issue for comment	CM	MAG
004	18.05.21	Issued for comment	AJ	MAG
005	21.02.21	Issued to Building Control	AJ	MAG
006	22.03.21	Updated to suit comments from Contractor	KA	MAG
007	16.07.21	Issued for Construction	KA	MAG

**Client**  
Read Construction

**Project Title**  
Meole Brace SPP 5 Class Extension

**Drawing Title**  
GA Plans

**Purpose of Issue**  
For Information

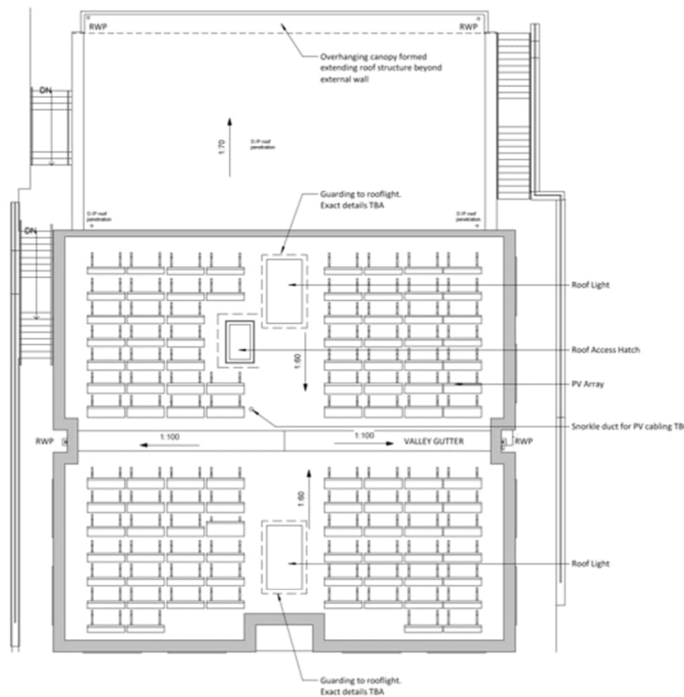
**Scale**  
1 : 100@A1

**Date**  
15/09/20

**Drawn By**  
AJ

**Checked By**  
MAG

**TACP Architects Ltd**  
Pembroke House  
Ellice Way, Wrexham Technology Park,  
Wrexham, LL13 7Y7  
01978 291161  
admin@tacparchitects.co.uk  
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**02-Roof GA**  
1 : 100

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007	16.07.21	Issued for Construction	KA	MAG

**Client**  
Read Construction

**Project Title**  
Meole Brace SPP 5 Class Extension

**Drawing Title**  
GA Roof Plan

**Purpose of Issue**  
For Information

**Scale**  
1 : 100@A2

**Date**  
15/09/20

**Drawn By**  
AJ

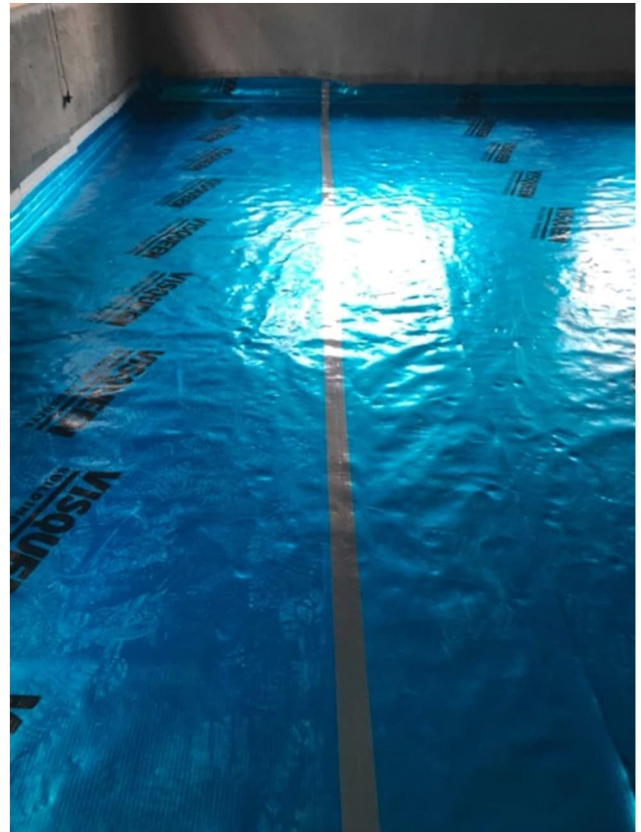
**Checked By**  
MAG

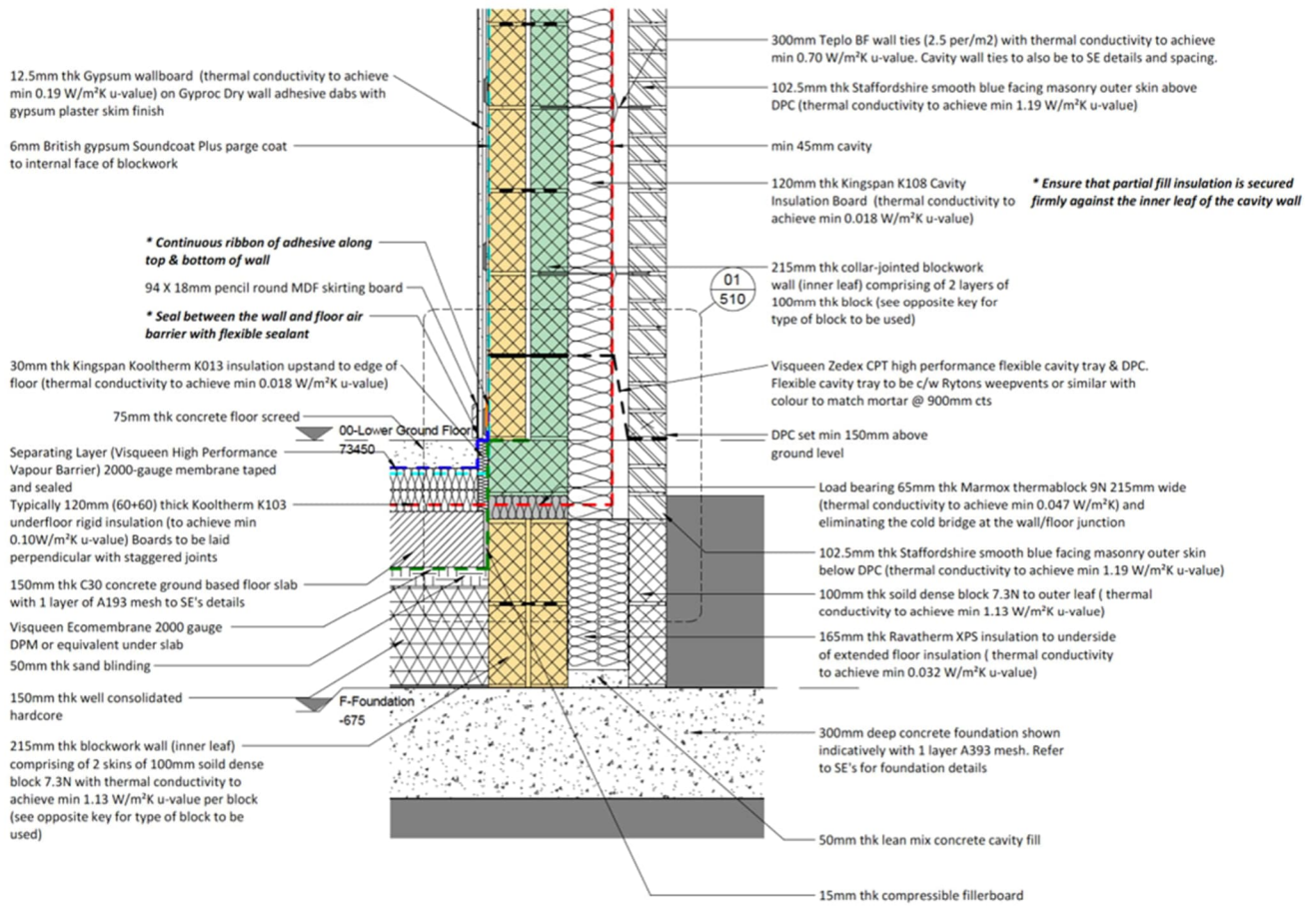
**TACP Architects Ltd**  
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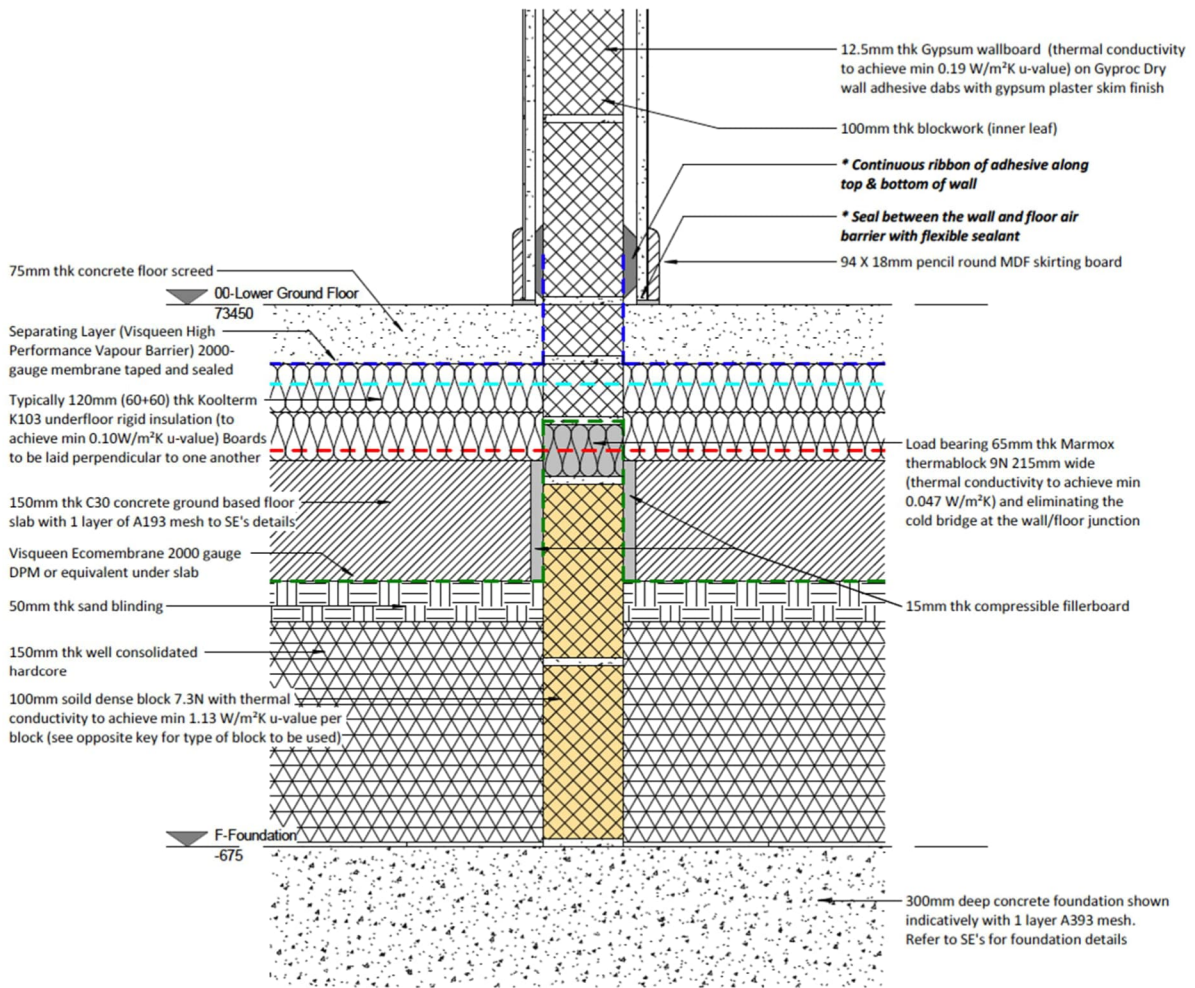
## 5. Construction of Floor Slab / Konstruktion der Bodenplatte

The floor construction consists of a 150mm thick concrete slab on grade with 120mm rigid insulation and 75mm floor screed on top. The perimeter ground floor / wall junction is cavity blockwork wall infilled with XPS insulation below ground and with a course of Marmox thermablock on the inner leaf to maintain the insulation line. Marmox has also been used on internal walls

Assembly no.		10ud <b>Floor Slab on Grade</b>				Interior insulation?	
Orientation of building element		3-Floor		Heat transmission resistance [m <sup>2</sup> K/W]		interior R <sub>si</sub> : 0.17	
Adjacent to		2-Ground		exterior R <sub>se</sub> :		0.00	
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Sand Cement Screed	1.400					75	
Polythene Separation Layer	0.400					0	
Rigid Insulation	0.018					120	
Concrete Slab	1.400					150	
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total	
100%						34.5 cm	
U-value supplement				U-value:		0.143 W/(m <sup>2</sup> K)	

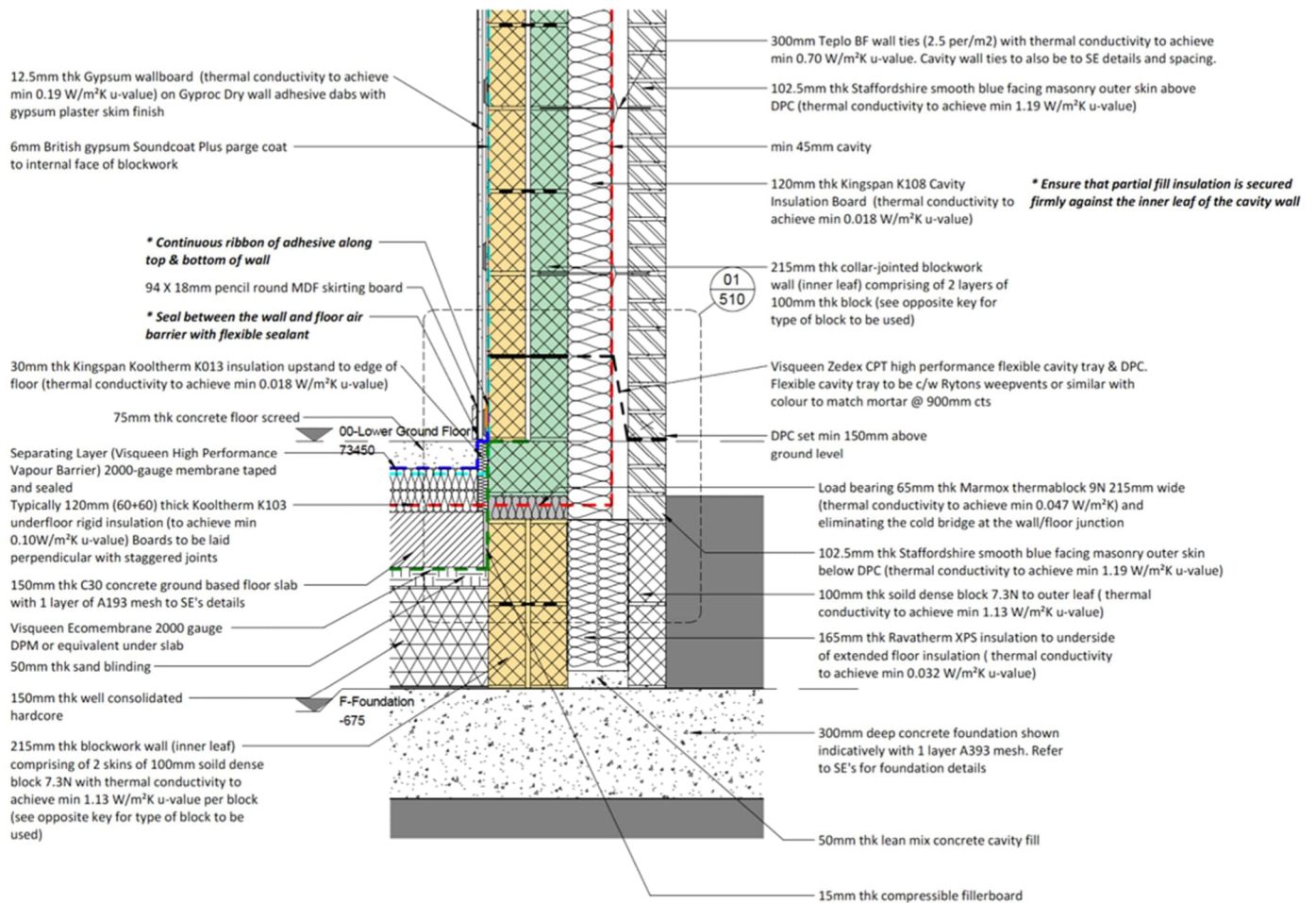






## 6. Construction of External Walls / Konstruktion der Außenwände

The external wall construction is typically a cavity wall construction using aerated thermal blockwork with 120mm rigid insulation on the inside leaf of the 45mm cavity and brickwork on the external leaf. For structural reasons the inner leaf has been supplemented with a collar jointed dense blockwork as reflected in the various wall types. The internal face of the internal leaf has a parge coat applied for airtightness with plaster board fixed on plaster dabs.



# Passive House Components

Meole Brace Language Centre / Climate: Sutton Bonnington / TFA: 597 m<sup>2</sup> / Heating: 12.6 kWh/(m<sup>2</sup>a) / Freq. overheating: 0 % / PER: 66.7 kWh/(m<sup>2</sup>a)

Go to: ['AREAS'](#)

[Thermal bridges \(Psi-values\)](#)

[Glazing](#)

[Window frames](#)

[www.passivehouse.com/component-database](http://www.passivehouse.com/component-database)

[Ventilation units](#)

[Compact units](#)

[Heat recovery DHW](#)

## Building assemblies (U-Values)

Recommended starting values for optimisation: U-values for walls and roofs | Floor slabs:

0.15 W/(m<sup>2</sup>K) | 0.29 W/(m<sup>2</sup>K)

ID	Building system	Building assembly	1		
			Total thickness	U-Value	Interior insulation
Summary of the constructions calculated in 'U values' worksheet			m	W/(m <sup>2</sup> K)	-
01ud	Wall Type A	Wall Type A	0.373	0.127	0
02ud	Wall Type A(i)	Wall Type A(i)	0.413	0.124	0
03ud	Wall Type B	Wall Type B	0.258	0.131	0
04ud	Wall Type C	Wall Type C	0.298	0.128	0
05ud	Wall Type D	Wall Type D	0.408	1.872	0
06ud	Wall Type E	Wall Type E	0.298	0.128	0
07ud	Wall Type F	Wall Type F	0.413	0.124	0
08ud	Wall Type K	Wall Type K	0.373	0.125	0
09ud	Floor Suspended	Floor Suspended	0.425	0.113	0
10ud	Floor Slab on Grade	Floor Slab on Grade	0.345	0.143	0
11ud	Roof	Roof	0.505	0.074	0
12ud	Wall Type J below ground	Wall Type J below ground	0.215	3.122	0
13ud	Sprinkler Tank Door	Sprinkler Tank Door	0.050	0.610	0
14ud	Plant Room Door	Plant Room Door	0.050	0.620	0
15ud	Roof hatch	Roof hatch	0.100	0.210	0
16ud					
17ud					

### EXTERNAL WALL TYPES

**Type A - 2 Layer Blockwork (100+100mm), Cavity, Brickwork**  
Type A(i) - 2 Layer Blockwork (140+100mm), Cavity, Brickwork  
U-Values: 0.12W/m<sup>2</sup>K

**Type B - 1 Layer Blockwork (100mm), Cavity, Brickwork**  
U-Values: 0.12W/m<sup>2</sup>K

**Type C - 1 Layer Blockwork (140mm), Cavity, Brickwork**  
U-Values: 0.12W/m<sup>2</sup>K

**Type D - 1 Layer Blockwork (140mm), Cavity, Brickwork Retaining Structure**

**Type E - 1 Layer Blockwork (140mm), Cavity, Blockwork, Cladding**  
U-Values: 0.12W/m<sup>2</sup>K

**Type F - 2 Layer Blockwork (140+100mm), Cavity, Blockwork, Cladding**  
U-Values: 0.12W/m<sup>2</sup>K

### INTERNAL WALL TYPES

**Type G - 1 Layer Blockwork (100mm)**

**Type H - 1 Layer Blockwork (140mm)**

**Type J - 2 Layer Blockwork (100+100mm)**

**Type K - 2 Layer Blockwork, Cavity, Blockwork**  
U-Values: 0.12W/m<sup>2</sup>K

**Type L - Metal stud partition**  
British Gypsum ref: A206013(EN) - 30min fire

**Type M - Metal stud partition**  
British Gypsum ref: A206016(EN) - 60min fire

**Type N - Metal stud partition**  
British Gypsum ref: A206078 - 60min fire

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**NOTES:**  
Refer to drawings L08 & L10 for location of wall types

**FINISHING DETAIL**

1. Plasterboard on internal face of wall  
2. Plaster  
3. Plasterboard on external face

**Revisions**

No.	Date	Description	By	Check
001	20/01/21	Issue for review and comment further to comments from contractor	CM	AG
002	20/01/21	Issue for review and comment further to comments from contractor	CM	AG
003	20/01/21	Issue for review and comment further to comments from contractor	CM	AG
004	20/01/21	Issue for review and comment further to comments from contractor	CM	AG
005	20/01/21	Issue for review and comment further to comments from contractor	CM	AG
006	20/01/21	Issue for review and comment further to comments from contractor	CM	AG

**Read Construction**

**Project Title:** Meole Brace SPP 5 Class Extension

**Drawing Title:** Wall Types Drawing

**Project Information**

1: 100/A1 Date: 16/12/20 Drawn By: Checked By: CM AG

All Numbers: Project/Package/Sheet/Revision/Date/Author/Client  
20041 MEO-TACP-PB-KX-DR-A-S21 C01

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**TACP**

Assembly no.		Building assembly description				Interior insulation?	
01ud		Wall Type A					
		Heat transmission resistance [m <sup>2</sup> K/W]					
Orientation of building element		2-Wall		interior R <sub>si</sub>		0.13	
Adjacent to		3-Ventilated		exterior R <sub>se</sub>		0.13	
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Gypsum Plasterboard	0.250					13	
Air Cavity	0.100	Plaster Dabs	0.460			19	
Parge Coat	0.460					6	
Dense Blockwork	1.130			Mortar	0.800	100	
Air Cavity	0.090					15	
Aerated Blockwork	0.180			Mortar	0.800	100	
Rigid Insulation	0.018					120	
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total	
73%		20.0%		6.6%		37.3 cm	
U-value supplement				U-value:		0.127 W/(m <sup>2</sup> K)	

Assembly no.		Building assembly description				Interior insulation?	
02ud		Wall Type A(i)					
		Heat transmission resistance [m <sup>2</sup> K/W]					
Orientation of building element		2-Wall		interior R <sub>si</sub>		0.13	
Adjacent to		3-Ventilated		exterior R <sub>se</sub>		0.13	
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Gypsum Plasterboard	0.250					13	
Air Cavity	0.100	Plaster Dabs	0.460			19	
Parge Coat	0.460					6	
Dense Blockwork	1.130			Mortar	0.800	100	
Air Cavity	0.090					15	
Aerated Blockwork	0.180			Mortar	0.800	140	
Rigid Insulation	0.018					120	
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total	
73%		20.0%		6.6%		41.3 cm	
U-value supplement				U-value:		0.124 W/(m <sup>2</sup> K)	

Assembly no.		Building assembly description				Interior insulation?	
03ud		Wall Type B					
		Heat transmission resistance [m <sup>2</sup> K/W]					
Orientation of building element		2-Wall		interior R <sub>si</sub>		0.13	
Adjacent to		3-Ventilated		exterior R <sub>se</sub>		0.13	
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Gypsum Plasterboard	0.250					13	
Air Cavity	0.100	Plaster Dabs	0.460			19	
Parge Coat	0.460					6	
Aerated Blockwork	0.180			Mortar	0.800	100	
Rigid Insulation	0.018					120	
					0.800		
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total	
73%		20.0%		6.6%		25.8 cm	
U-value supplement				U-value:		0.131 W/(m <sup>2</sup> K)	



Assembly no. **07ud** **Wall Type F** Interior insulation?

Heat transmission resistance [m<sup>2</sup>K/W]

Orientation of building element **2-Wall** interior R<sub>si</sub> **0.13**

Adjacent to **3-Ventilated** exterior R<sub>se</sub> **0.13**

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
<b>Gypsum Plasterboard</b>	<b>0.250</b>					<b>13</b>
<b>Air Cavity</b>	<b>0.100</b>	<b>Plaster Dabs</b>	<b>0.460</b>			<b>19</b>
<b>Parge Coat</b>	<b>0.460</b>					<b>6</b>
<b>Dense Blockwork</b>	<b>1.130</b>			<b>Mortar</b>	<b>0.800</b>	<b>100</b>
<b>Air Cavity</b>	<b>0.080</b>					<b>15</b>
<b>Aerated Blockwork</b>	<b>0.180</b>			<b>Mortar</b>	<b>0.800</b>	<b>140</b>
<b>Rigid Insulation</b>	<b>0.018</b>					<b>120</b>
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
73%		20.0%		6.6%		<b>41.3</b> cm

U-value supplement  W/(m<sup>2</sup>K) **U-value: 0.124** W/(m<sup>2</sup>K)

Assembly no. **12ud** **Wall Type J below ground** Interior insulation?

Heat transmission resistance [m<sup>2</sup>K/W]

Orientation of building element **2-Wall** interior R<sub>si</sub> **0.13**

Adjacent to **2-Ground** exterior R<sub>se</sub> **0.00**

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
<b>Thermal Blockwork</b>	<b>1.130</b>					<b>215</b>
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%						<b>21.5</b> cm

U-value supplement  W/(m<sup>2</sup>K) **U-value: 3.122** W/(m<sup>2</sup>K)

Assembly no. **08ud** **Wall Type K** Interior insulation?

Heat transmission resistance [m<sup>2</sup>K/W]

Orientation of building element **2-Wall** interior R<sub>si</sub> **0.13**

Adjacent to **3-Ventilated** exterior R<sub>se</sub> **0.13**

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
<b>Gypsum Plasterboard</b>	<b>0.250</b>					<b>13</b>
<b>Air Gap</b>	<b>0.100</b>	<b>Plaster Dabs</b>	<b>0.460</b>			<b>19</b>
<b>Parge Coat</b>	<b>0.460</b>					<b>6</b>
<b>Dense Blockwork</b>	<b>1.130</b>			<b>Mortar</b>	<b>0.800</b>	<b>100</b>
<b>Air Cavity</b>	<b>0.080</b>					<b>15</b>
<b>Aerated Blockwork</b>	<b>0.180</b>			<b>Mortar</b>	<b>0.800</b>	<b>100</b>
<b>Rigid Insulation</b>	<b>0.018</b>					<b>120</b>
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
100%						<b>37.3</b> cm

U-value supplement  W/(m<sup>2</sup>K) **U-value: 0.125** W/(m<sup>2</sup>K)

## 7. Construction of Roof / Konstruktion des Daches

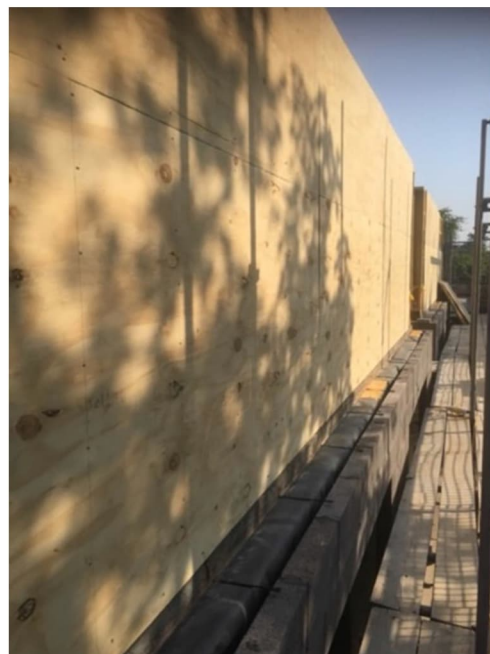
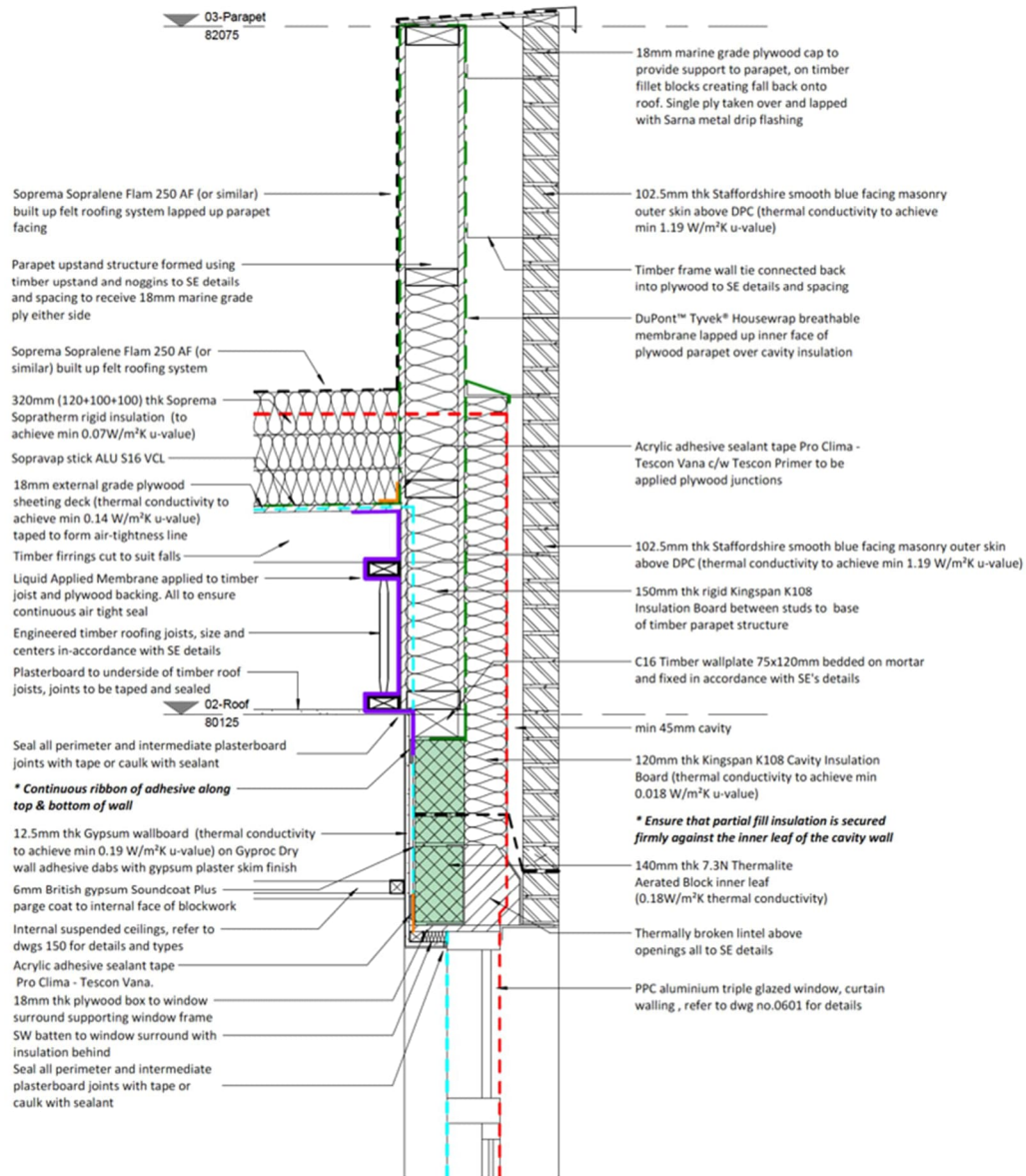
The roofing felt is installed over 320mm of rigid insulation, above vapour control layer over 18mm exterior grade plywood deck with all joints taped. All installed above engineered timber joists with a plasterboard ceiling below.

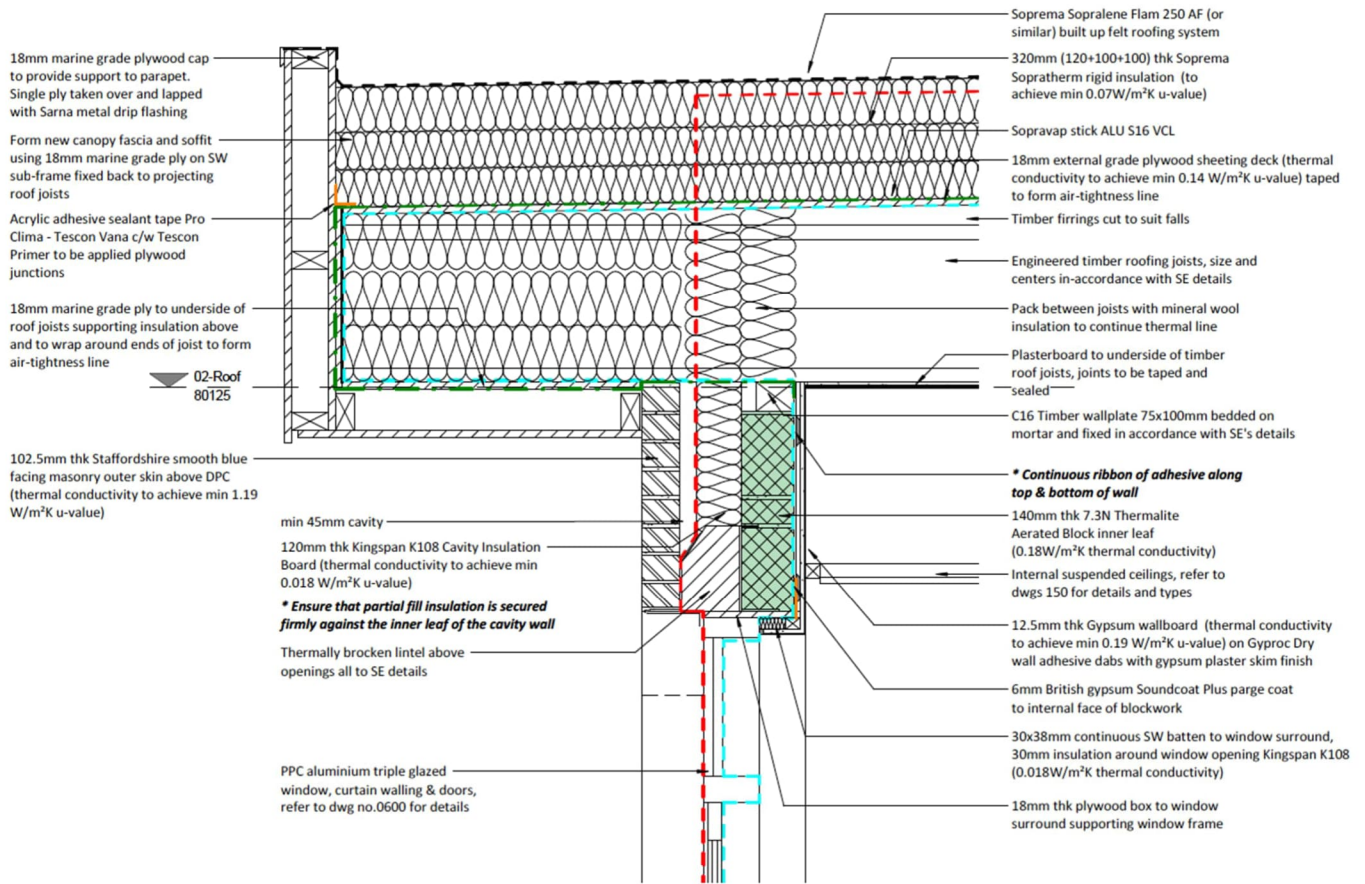
PH Certified Flat Roof Window FE Passive House+ Roof by Lamilux have been installed above circulation spaces.

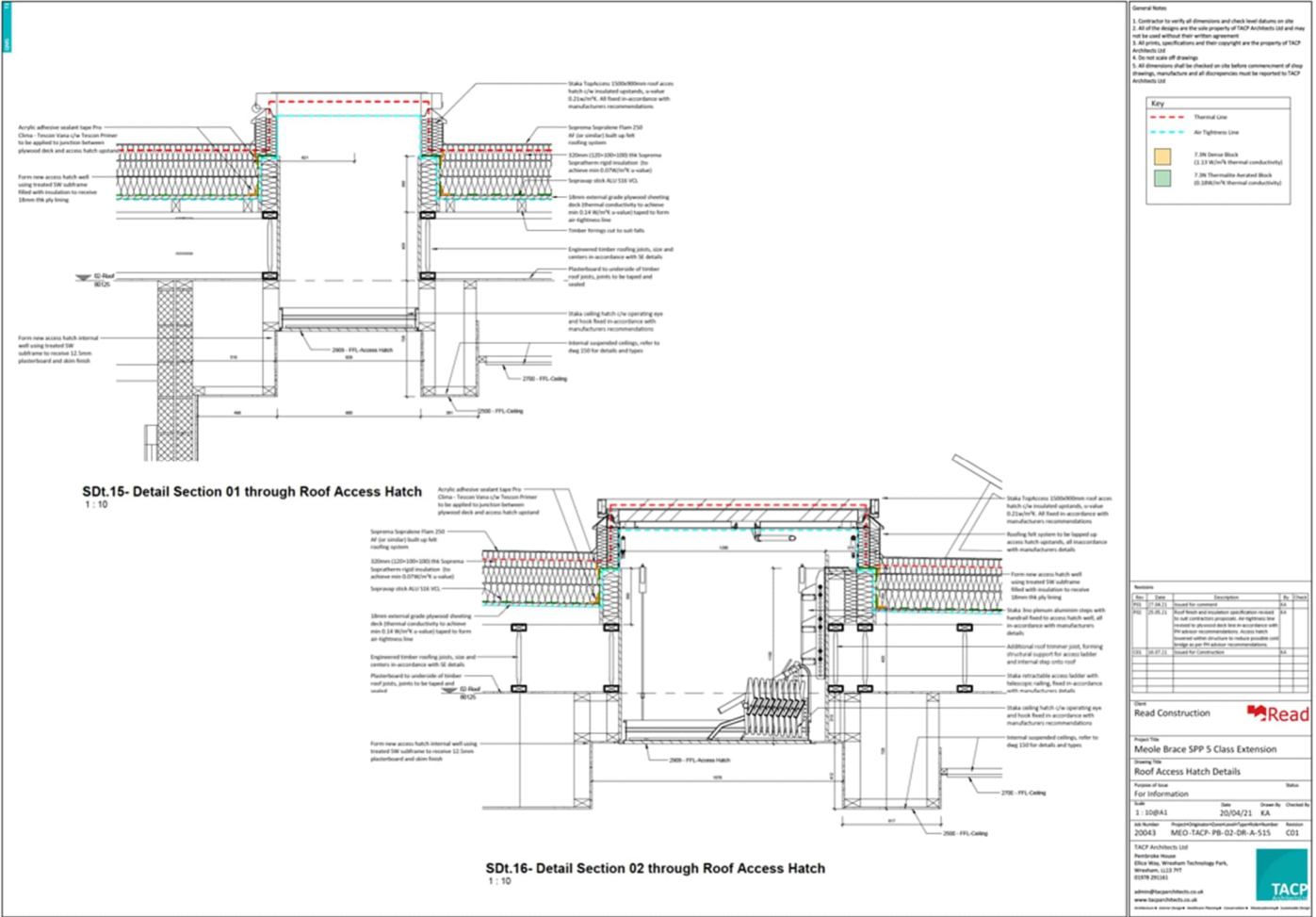
A Staka DL147 roof access hatch has been installed to provide maintenance access.

Assembly no.		11ud				Roof		Interior insulation?	
Orientation of building element		1-Roof		Heat transmission resistance [m <sup>2</sup> K/W]		interior R <sub>si</sub>		0.10	
Adjacent to		1-Outdoor air		exterior R <sub>se</sub>		0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]			
Gypsum plasterboard	0.190					13			
Timber Joist Cavity	0.920	Timber	0.130			150			
Plywood Deck	0.170					18			
Bitumen Vapour Check	0.230					3			
Sopratherm G	0.024					120			
Sopratherm G	0.025					100			
Sopratherm T	0.025					100			
Membrane	0.160					2			
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total			
88%		12.5%				50.5 cm			
U-value supplement				U-value:		0.074 W/(m <sup>2</sup> K)			









## 8. Windows & Window Installation / Fenster und Fenster-Einbau

The windows generally are Rational AURAPLUS aluclad timber with standard and solar control glazing depending on orientation. The doors are Senior SF52 curtain walling with PUn Commercial doors. The doors are installed on compact foam thresholds to minimise cold bridging.

Description of window (frame) Construction, manufacturer / Beschreibung der Fenster (rahmen)- Konstruktion, Hersteller	Rationel aluclad timber window Senior aluminium curtain walling
Window make (frame product name) / Fabrikat Fenster (rahmen; Produktname)	AURAPLUS Fixed Light & Top Hung Windows Senior SF52 curtain wall and PUn commercial doors
Frame U-Value / Rahmen-U-Wert U <sub>f</sub>	As table below
Type of Glazing / Bauart der Verglasung	As table below
Glass U-Value / Glas-U-Wert U <sub>g</sub>	As table below
Glazing g-value / g-Wert der Verglasung	As table below

Window frames		Window frames																	
ID	Description	U-Value				Frame width				Glazing edge thermal bridge				Installation thermal bridge				X <sub>LC</sub> -value Glass carrier	
		left	right	bottom	above	left	right	bottom	above	ψ <sub>glazing edge left</sub>	ψ <sub>glazing edge right</sub>	ψ <sub>glazing edge bottom</sub>	ψ <sub>glazing edge top</sub>	ψ <sub>installation left</sub>	ψ <sub>installation right</sub>	ψ <sub>installation bottom</sub>	ψ <sub>installation top</sub>		
		W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	m	m	m	m	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K)	W/K
01ud																			
02ud	Rationel AURAPLUS Fixed Light	1.08	1.08	1.08	1.09	0.051	0.051	0.051	0.051	0.036	0.036	0.036	0.036	0.040	0.040	0.040	0.040	0.040	0.000
03ud	Rationel AURAPLUS Top Hung	1.19	1.19	1.19	1.19	0.094	0.094	0.094	0.094	0.037	0.037	0.037	0.037	0.040	0.040	0.040	0.040	0.040	0.000
04ud																			
05ud	Senior SF52 Curtain Walling - Fixed Pane	1.73	1.73	1.73	1.73	0.052	0.052	0.052	0.052	0.036	0.036	0.036	0.036	0.070	0.070	0.070	0.070	0.070	0.040
06ud	Senior PUn Commercial Door	1.91	1.91	1.91	1.91	0.194	0.194	0.194	0.194	0.036	0.036	0.036	0.036	0.040	0.040	0.100	0.040	0.040	0.040
07ud																			
08ud																			
09ud																			
10ud	Lamilux PH Certified	1.42	1.42	1.42	1.42	0.098	0.098	0.098	0.098	0.036	0.036	0.036	0.036	0.100	0.100	0.100	0.100	0.100	0.000
11ud																			

Glazing		Glazing	
Recommended glazing type to start planning:			
Triple thermally insulated glazing (Please consider the comfort criterion!)			
ID	Description	g-Value	U <sub>g</sub> -Value
			W/(m <sup>2</sup> K)
01ud			
02ud	Rationel AURAPLUS Energy Std Toughened 4-20-4-18-6,8	0.52	0.52
03ud	Rationel AURAPLUS Sun SKN176 Toughened 4-20-4-18-6,8	0.35	0.50
04ud			
05ud			
06ud	Rationel AURAPLUS Energy Std TOUGHENED Obscure 4-20-4-18-6,8	0.52	0.52
07ud			
08ud	Senior PUn Door Glazing 6/16/6/16/6	0.32	0.55
09ud	Senior Curtain Wall Glazing	0.32	0.55
10ud	Lamilux W110 Glazing	0.51	0.53
11ud			

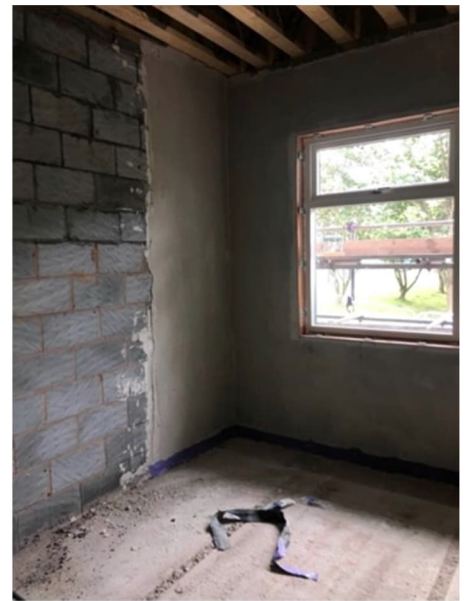




## 9. Description of Airtightness / Beschreibung der luftdichten Hülle

### Airtightness Strategy

- Ground Floor: Floor screed over membrane taped to walls
- Walls: Parge coat to internal face of blockwork
- Roof: Plywood decked with taped joints over engineered joints with liquid applied membrane around joist ends
- Intermediate Floor Connection: Liquid applied membrane to ledge for precast concrete planks, joint in planks grouted
- Window connection: Membrane taped to window bridging reveal and taped to parge coat





<b>Building and Test Information</b>	
Test file name:	<b>Meole Brace School</b>
Building volume [m <sup>3</sup> ]:	<b>2,029.7</b>
Envelope Area [m <sup>2</sup> ]:	<b>1,535.3</b>
Floor Area [m <sup>2</sup> ]:	<b>0</b>
Building Height (from ground to top) [m]:	<b>0</b>

<b>Results</b>	
Air flow at 50 Pa, Q <sub>50</sub> [m <sup>3</sup> /h]	<b>1175.5</b>
Air changes, n <sub>50</sub>	<b>0.58</b>
Equivalent leakage area at 50 Pa [cm <sup>2</sup> ]	<b>188.0</b>
Permeability at 50 Pa [m <sup>3</sup> /h/m <sup>2</sup> ]	<b>0.766</b>

## 10. Ventilation / Lüftungsgerät

A balanced supply / exhaust air system with a highly efficient counter current air-to-air heat exchanger was used. The unit is located in a dedicated plant room with short intake and exhaust runs tot he external wall, both of which are fully insulated. The operation is controlled by time control as well as CO2 sensors to maximise efficient operation linked to classroom occupancy.

Make / Fabrikat Lüftungsanlage	Swegon GOLD RX 25
Effective Heat recovery Efficiency / effektiver Wärmebereitstellungsgrad	84 %
Electric Efficiency / Elektroeffizienz	0,45 Wh/m <sup>3</sup>





# 12. Heating Supply / Wärmeversorgung

## Space Heating

The space heating requirement is delivered by direct electric radiators controlled by thermostats and time controls.

**LEGEND**

DIRECT HEAT HEATER

**NOTES**

1. ALL RADIATORS SHALL BE CONTROLLED BY THERMOSTATS AND TIME CONTROLS.
2. ALL RADIATORS SHALL BE CONTROLLED BY THERMOSTATS AND TIME CONTROLS.
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8. ALL RADIATORS SHALL BE CONTROLLED BY THERMOSTATS AND TIME CONTROLS.
9. ALL RADIATORS SHALL BE CONTROLLED BY THERMOSTATS AND TIME CONTROLS.
10. ALL RADIATORS SHALL BE CONTROLLED BY THERMOSTATS AND TIME CONTROLS.

REF	DESCRIPTION	LOCATION	POWER	WARRANTY PERIOD
R01	CONVECTOR	LOBBY	400W	5YR
R02	CONVECTOR	LOBBY	400W	5YR
R03	CONVECTOR	LOBBY	400W	5YR
R04	CONVECTOR	LOBBY	400W	5YR
R05	CONVECTOR	LOBBY	400W	5YR
R06	CONVECTOR	LOBBY	400W	5YR
R07	CONVECTOR	LOBBY	400W	5YR
R08	CONVECTOR	LOBBY	400W	5YR
R09	CONVECTOR	LOBBY	400W	5YR
R10	CONVECTOR	LOBBY	400W	5YR
R11	CONVECTOR	LOBBY	400W	5YR
R12	CONVECTOR	LOBBY	400W	5YR
R13	CONVECTOR	LOBBY	400W	5YR
R14	CONVECTOR	LOBBY	400W	5YR
R15	CONVECTOR	LOBBY	400W	5YR
R16	CONVECTOR	LOBBY	400W	5YR
R17	CONVECTOR	LOBBY	400W	5YR
R18	CONVECTOR	LOBBY	400W	5YR
R19	CONVECTOR	LOBBY	400W	5YR
R20	CONVECTOR	LOBBY	400W	5YR
R21	CONVECTOR	LOBBY	400W	5YR
R22	CONVECTOR	LOBBY	400W	5YR
R23	CONVECTOR	LOBBY	400W	5YR
R24	CONVECTOR	LOBBY	400W	5YR
R25	CONVECTOR	LOBBY	400W	5YR
R26	CONVECTOR	LOBBY	400W	5YR
R27	CONVECTOR	LOBBY	400W	5YR
R28	CONVECTOR	LOBBY	400W	5YR
R29	CONVECTOR	LOBBY	400W	5YR
R30	CONVECTOR	LOBBY	400W	5YR
R31	CONVECTOR	LOBBY	400W	5YR
R32	CONVECTOR	LOBBY	400W	5YR
R33	CONVECTOR	LOBBY	400W	5YR
R34	CONVECTOR	LOBBY	400W	5YR
R35	CONVECTOR	LOBBY	400W	5YR
R36	CONVECTOR	LOBBY	400W	5YR
R37	CONVECTOR	LOBBY	400W	5YR
R38	CONVECTOR	LOBBY	400W	5YR
R39	CONVECTOR	LOBBY	400W	5YR
R40	CONVECTOR	LOBBY	400W	5YR
R41	CONVECTOR	LOBBY	400W	5YR
R42	CONVECTOR	LOBBY	400W	5YR
R43	CONVECTOR	LOBBY	400W	5YR
R44	CONVECTOR	LOBBY	400W	5YR
R45	CONVECTOR	LOBBY	400W	5YR
R46	CONVECTOR	LOBBY	400W	5YR
R47	CONVECTOR	LOBBY	400W	5YR
R48	CONVECTOR	LOBBY	400W	5YR
R49	CONVECTOR	LOBBY	400W	5YR
R50	CONVECTOR	LOBBY	400W	5YR

LOWER GROUND FLOOR

GROUND FLOOR

The drawing was prepared by Davis Bristol for the client and is not to be used for any other purpose without the written consent of Davis Bristol.

Revised	Date	Description	By	Checked	Drawn
01	2023-07-01	Issue for Construction	P. N.	P. N.	P. N.

Project Name: **DAVIS BRISTOL - BRISTOL - BRISTOL - BRISTOL**

Project No: **DAVIS BRISTOL - BRISTOL - BRISTOL - BRISTOL**

Project Date: **DAVIS BRISTOL - BRISTOL - BRISTOL - BRISTOL**

Project Location: **DAVIS BRISTOL - BRISTOL - BRISTOL - BRISTOL**





### **13. Construction Costs / Baukosten**

The Vanguard Building was constructed partly during the Covid Pandemic (2020 to 2021) which will have had an impact on the construction costs due to restrictions in working and supply of materials. The overall construction cost amounted to £3350/m<sup>2</sup>.

# 14. PHPP Results / PHPP-Ergebnisse

## Passive House Verification



**Architecture:** TACP  
 Street: **Pembroke House, Ellice Way, Wrexham Technology Park**  
 Postcode/City: **LL13 7YT Wrexham**  
 Province/Country: **Wales GB-United Kingdom/ Britain**

**Energy consultancy:** HLM Architects  
 Street: **Suite 2.02, Custom House, Custom House Square**  
 Postcode/City: **BT1 3ET Belfast**  
 Province/Country: **Northern Ireland GB-United Kingdom/ Britain**

Year of construction: **2021**  
 No. of dwelling units: **1**  
 No. of occupants: **168.0**

**Building:** Meole Brace Language Centre  
 Street: **Longden Road**  
 Postcode/City: **SY3 9DW Shrewsbury**  
 Province/Country: **England GB-United Kingdom/ Britain**  
 Building type: **School**  
 Climate data set: **GB0007a-Sutton Bonnington**  
 Climate zone: **3: Cool-temperate** Altitude of location: **75 m**

**Home owner / Client:** Meole Brace School  
 Street: **Longden Road**  
 Postcode/City: **SY3 9DW Shrewsbury**  
 Province/Country: **England GB-United Kingdom/ Britain**

**Mechanical engineer:** Davies Partnership  
 Street: **Cestrian House, Lightfoot Street**  
 Postcode/City: **CH2 3AD Chester**  
 Province/Country: **England**

**Certification:** WARM  
 Street: **3 Admirals Hard, Plymouth**  
 Postcode/City: **PL1 3RJ**  
 Province/Country: **England, GB**

Interior temperature winter [°C]: **19.4** Interior temp. summer [°C]: **25.0**  
 Internal heat gains (IHG) heating case [W/m²]: **3.2** IHG cooling case [W/m²]: **3.2**  
 Specific capacity [Wh/K per m² TFA]: **148** Mechanical cooling:

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

Criteria	Alternative criteria	Fulfilled? <sup>2</sup>
<b>Space heating</b>		
Treated floor area m²	<b>597.2</b>	
Heating demand kWh/(m²a)	<b>13</b>	≤ 15
Heating load W/m²	<b>10</b>	≤ - 10
Frequency of overheating (> 25 °C) %	<b>0</b>	≤ 10
Frequency of excessively high humidity (> 12 g/kg) %	<b>0</b>	≤ 20
<b>Airtightness</b>		
Pressurization test result n <sub>50</sub> 1/h	<b>0.6</b>	≤ 0.6
<b>Non-renewable Primary Energy (PE)</b>		
PE demand kWh/(m²a)	<b>155</b>	≤ -
<b>Primary Energy Renewable (PER)</b>		
PER demand kWh/(m²a)	<b>67</b>	≤ 60 67
Generation of renewable energy (in relation to projected building footprint area)	<b>29</b>	≥ - 8

<sup>2</sup> Empty field: Data missing; '-': No requirement

I confirm that the values given herein 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-Certifier** First name: **Sally** Surname: **Godber**  
 Certificate ID: **41264-41269\_WARM\_PH\_20231208\_SG** Issued on: **18/12/23** City: **Plymouth**

Passive House Classic? **yes**  
 Signature: \_\_\_\_\_

