



Land Adjacent to 29 Milton Park London N6 5QB

Development of a Family Passive House

PH Statement

October 2023

ICE21.273.301.020

ice

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ICE Environmental Policy 2023

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1.0 INTRODUCTION

- 1.1 This document is a Passive House (PH) Design Statement for the proposed development of a single-family house on the land next to 29 Milton Park London N6 5QB.
- 1.2 The proposed scheme is designed as an energy efficient building in line with Passive House standards. It adopts a whole-building approach with clear, measured targets, focused on high-quality construction, intended to be certified through an exacting quality assurance process.
- 1.3 The PHPP (Passive House Planning Package) has been used at early stage of design to ensure it meets high level of comfort and extremely low energy demand.
- 1.4 According to Royal Institute of British Architects (RIBA) Passive house Overlay 2022:
"A Passive house approach can identify opportunities for cost and fabric efficiencies as well as energy efficiencies, raise quality in design and construction, and close energy performance gaps.
...

Good low energy buildings, including those that meet the Passive Houses standard, require us to reappraise the process of building design and construction. By drawing upon the experience of professionals that consistently apply the Passive House standard, we can learn what these projects do differently, understand why it is a model of good practice, and gain an appreciation of how it successfully closes energy performance gaps.

A survey undertaken by the RIBA North-East Sustainable Futures Forum demonstrated that the Passive House design process encourages project teams to consider certain important aspects of design at an earlier stage than the norm. ...".

2.0 BUILDING ORIENTATION.

- 2.1 The building is on three levels, with exposed elevations and North-South axis rotated -356°.

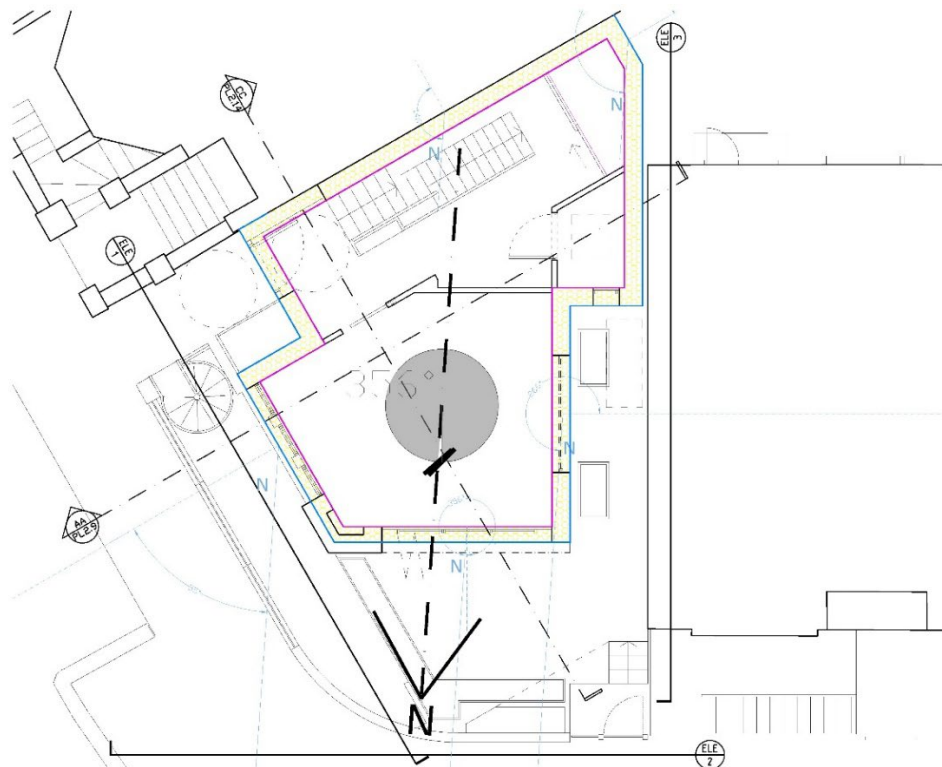


Fig. 01_ Extract from ICE-21-273_PH_Ground Floor Plan_ Building Orientation

- 2.2 The proposed plan layout is for living areas at ground and first floor levels and bedrooms at basement level, all facing North and North-East.

3.0 PH DESIGN PROCESS

- 3.1 The design is compact, actively contributing to the achievement of the PH standard.
- 3.2 The proposal is for an energy efficient envelope of traditional construction of cavity wall with facing bricks and a timber frame roof.
- 3.3 External walls are designed as an ensemble of layers with facing bricks, render and stone lintols and details with continuous insulation wrapping the structure. Reference should be made to the PH detail drawings submitted with the application – see drawing reference – ICE21 273_AA01_PH_Details.

WALL TYPE 1 / INTERMEDIATE FLOOR _ SECTION DETAIL

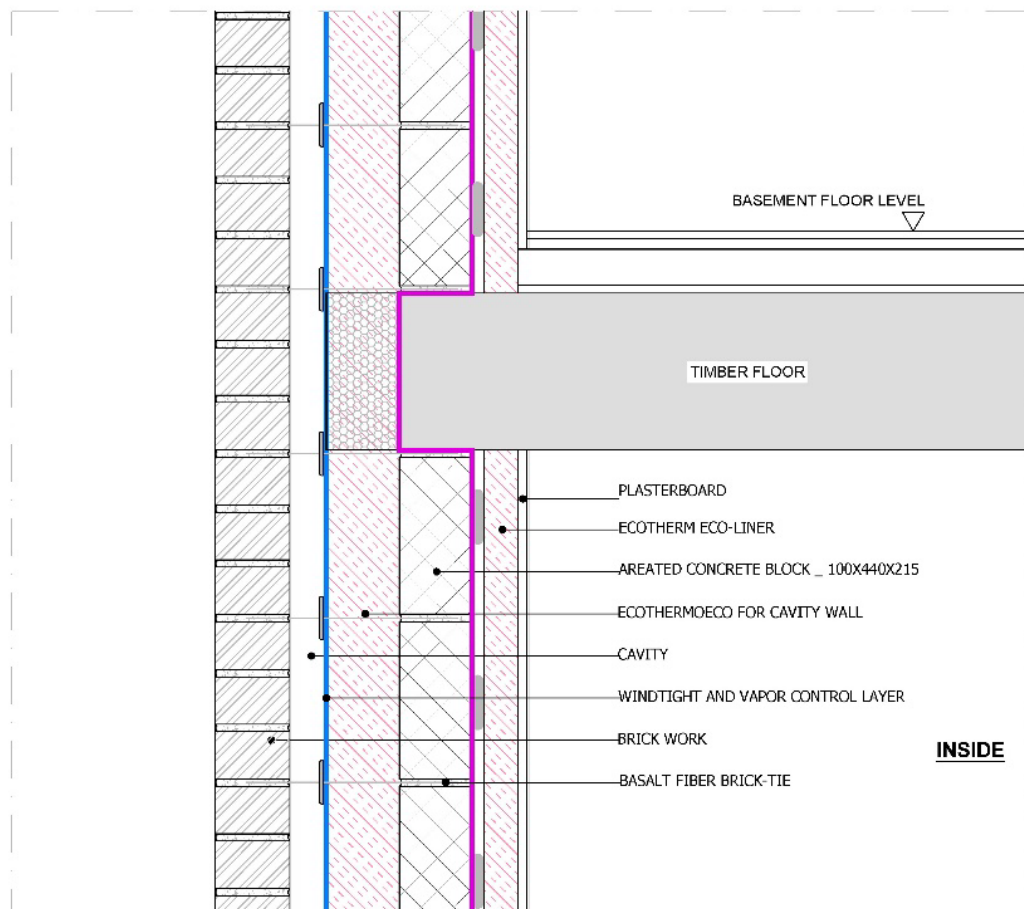


Fig. 02 Extract from AA01

- 3.4 Certified PHI windows and external doors with high performance elements and insulated frames are proposed. Windows and doors are sized to reduce heat loss at the elevations facing North-East and North and to balance solar gains during winter and summer seasons. Correct installation will be verified with airtightness tests and certified as part of the process of achieving the final PH certification.
- 3.5 While external openings ensure continuity of airtightness, internal doors have undercuts to allow constant air transfer, in support of continuous supply of fresh air provided by the heat recovery mechanical ventilation system.
- 3.6 The thermal performance of the proposed construction is set out on the following pages.

U-values of building assemblies

Passive House with PHPP Version 10.4a EN

A SINGLE FAMILY HOUSE / Climate: London (Central) / TFA: 130 m² / Overheating: % / PER: 50.5 kWh/(m²a)

Show special cases and secondary calculations on the right ->

Description of building assembly						Assembly no.	
External Wall - Type 1						01ud	
Orientation of building assembly (or R _{si})		2-Wall		Interior insulation?		X	
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]	
Plaster Skim _ 3 mm	0.180					3	
Plasterboard internal Finish	0.190					13	
Ecotherm Eco-Liner	0.022					50	
Plaster Dabs	0.190					15	
Aerated Block _ 100 mm	0.110					100	
Ecothermoeco-cavity	0.022					100	
Cavity						50	
Brick work						103	
Percentage of sec. 1:		100%	Percentage of sec. 2:			Percentage of sec. 3:	
Heat transmission resistance coefficients				Total thickness [cm]: 43.3			
Interior R _{si} : 0.13 m²KW				U-value [W/(m²K)]: 0.124			
Exterior R _{se} : 0.04 m²KW							

Description of building assembly						Assembly no.	
Roof						02ud	
Orientation of building assembly (or R _{si})		1-Roof		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]	
Plaster Skim	0.180					3	
Plasterboard	0.190					13	
Vapour Control Layer							
Timber Rafter Cavity	0.180					50	
Ecotherm Eco-Versal between Rafters	0.022					100	
Ecotherm Eco-Versal above Rafters	0.022					110	
Breathable Membrane						1	
counterbatten cavity and Tiles/slates						68	
Percentage of sec. 1:		100%	Percentage of sec. 2:			Percentage of sec. 3:	
Heat transmission resistance coefficients				Total thickness [cm]: 34.4			
Interior R _{si} : 0.10 m²KW				U-value [W/(m²K)]: 0.100			
Exterior R _{se} : 0.04 m²KW							

Description of building assembly						Assembly no.	
Basement floor						03ud	
Orientation of building assembly (or R _{si})		3-Floor		Interior insulation?			
Adjacent to (or R _{se})		2-Ground		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]	
Sand Cement Screed	1.400					65	
Airtight Membrane						1	
EcothermEco-Versal	0.022					80	
EcothermEco-Versal	0.022					90	
Sika System HD20 Membrane +CD						20	
Alti-lime Coating							
Concrete 1:2:4 2000 kg/m²	1.400					150	
Damp Proof Membrane						1	
Percentage of sec. 1:		100%	Percentage of sec. 2:			Percentage of sec. 3:	
Heat transmission resistance coefficients				Total thickness [cm]: 40.6			
Interior R _{si} : 0.17 m²KW				U-value [W/(m²K)]: 0.124			
Exterior R _{se} : 0.00 m²KW							

Description of building assembly						Assembly no.	
Partition wall - Type 2						04ud	

Orientation of building assembly (or R _{si})		2-Wall		Interior insulation?			
Adjacent to (or R _{se})		3-Ventilated		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]
Plaster Skim _ 3 mm	0.180					3
Plasterboard internal Finish	0.190					13
Ecotherm Eco-Liner	0.022					50
Plaster Dabs	0.190					15
Areated Block _ 100 mm	0.110					100
Ecothermoeco-cavity	0.022					100
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:		

Heat transmission resistance coefficients Interior R _{si} : 0.13 m²K/W Exterior R _{se} : 0.13 m²K/W	Total thickness [cm]: 28.1 U-value [W/(m²K)]: 0.123
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Description of building assembly						Assembly no.	
Retaining wall Underpinning - Type 3						05ud	

Orientation of building assembly (or R _{si})		2-Wall		Interior insulation?		X	
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]
Plaster Skim _ 3 mm	0.180					3
Plasterboard internal Finish	0.190					13
Ecotherm Eco-Liner	0.022					50
Plaster Dabs	0.190					15
Areated Block _ 100 mm	0.110					100
Ecothermoeco-cavity	0.022					100
Reinforced Concrete	2.100					350
Underpinning, Reinforced Concrete						
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:		

Heat transmission resistance coefficients Interior R _{si} : 0.13 m²K/W Exterior R _{se} : 0.04 m²K/W	Total thickness [cm]: 63.1 U-value [W/(m²K)]: 0.122
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Description of building assembly						Assembly no.	
Retaining wall - Type 4						06ud	

Orientation of building assembly (or R _{si})		2-Wall		Interior insulation?		X	
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]
Plaster Skim _ 3 mm	0.180					3
Plasterboard internal Finish	0.190					13
Ecotherm Eco-Liner	0.022					50
Plaster Dabs	0.190					15
Areated Block _ 100 mm	0.110					100
Ecothermoeco-cavity	0.022					100
Reinforced Concrete	2.100					200
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:		

Heat transmission resistance coefficients Interior R _{si} : 0.13 m²K/W Exterior R _{se} : 0.04 m²K/W	Total thickness [cm]: 48.1 U-value [W/(m²K)]: 0.123
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Fig. 03 External Envelope components and associated U-Values

						Dimensions windows, doors etc.		Installed in	Glazing/panel	Frame
Quan- ty	Description		Deviation from north	Angle of inclination from the horizontal	Orien- ta-tion	Width	Height	Selection from 'Areas' worksheet	Selection list in 'Components' worksheet	Selection list in 'Components' worksheet
	Pos. no.		°	°		m	m		1-Sort as list	1-Sort as list
1	W01	Floor to Ceiling Door - Patio	356	90	North	2.60	2.60	1-External wall North Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W02	Window to Patio	356	90	North	0.50	0.80	1-External Wall North Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W03	Window to Patio	356	90	North	2.16	1.55	1-External Wall North Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W04	Window to Patio	356	90	North	0.50	2.40	1-External Wall North Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W05	Window on Milton Road	55	90	East	2.49	1.70	3-External wall North-East Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W06	Window on Milton Road	55	90	East	1.55	3.20	3-External wall North-East Elevation	02ud-Triple-low-e Kr12	02ud-Wider wooden frame + PU casing
1	W07	Window on Milton Road	55	90	East	0.50	1.55	3-External wall North-East Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W08	Window on Milton Road	55	90	East	2.49	1.55	3-External wall North-East Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W09	Floor to Ceiling Door - Milton Road	55	90	East	2.49	2.60	4-External wall North-East Elevation (Basement)	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W10	Floor to Ceiling Door - Milton Road	55	90	East	2.50	2.60	4-External wall North-East Elevation (Basement)	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
1	W11	Window	266	90	West	2.26	0.80	9-External wall West Elevation	01ud-Triple-low-e Kr08	01ud-Wooden frame + PU casing
2	W12/13	Walkable Skylight - Patio	0	180	North	0.60	1.10	22-Roof- Flat	02ud-Triple-low-e Kr12	02ud-Wider wooden frame + PU casing
1	W14	Glazed Staircase roof	0	180	North	1.27	7.95	22-Roof- Flat	02ud-Triple-low-e Kr12	02ud-Wider wooden frame + PU casing

Fig. 04 Windows schedule

Window orientation	Global radiation (main direction)	Shading	Dirt	Non-perpendicular radiation incidence	Glazing fraction	g-value	Solar irradiation reduction factor	Window area	Window U _a installed	Glazing area	Average global radiation
Standard values →	WWh/(m²a)	0.75	0.95	0.85				m²	W/(m²K)	m²	WWh/(m²a)
North	81	0.87	0.95	0.85	0.71	0.50	0.50	23.1	0.74	16.38	55
East	163	0.58	0.95	0.85	0.75	0.50	0.35	26.8	0.75	20.01	107
South	308	1.00	0.95	0.85	0.00	0.00	0.00	0.0	0.00	0.00	308
West	177	0.83	0.95	0.85	0.55	0.50	0.37	1.8	0.83	1.00	185
Horizontal	259	1.00	0.95	0.85	0.00	0.00	0.00	0.0	0.00	0.00	259
Total or average value for all windows.						0.50	0.41	51.73	0.75	37.38	86

Fig. 05 Windows Orientation and G-Values

- 3.7 The PHPP calculation shows that external shading to prevent solar gain in the summer season is not required because of the orientation of the proposed dwelling and the position of neighbouring buildings.
- 3.8 On site additional measures will be required to ensure airtightness including the sealing of junctions between adjacent materials and between different components (e.g. - external wall and window frame). Service penetrations require sealing by accessories specified by design.
- 3.9 A PH project is thermal bridge free building. Thermal bridges are accurately calculated with PHPP and highlighted on PH drawings, as shown in submitted plans, section and details.
- 3.10 Internal comfort is provided by mechanical ventilation with heat recovery supplemented by an air source heat pump (ASHP) to provide underfloor heating in the winter months. The principle of the PH is that heat losses are reduced so much that a heat load of less than 10W/m² in living spaces.
- 3.11 Generally, in a PH, this is provided by the sun, human occupants, appliances and the mechanical ventilation system - however the PHPP data for this proposal shows that an ASHP will be required as the solar gain in the dwelling is low as a result of the primary orientation to the north and northeast.
- 3.12 The mechanical ventilation system has a heat recovery of 85%, is adjustable and ducted ventilation is provided in all rooms with operational sound level are less than 25 dab(A) at supply air rooms and bedrooms, and less than= n 30 db.(A) at extract air rooms.
- 3.13 A Photovoltaic System of 10m² is integral part of the project, to meet the building regulations and to reduce carbon emissions. It will be installed on the flat roof area and located so as to minimise overshadowing from the adjoining buildings to the south and west.

4.0 DOCUMENT STATUS

4.1 The statement should be read in junction with the following PH drawings:

PL20.1	Basement Plan	1:50@A3
PL20.2	Ground Floor Plan	1:50@A3
PL20.3	First Floor Plan	1:50@A3
PL20.5	Roof Plan	1:50@A3
PL20.11	Section AA	1:50@A3
AA01	Built-up Details	1:50@A3

Fig. 05 PH Drawings List

5.0 AREA SCHEDULE

5.1 The following calculation of areas and volumes were used in the PHPP calculations:

Area input											Building assembly selection			Radiation balance input						
Area no.	Building assembly description	Assigned to group	Quantity	x	a [m]	b [m]	+	User-defined calculation [m²]	User-defined subtraction [m²]	Subtraction window areas [m²]	=	Area [m²]	Selection building assembly / Building system	U-value [W/(m²K)]	Deviation from North	Angle of inclination from the horizontal	Orientation	Reduction factor shading	Exterior absorptivity	Exterior emissivity
	Projected building footprint	0-Projected building footprint	1	x			+	105.00	-		=	105.0	1-Start as list							
	Treated floor area	1-Treated floor area	1	x			+	198.20	-		=	198.2								
	Exterior door	7-Exterior door	1	x	2.35	1.10	+		-		=	2.6	Exterior door	0.70				Radiation balance window frames	0.25	0.60
1	External Wall North Elevation	8-External wall - ambient	1	x	8.06	6.10	+		-	11.7	=	25.9	U1a6 External Wall - Type 1	0.122	358	90	North	0.90	0.60	0.60
2	External Wall North-West Elevation (Basement)	8-External wall - ambient	1	x	4.56	3.20	+		-	0.0	=	14.7	U1a6 Retaining wall - Type 4	0.123	327	90	North	0.90	0.60	0.60
3	External Wall North-East Elevation (Basement)	8-External wall - ambient	1	x	8.27	6.10	+		-	13.6	=	24.4	U1a6 External Wall - Type 1	0.122	55	90	East	0.90	0.60	0.60
4	External wall North-East Elevation (Basement)	8-External wall groundbasement	1	x	8.50	3.20	+		-	13.6	=	7.6	U1a6 External Wall - Type 1	0.122	55	90	East	0.90	0.60	0.60
5	External wall North-East Elevation (Basement)	8-External wall groundbasement	1	x	1.46	3.20	+		-	0.0	=	4.7	U1a6 Retaining wall - Type 4	0.123	55	90	East	0.90	0.60	0.60
6	External wall South-West Elevation (Basement)	8-External wall - ambient	1	x			+	47.50	-		=	47.5	U1a6 External Wall - Type 1	0.122	148	90	South	0.90	0.60	0.60
7	External wall South-East Elevation (Basement)	8-External wall - ambient	1	x	1.41	6.10	+		-	0.0	=	8.6	U1a6 External Wall - Type 1	0.122	148	90	South	0.90	0.60	0.60
8	External wall South-East Elevation (Basement)	8-External wall groundbasement	1	x	9.55	3.20	+		-	0.0	=	31.8	U1a6 Retaining wall Underpinning - Type 3	0.122	148	90	South	0.90	0.60	0.60
9	External wall West Elevation	8-External wall - ambient	1	x	4.56	6.10	+		-	1.8	=	26.0	U1a6 External Wall - Type 1	0.122	286	90	West	0.90	0.60	0.60
10	External wall West Elevation	8-External wall - ambient	1	x	3.05	6.10	+		-	0.0	=	18.6	U1a6 Partition wall	0.123	286	90	West	0.90	0.60	0.60
11	External wall West Elevation (Basement)	8-External wall groundbasement	1	x	8.82	3.20	+		-	0.0	=	26.3	U1a6 Retaining wall - Type 4	0.123	286	90	West	0.90	0.60	0.60
12	External wall South-West Elevation	8-External wall - ambient	1	x	1.11	2.80	+		-	0.0	=	2.9	U1a6 External Wall - Type 1	0.122	236	90	West	0.90	0.60	0.60
13	External wall South-West Elevation	8-External wall - ambient	1	x	2.69	3.60	+		-	0.0	=	8.4	U1a6 External Wall - Type 1	0.122	236	90	West	0.90	0.60	0.60
14	External wall South-West Elevation (Basement)	8-External wall groundbasement	1	x	9.66	3.20	+		-	0.0	=	2.6	U1a6 External Wall - Type 1	0.122	236	90	West	0.90	0.60	0.60
15			1	x			+		-	0.0	=									
16	Roof - Pitched P1	10-Roof/ceiling - ambient	1	x			+	2.22	-	0.0	=	2.2	U1a6-Roof	0.160	358	45	North	1.00	0.90	0.60
17	Roof - Pitched P2	10-Roof/ceiling - ambient	1	x			+	5.53	-	0.0	=	5.5	U1a6-Roof	0.160	26	45	North	1.00	0.90	0.60
18	Roof - Pitched P3	10-Roof/ceiling - ambient	1	x			+	2.27	-	0.0	=	2.3	U1a6-Roof	0.160	66	45	East	1.00	0.90	0.60
19	Roof - Pitched P4	10-Roof/ceiling - ambient	1	x			+	4.11	-	0.0	=	4.1	U1a6-Roof	0.160	146	45	South	1.00	0.90	0.60
20	Roof - Pitched P5	10-Roof/ceiling - ambient	1	x			+	1.25	-	0.0	=	1.3	U1a6-Roof	0.160	239	45	West	1.00	0.90	0.60
21	Roof - Pitched P6	10-Roof/ceiling - ambient	1	x			+	3.42	-	0.0	=	3.4	U1a6-Roof	0.160	286	45	West	1.00	0.90	0.60
22	Roof - Flat	10-Roof/ceiling - ambient	1	x			+	84.64	-	11.4	=	63.2	U1a6-Roof	0.160	0	160	Hor	1.00	0.90	0.60
23	Basement Floor	11-Floor slab / basement ceiling	1	x			+	78.06	-	0.0	=	78.9	U1a6-Basement floor	0.124	0	160	Hor			

Fig. 06 Areas and zones classification

6.0 PH Verification

6.1 The design has been prepared by ICE Architects in-house PH Designer. During construction to achieve PH Certification an independent Certified Passive House Designer will be appointed to independently verified the design and construction.

6.2 PH Certification for ICE Personnel is included below.

Certificate

Passive House Designer



Dr. Wolfgang Feist
64283 Darmstadt
Germany
www.passivehouse.com

Valid until 5th July 2027

Giuseppina Trani

Date of birth: 14th June 1974

is entitled to use the seal below during the five year validity of the certificate and is listed during this period in the list of Certified Passive House Designers/Consultants at www.passivehouse-designer.org

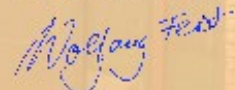
The qualification was obtained according to the valid examination regulations

at: **Passive House Academy / O'Leary, Tomás**

in: **Online exam**



Darmstadt, 5th July 2022

A handwritten signature in blue ink that reads 'Wolfgang Feist'.

Prof. Dr. Wolfgang Feist

This certificate does not qualify the recipient for authentication under public law and therefore does not replace any official authorisation to present building documents.

Fig. 08 Giuseppina Trani Passive House Designer Certificate

7.0 CONCLUSION

- 7.1 The proposal delivers a new family house project, designed to the Passive House standard.
- 7.2 The orientation of the site to the north and east and with higher buildings to the south and west means that an additional heat source is required to provide comfort in the heating season' but as a result of the orientation overheating will not occur in the summer months.
- 7.3 The additional heat source will be an air source heat pump connected to underfloor heating.
- 7.4 The PH design methodology and PHPP analysis tool has been used to design the house up to RIBA Stage 3 for planning submission. Full certification of the PH standard will require an independent assessment of the design and the construction on site.

Document ends.